VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

2.5.4
Re-test and Answer Sheets during Last Five Years

Index

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VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

Velammal Village, Madurai - Tuticorin Ring Road, Anuppanadi, Madurai – 625009.

NAME OF THE EXAMINATION : 1st IA (✓) / 2nd IA ( ) / 3rd IA ( ) / 4th IA ( ) / 5th IA ( ) / MODEL EXAM ( )

SUBJECT OF THE EXAMINATION : Physiology

DATE OF THE EXAMINATION : 27/12/2017 / YEAR : 2017

For College use only

ROLL NUMBER : 19VMCHR1007

SUBJECT CODE :

Total marks = 26/100

Signature of the Candidate

Signature of the Chief Superintendent / Invigilator

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

Signature of the Examiners

1.
2.
3.
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5.
6.
7.
8.

Answered page Number to be filled by the candidate

Q.No.	1	2	3	4	5	6	7	8	9	10
I	1									
II	8	9	10	11	12		1			
III	14	15	16	17	17	18	18	19	20	21
IV										
V										

QUESTION NUMBERS / MARKS

VALUATION

	1	2	3	4	5	6	7	8	9	10	TOTAL
I	5 1/4										
II	1	1/2	0	1/2	0						
III	1/4	3/4	3/4	1/2	3/4	1/4	3/4	1/2	1/4	0	
IV											
V											
										GRAND TOTAL	13

INSTRUCTIONS TO THE CANDIDATE

1) Kindly check whether your register number, subject code etc. printed correctly on the Answer Booklet. If not, please contact the Chief Superintendent.
2) You are prohibited from writing your name in any part of the answer book including the Bar Coded sheet.
3) Write your Register Number, Subject Code etc., in the Bar Coded Sheet in the Column specified Register Number should not be written anywhere else in the answer book.
   Illustrations for Writing Numerals VMCH & RI
4) Verify that given question paper of subject, Regulation, title etc., before answering.
5) Use both sides of the paper for answering questions, in each page not less than 25 lines to be written.
6) Possessions of any incriminating written / printed / Xerox material, calculator, cell phone or any other electronic devices are totally prohibited.
7) Malpractice of any nature is punishable as per college Statutes.
*) Write the answers according to the order in the question paper.
9) Additional sheets are incorporated in the Answer Booklet. Additional booklet should not be used.
10) Write the page number of the written answer in the Tabulator column provided for the candidate.

I Essay:- Blood

1. Erythropoiesis:-

Formation of RBC from bone marrow of the cell. It is also increases RBC count. cells. It also contains many stages in formation of RBC content from ~~foetal~~ life. is also called Erythropoiesis.

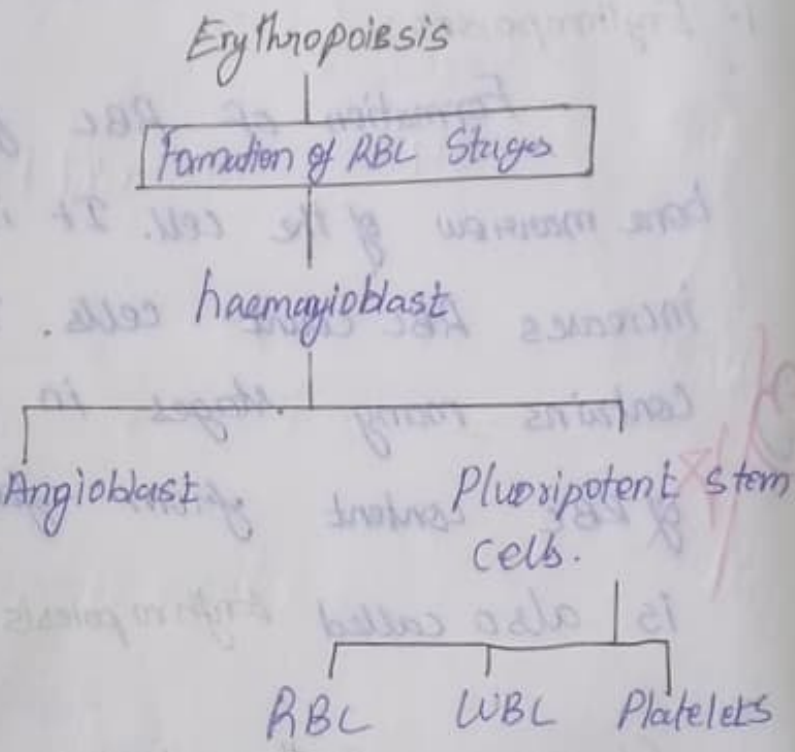
Stages of Erythropoiesis:-

* Mesoblastic stage
* Hepatic stage.
* Myeloid stage

Mesoblastic stage:-

In Mesoblastic stage in before 3 months of foetal life as the origin in Embryo of yolk sac of the yaeolus. In Embryo sac the middle layer of mesoderm origin it regulates

the cells in the stage.



* It is also called as intravascular erythropoiesis.

In this stage the without outlining of the transe membrane. Haemangioblast to the angioblast and pluripotent stem cells. are formed. In Pluripotent stem cells are called as blood cells or blood vessels.

Hepatic stage.

In this stage occurs after 3 months of foetal life from birth. In mesenchyma cells the RBC are Nucleated in the stage arises from. Liver, kidney and spleen.

Myeloid stage:-

In this stage occurs in bone formation. which is caused by formation of bone marrow. In which it synthesis RBC production is known as myeloid stage.

Red bone marrow	Yellow bone marrow.
* The bone marrow is formed in precursor of myeloid and erythroid. also red in colour blood vessels.	* The bone marrow is formed in Precursor of fibres and yellow in colour.
* It is in 'active' form	* It is in 'inactive' form.
* It is found in end of long bone	* It is found in middle of long bone shaft

Cell size.

Stages of erythropoiesis

(i) Pre erythroblast 23-19 Mm

(ii) Post erythroblast 19-16 Mm

Normoblast

~~Normo erth~~

(iii) Intermediate erythroblast 15-12 Mm

(iv) Normo erythroblast 12-7 Mm

(i) Early

(ii) Late.

(v) Reticulocytes 8-7 Mm

(vi) Mature RBC 7.4 Mm

Function :-

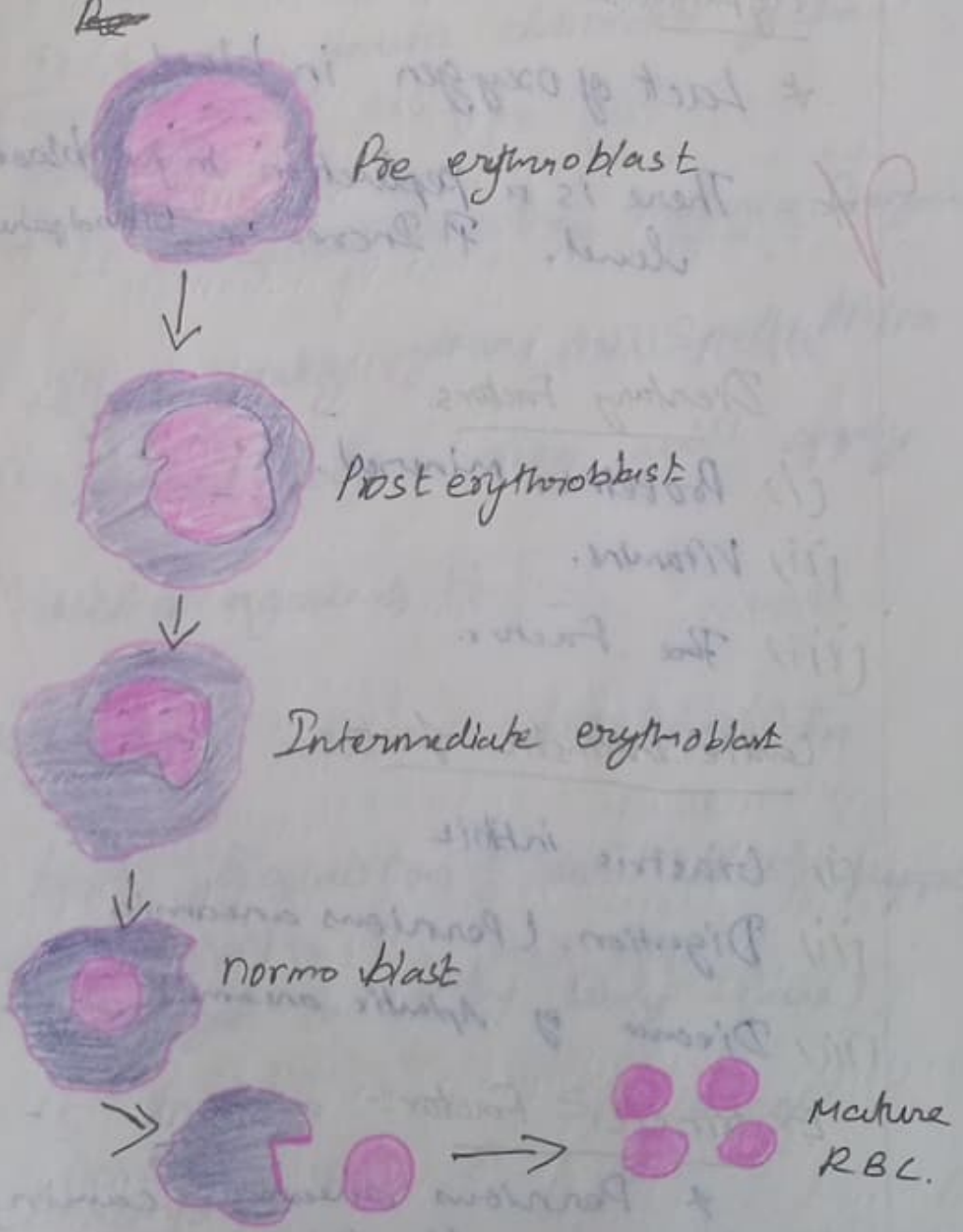
(i) It is very big in size of nucleus

(ii) Becomes small in size in decrease in stages of nucleus.

Increase in the cytoplasm of nucleus. the chromatin is also formed.

(iii) At last stage the destruction of RBC at reticulocyte stage and forms mature RBC content.

Stages of Erythropoiesis



⑥

Regulation of Erythropoiesis:-

General Factor.

(i) Hypoxia.

Regulatory Factor affecting.

(i) Dietary Factor.

(ii) Castle intrinsic Factor

(iii) Extrinsic Factor.

Hypoxia:-

* Lack of oxygen in blood

* There is a depletion in the blood level. Increase blood pressure

Dietary Factors.

(i) Proteins, mineral.

(ii) Vitamins.

(iii) The Factor.

Castle intrinsic factor.

(i) Gastric inhibit

(ii) Digestion. (Pernicious anaemia

(iii) Disease of Aplastic anaemia

Extrinsic Factor:-

* Pernicious anaemia causing the

In the yellowing

Sickle cell Anaemia :-

* In RBC cells which is Sickle in shape. which is so flat cells like a sickle shape.

* It is caused due to the Proteins in blood changes its shape It is the genetic disorder of the following.

* It is caused in the Malaria, Dengue.

* It is mostly found in South Africa in that case they will apply Vaccines against it.

* which also decreases in blood production and less supply of oxygen to the body level. is known as Sickle cell Anaemia.

II

1. Facillated diffusion:-

* It is also a passive transport. It is from the higher concentration level to lower Concentration level.

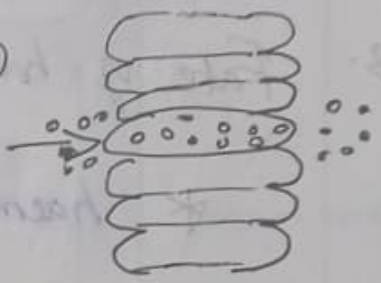
* They diffuses with moderate speed like ions, proteins and molecules.

* It also act as a carrier Protein. to cross across the Cellmembrane, The substance which carry the substance to facilliate to other is called Facilliated diffusion.

* There is also a water channels passes into it (or) ions.

* The water channels namely aquaporins channel to cross the membrane.
* This diffusion contains in an membrane of two particles one divides carries of proteins.

* Uniport (one direction)
* Symport (two direction)
* Antiport (opposite direction)



2. Hematocrit :- $\text{Plasma Volume} = \frac{\text{Hematocrit} \times 100}{100}$

Hematocrit is the RBC of the Pack cell volume (PCV).

PCV is number of amount of RBC in 100 ml of plasma volume.

* Increases PCV causes Polycythemia.
* Decreases in PCV causes Anaemia.
* Treatment of the Ammonium oxalate for is used.

The experment is also called Winrobe's tube method where the down layer of the tube contains RBC and, middle layer of the

Tube contains WBC and upper tube which is yellowish colour shows serum plasma cells are in Floating state.

3. Fate of haemoglobin after hemolysis:-

* haemoglobin of Red bloods cells

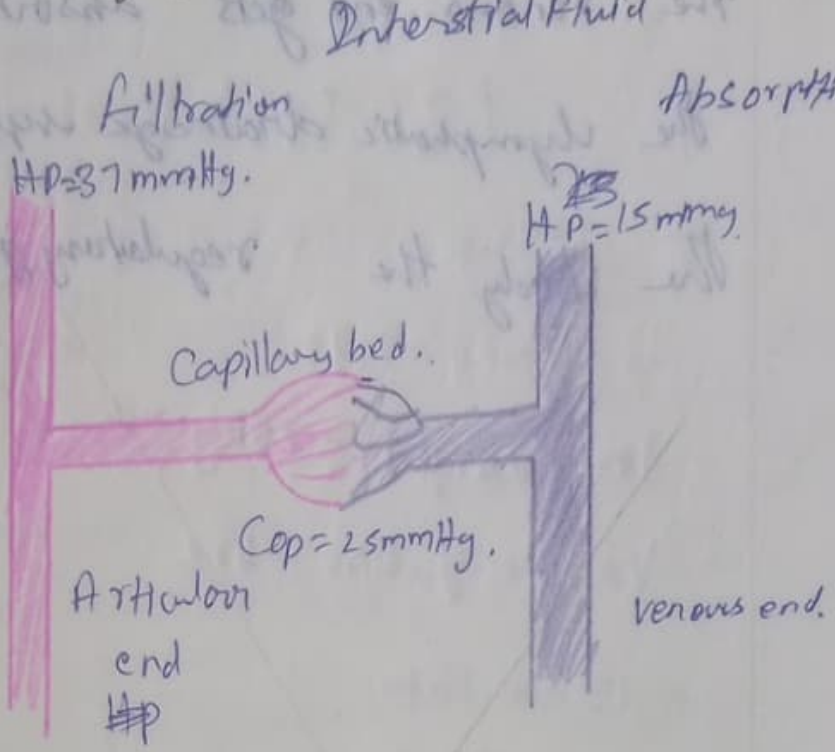
haem - Iron content RBC
globin - Protein.s. Antibody.

* In which, Bilirubin is Converted into Biliverdin with respective enzymes.

* haemolysis mainly used in the treatment of Renal failure & liver which is also called Fate of haemoglobin after hemolysis.

(11)

4. Function of plasma proteins.



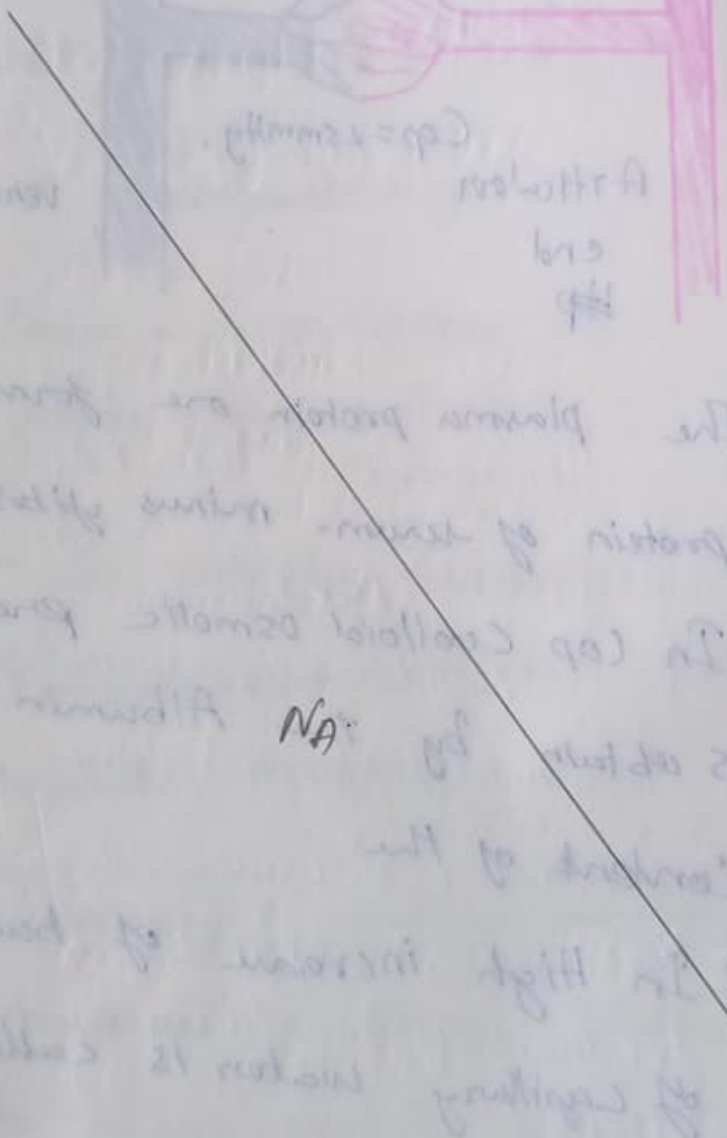
* The plasma protein are formed in all protein of serum. minus fibrinogen.

In Cop (colloid osmotic pressure) it's obtain by the Albumin protein content of the

* In High increase of balance of capillary water is called, Starling force which causes edema in our body.

* Hydrostatic pressure increase filtration Cop absorption is 85%.

The venous end gets absorbed by the lymphatic drainage system of the body the regulatory pore.



III very short answers :-

1. Measurement of Total body water. (TBW).

In young adult

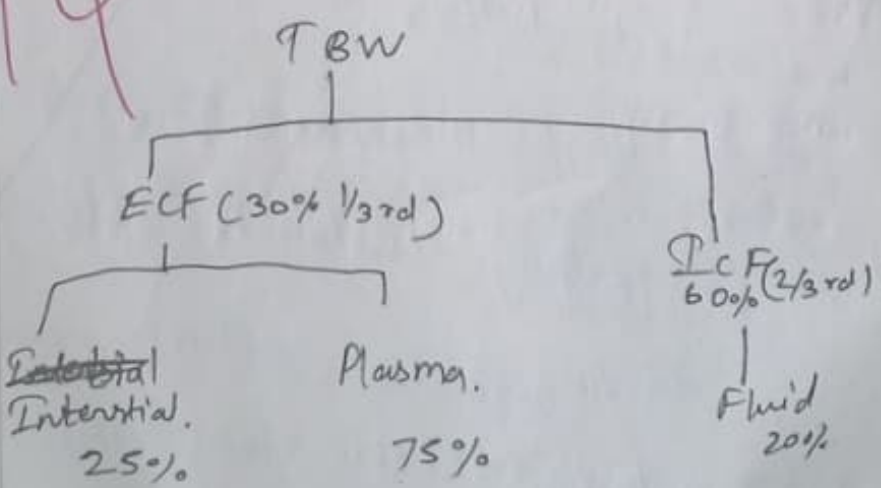
body weight - 70kg.

Volume of litre - 42L

* 15% Fat
* 18% Protein.
* 7% Plasma
* 60% total body water.
* 8% minerals.

ECF 1/3rd. ICF 2/3rd

1/4



TBW = weight of the body × Volume of litre in body

2. a) RBC's swell when kept in hypotonic solution.

The size of RBC is Bioconcave Spherical shape which is kept in hypotonic solution. The concentration inside outside the gets fully swollen and the RBC swell.

b). Oral Rehydration Therapy (ORS).

when diarrhoea. it helps to reduces the acid substances in our stomach to reduces the diarrhoea. ORS is also Contains glucose molecules to give excess of water to body when diarrhoea causes loss of water in our body.

3. GAP Junction:-

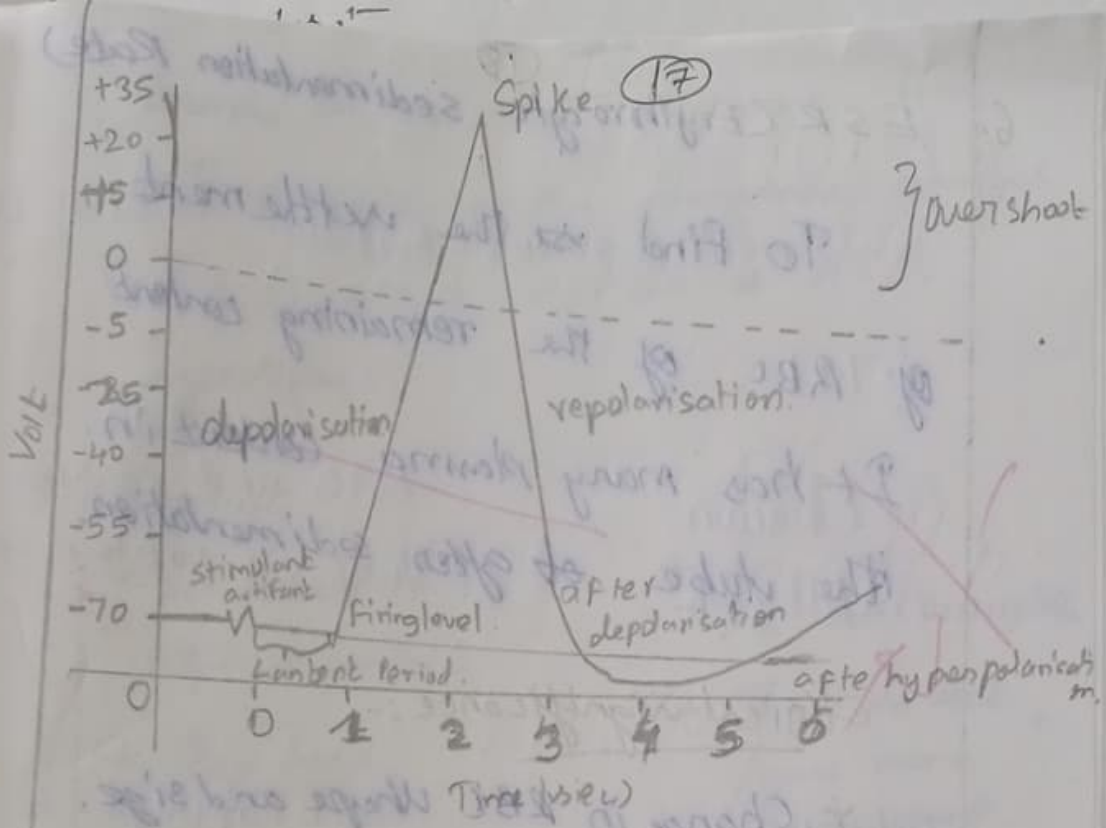
GAP Junction in which the large macromolecule substances are passed into it and some ions also. They are to prevents leakages and fast transport between them.

* Tight Junction.
* Adherring Junction.
*

4. Action potential:

+ Action potential is which causes changes in cellmembrane Potential difference of excitable is called Action potential.

* It is act in mvsdes and nerve cells.



5. Millieu interior :-

* It is the internal environment of the blood which is in Extracellular fluid.

* It also maintain the constant body temperature.

* It is of the millieus interior changes happened in our body part.

* In cop to change the Colloid osmotic pressure of (or) hydrostate pressure.

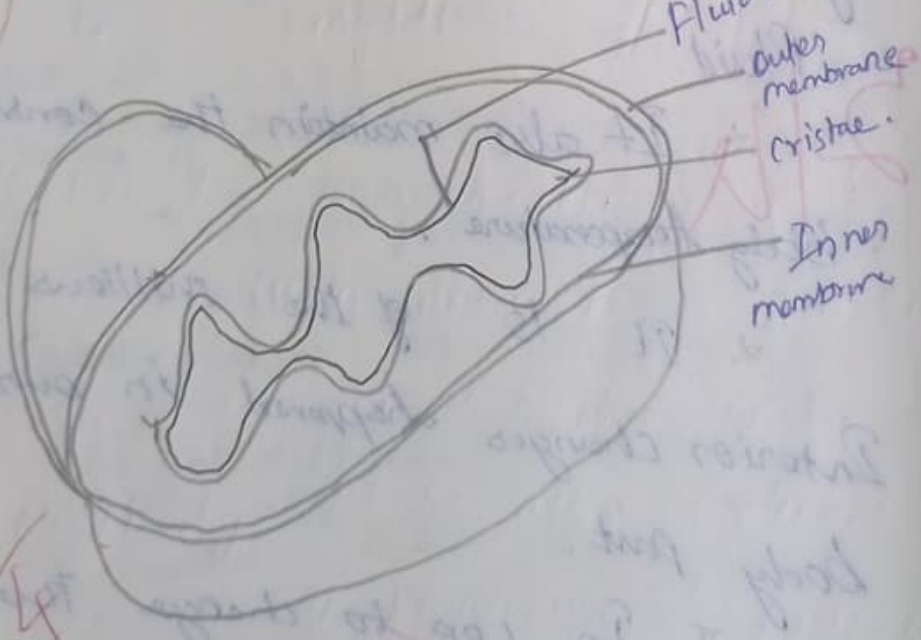
6. ESR (Erythrocyte sedimentation Rate)

To find the settlement of RBC of the remaining content

It has many plasma content in the tube after sedimentation.

Clinical significance :-

* Change in RBC shape and size.
* Sickle cell anaemia.
* Malaria.



Mitochondria is a power house of cell. It contain Stain called Janus green. In matrix krebscycle.

forms. In cristae it forms the (19)
TCA cycle of n. phosphate groups.
* It is also act as a ATP.
synthesis.

8.

Adult	Fetal
* In Adult It is 12g - 18 gm/dL	* In fetal it is 16 - 20 mg/dL
* They have more Iron contents in blood	* They do not have more Iron content.
* They have less oxygen and RBC.	* They have more oxygen and RBL.
* The Pt has less Antibody in Hb.	* It is has more Antibody in Hb.
* Pt is 4.5 to 5 million U/L RBC are there.	* Pt is 5-6 million U/L RBC are there.
* The Adult is very less intake of orgen.	* Pt is very more intake of orgen.

9. Albumin : Globulin Ratio

* Albumin and Globulin Ratio is 1.7:1

Functions.

Albumin — Binds and carries.

Albumin — They are protein content

Globulin — Precursor to Fibrinogen

Prothrombin — Precursor to Fibrin.

* Globulin normal plasma concentration is 2-3 mg/dL.

10. Positive Feedback mechanism:-

When there is a sudden change is arised to due to the Antibody. It is also a direct formation of physiological process. is called Positive feed back mechanism Its various parts

→ to be continued.

Examples:-

* Blood regulation method
* Hormonal regulation method.

3/2/18

Class test - II

I Essay :-

1. Define blood pressure

Blood pressure is defined as B.P of Pressure exerted on Lateral walls of in the arterial blood pressure is kno Blood pressure. Normal blood pressure will be 120/80 mm Hg

Systolic Bp :- 120 mmHg
Diastolic Bp :- 80 mm Hg.

Factors Affecting Arterial Blood pressur

The B.p of arterial is the function Part of Cardiac output (co) and (P) pheripher resistance. The venous return (VR) increase (co) Cardia output increases and pheripherall resistance also increases.

1. Age :-

When the Age increases blood pressu increases by advancing. Therefore, Card

output also increases. B.p on Age is determined. which are more in adult is above

Age	B.P.
15 days	: 70 mmHg Systolic B.P
30 days	: 80 mmHg Systolic B.P.
12 years	: 105 mmHg SBP: DBP - 50mmHg
17 years	: 120 mmHg SBP: DBP 60mm Hg
60 years	: 140 mm Hg SBP: DBP 80mmHg.

140/80 mmHg. which cause Hypertension, myocardial infarction.

2. Sex

In Females, B.p is lower 4-5 mmHg during menopause stage. It is lower than male B.p.

3. Body built.

The body posture of B.P is been regulated by the arm of the brachial artery. The leg of femoral artery which cause our body to the exercise Posture to buil the body and reduces the B.p and cardiac out also. The

Pheripheral resistance also increases.

4 Climate :-

(i) Barrier to warm climate via hypothalamus of sensing of the brain receptor

(ii) Barrier to cold climate :- via hypothalamus of ~~long~~ sensing of the brain receptor.

5 Meals :-

The food we take also gets the maintain normal blood pressure.

There are Gravity, body postures, Diurnal variation and Postures.

Value of normal B.P pressure :-

B.P	Definition	Value
Systolic pressure	The Maximum Poessure exerted On the Systole	120 mmHg
Diastolic Pressure	The minimum Pressure exerted on Diastole	60-70 mmHg
Pulse pressure	The difference between Systole minus	40 mmHg.

	diastole. PP = S - D	
Mean blood pressure	MBP is equal to Diastolic B.P in addition of 1/3rd of Pulse Pressure. MBP = DBP + 1/3 PP	95-100 mm Hg

Regulation of arterial blood pressure:-

It regulates the arterial b.p on the Cardia out. The main aim is the rate mean blood pressure to be maintain in the Cardiac output is classified into 4 Mechanism.

(i) Rapid short-term regulatory mechanism.
(ii) Intermediate term regulatory mechanism.
(iii) Long term regulatory mechanism.
(iv) Miscellaneous mechanism.

Short-term regulatory mechanism:-

* This regulatory mechanism is few seconds to few minutes response is activated.
* The duration is very short of decreases in blood pressure. Which is coincides with cardiovascular system.

CVS classified into 3 response

(i) Baro receptor reflex
(ii) Chemo receptor reflex
(iii) CNS Ischemia

∴ the bodden injury in body activates. Due to low B.P in arterial it helps to increase and maintains to normal pressure is named as baro receptor reflex

ii) Baro receptor reflex. :-

It's normal value is 60-200 mg. There is no discharge of blood pressure. There is no decrease in B.P to regain into normal level.

(i) Less inhibition of VMC (Vaso motor Centre)
(ii) Less stimulation of CVC. (Cardia Vagal Centre)

The decrease and stimulate the VMC and CVC in the medulla oblangate of the brain.

It also regains the 2/3rd level of B.P. Volume

(iv) Chemo receptor reflex:-

* It's normal value of B.P is 40-100mg. This cause the ~~2/3BP~~ 2/3rd level of B.P volume to be regain the normal level.

* There is chemical stimulated receptor of vmc and cvc. ~~Incre~~ Decreare in P_{O_2} and Increare in P_{CO_2} to carotid sinus and aortic areh. which regain to the normal ~~and~~ o to maintain B.P.

(iii) CNS Ischemia:-

It's value is below 50 mm Hg. of b.p also stimulates both vmc → CNS Ischemia → accumulation in Bp → Maintains its normal level of Bp level of the body of the short term. is determined. It is highly risk to activate the response after very low b.p of about below 40mm Hg.

(ii) Intermediate regulatory Mechanism:-

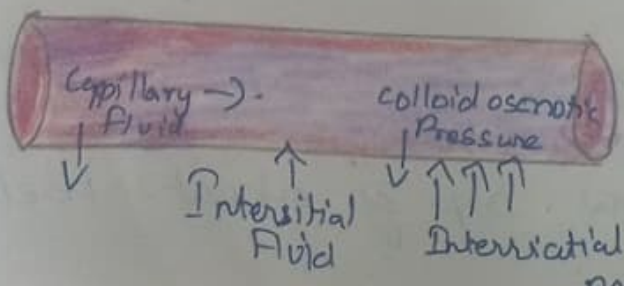
This mechanism is to regulate from few minutes to few hours. Decrease b.p of arterial vessels. This will help to increase for an hours to maintain its normal b.p.

Thus into two mechanism :-

(i) Capillary shift fluid mechanism
(ii) Stress relaxation (or) reverse relaxation

Capillary fluid shift mechanism :-

The capillary fluid in the B.p is decreased. The hydrostatic Pressure increases at arterial end pressure is exerted. Where the capillary fluid is lateral walled.



They may also present at the increase in B.P of capillary gets narrower. To give normal B.P.

Stress relaxation & reverse stress relaxation

This B.P may increase in the functional part of the body tissue to the stress relaxation. In liver, kidney, brain etc to back to its normal stress relaxation method.

Thus B.P is decreased in the body the stress relaxation comes back to its normal level process is called reverse stress relaxation.

(iii) Long term regulatory Mechanism:-
(kidney).

This mechanism forms from the few hours (or) 3 to 10 days to get back to its normal level. It is mainly kidney is classified into two * Direct mechanism
* Indirect mechanism

(i) Direct mechanism:-

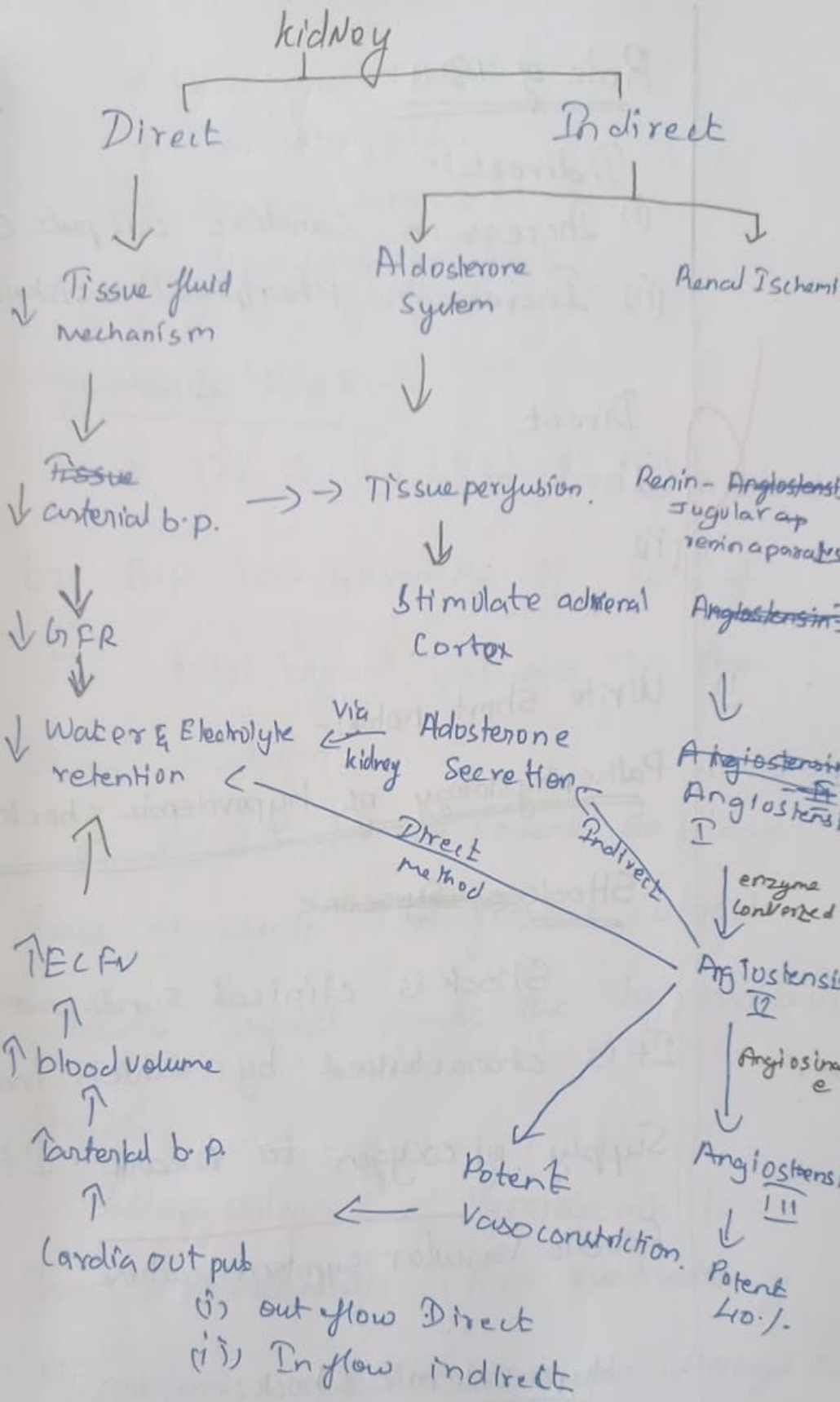
which keep control of normal blood volume of Tissue fluid mechanism is called Direct mechanism.

(ii) Indirect mechanism:-

which keeps control of the hormones secreted through the kidney part is called indirect Mechanism.

(iv) Miscellaneous mechanism.

The sympathetic ~~and~~ nerves and parasympathetic nerves of kidney



Long term blood B.P mechanism in kidney.

Role of ADH:-

Indirect:-

(i) Increase in cardiac output (CO)

(ii) Increase in Pheripheral resistance (PR)

Direct

(i)

(ii)

II Write short notes:-

1. Pathophysiology of hypovolemic shock.

Shock ~~or Syncope~~

Shock is clinical syndrome. It is characterised by which Inadequate supply of oxygen to heart. It is Cardio vascular system failure.

Hypo volemic shock:-

~~It is also called Shock~~

* It is also called cold shock

Hypovolemic shock is classified into

* Haemorrahge shock.
* Traumatic shock
* Surgical shock
* Dehydration shock.

Hypovolemic shock:-

* It is due to mild moderate to B.P 10-40mmHg of 30% of the total blood volume. in the blood circulation.

* It is to severe blood loss of up to 100% of total blood volume which cause the hypovolemic shock.

Pathophysiological of Hypovolemic is:-
The b.p decreases the activation of

Hypovolemic shock is operated through the to total blood volume. This cause will be due to the contro of to

~~the ~~

3. Factors regulating cardiac output:-

Cardiac output:-

The amount of blood pumped out by each ventricle into circulation. Per minuted is called Cardiac output

Ex. 75 beats permin. Normal value range:- 5-6 Litres/min.

Cardiac output (CO) = HR x SV.

↓ Heart rate ↓ Stroke volume.

Control of Cardiac output:-

* Heart rate control extrinsic auto regulation.
* Stroke volume control intrinsic auto regulation

Hemodynamic auto regulation:- (Extrinsic)

It is an Cardiac innervation and located in centre of medulla and has a VMC, CVC ~~etc~~. as receptors

Heterometric regulation:-

Intrinsic:-

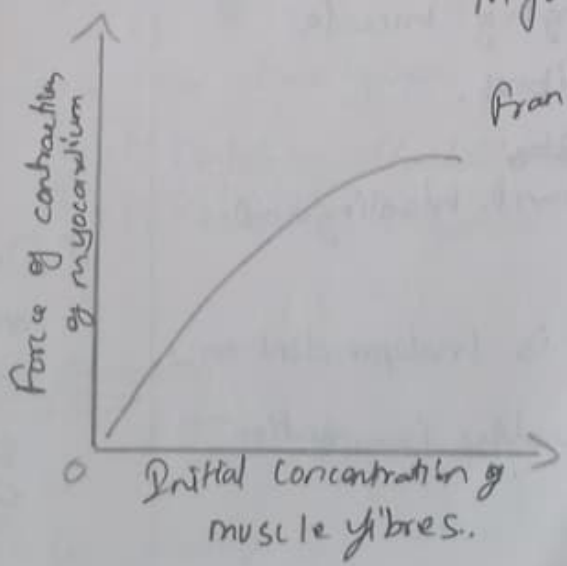
The force of contraction of the myocardium of a) Pre load b) after load.

* Preload is to the degree of the maintainance of the blood pressure.
* After load is the resistance against the ventricular pumping the blood.

The extend of preload results and the tension in cardiac muscle is developed. The length tension is relationship is known as Frank starling law.

Myocardium stretch

Frank starling curve.



The extent of preload., amount of blood into each ventricle in End diastolic Volume (EDV). Blood volume is remain into the ventricle. They may increases the EDV. The more will be EDV, the more will be the End systolic ~~Pro~~ volume.

~~Factors effe~~

Heterometric	Homometric autoregulation
* Hetero - difference. metric means measure. The force of contraction of ventricular muscle fibres. The initial length of muscle fibres. ~~Star~~ (Frank Starling law). It is independent on Cardiac innervation.	* Homometric regulation is independent on the force of contraction of muscle fibres. * It is dependent on cardiac innervation. Stimulate increase Sympathetic stimulate in Parasympathetic myocardial.

Factors affecting Venous return:-

Respiratory pump:- It is decrease in in expiration is sub atmospheric -2 mmHg.

During Inspiration,

* Intra thoracic pressure is ~~high~~ low decreases to -5mm Hg..

* descent of diaphragm, the pressure decrea blood squeeze out of the abdomen

Cardiac pump:-

The ~~Vasa~~ -

(i) Vis-a-vertigo. form behind. (wind kessel vessels)

(ii) Vis-a-fronte. formed towards blood capillaries.

This has two types.

(i) Ventricle diastolic suction.

(ii) Ventricle systolic suction

Muscle pump:-

The rhythmic contraction of muscle pump is due to the increase Contraction of muscle fibres.

Capacitance of venous system.

* The venous return decrease, the veins in the cappillaries.

Body posture :-

Body standing, cause Pheripheral blood pooling causes the posture.

Ventricular Compliance :-

↓ Venous return and ↓ Ventricular Compliances.

Homometric regulation :- (extrinsic).

* It the increase without increase in ~~myo~~ force of contraction of myocardium. which differs from initial length of muscle fibres.

* Increased myocardial contractility.
  * circulating catecholamines.
  * Sympathetic stimulation to nerve.
  * Drugs like, Xanthanine, Caffein Glucagon, ∞, Digitalis etc.

Decreased myocardial contractility:-

* By MI (myocardial infraction).
* Parasympathetic stimulation to nerve
* Drugs like, Procaindane, Barbiturates

Factors affecting Mycardial Contractility:-

(i) Catecholamine, anti B-antigens.

* Ca^{+2} influx to bind to troponin C.
* The active transport of calcium.

(ii) Stimulation of sympathetic nerve changes the rhythm and Heart Rate.

(iii) Xanthenin eg:- caffeine.

(iv) Digitalis. as drug.

decreased by

* Stimulation of Vagus nerve.
* myocardial depression.
* myocardial infraction.
* hypocapnea, hypotension.
* Pharmalogical method.

5. Cardiac cycle.

The change of ~~pressure~~ pressure in sequence in ~~flow~~ pressure and blood in ~~blood~~ heart Chamber and subsequent change In between 2 Cardiac Contraction is called Cardiac cycle.

Artrial systole :- (0.1) sec.

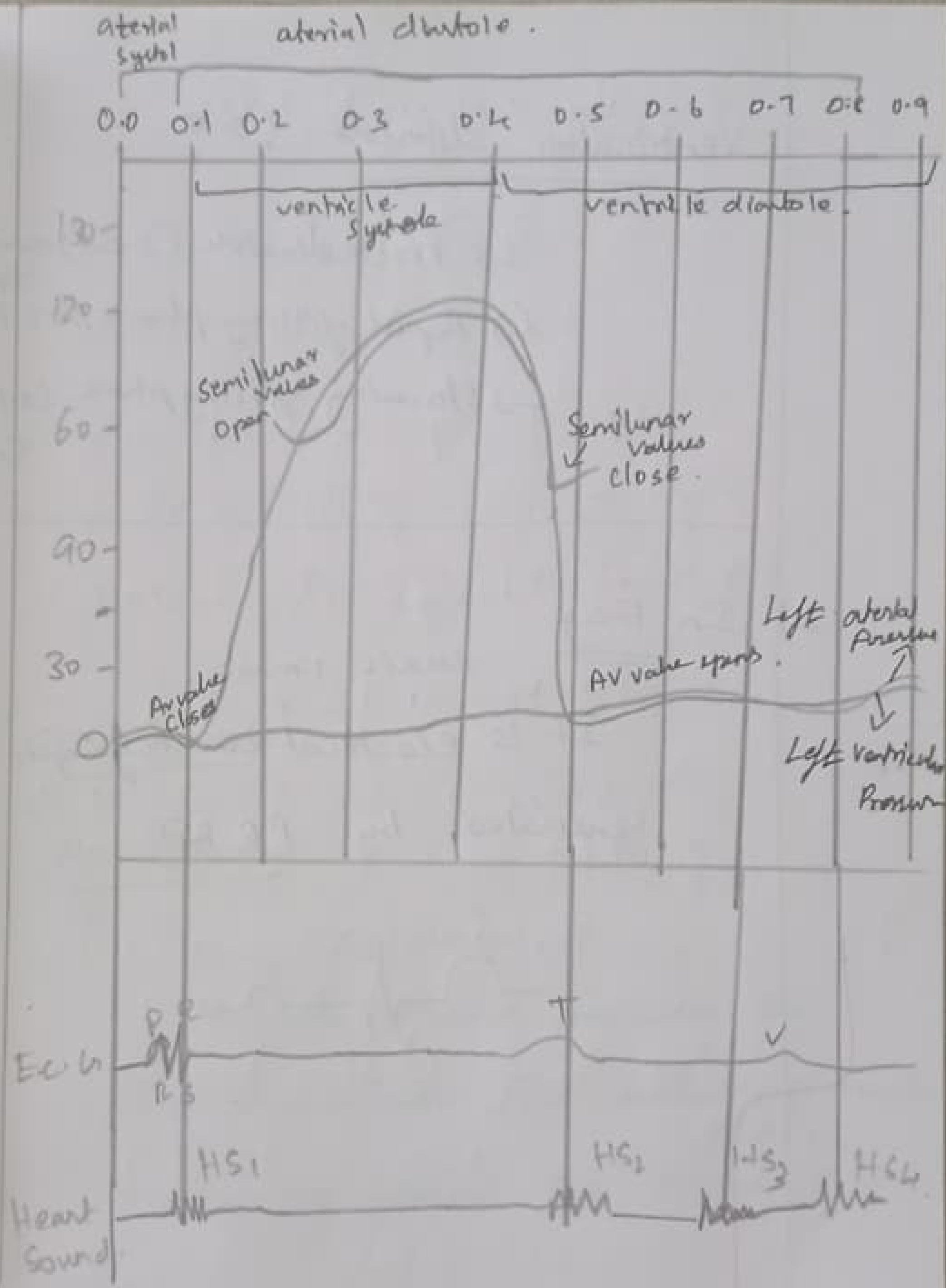
The atrial muscle Contraction -> the and ~~Right~~ left atrial contraction 4 to 6 mm Hg and Right atrial Contraction 7 to 8 mm Hg

The approx additional of 30 ml of blood is injected into ventricle. The total ventricle of 130 ml of during its relaxation Phase.

Ventricle ~~diastole~~ systole :- (0.3)

Where the closure the AV valves with production of ~~Sec~~ First heart Sound

* During its value is called as the Iso ~~metric~~ volumetric contraction phase (0.05) sec.



~~Ves~~ ~~aterial~~. Systole
~~Ventricle~~ ~~diastole~~ :- (0.5) Sec
Ventricle

↳ Iso volumetric contraction phase (0.05sec).

↳ Rapid ejection phase (0.1sec).

↳ Summit

↳ Slow ejection phase (0.15sec)

Ventricular diastole. (0.8 sec)

↳ Protodiastole (0.04 sec) when HS_2 appear.
↳ Rapid filling phase. (0.1 to 0.2 sec)
→ Slowing filling phase. (0.12 to 0.8 sec)

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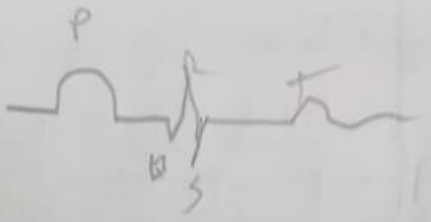
2) In Ecg

Lexis 1 mm

It is electrical cardiogram generated by P Q R S T

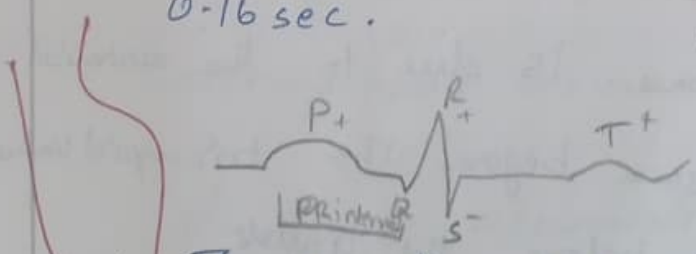


II Short notes:-

1. PR Interval.

The PR interval is

* The 'P' wave indicates the atrial repolarisation. Plus conduction of bundle of His.
* In PR interval the wave Q is absent.
* The normal duration is 0.12 sec to 0.16 sec.



* The more than 0.2 sec, indicates the delayed conduction of bundle of His.
* The less than 0.12 sec which has

Probably arisen to AVN

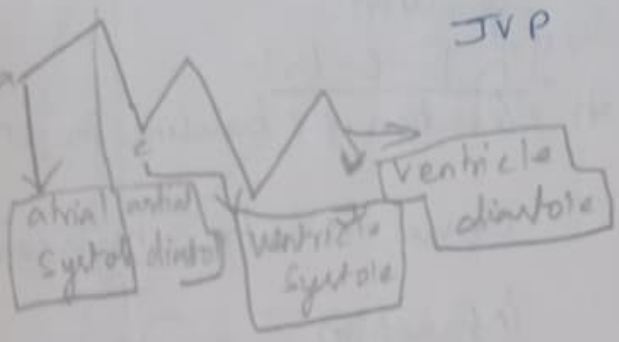
2. Jugular venous pulse.

There is no valve at the Junction of superior venaecava and right atrium. Where the right atrium changes transmitted to Jugular vein in the neck.

'a' wave is due to atorial systole. of which the SVC and IVC gets Contracted in in first 0.1 sec arterial pressure increases.

'C' wave is due to Ventricular systole. where the arterial bulging of Tricuspid valve in It occurs in Isometric Ventricular Contraction phase.

'V' wave. is due to the arterial Pressure before the tricuspid valve opens before the Diastole.



3. Ejection fraction:-

The amount of blood ejected into Per stroke at rest 70-80ml is called Stroke volume. 65% End diastolic Volume (EDV) is (120-140 ml) remains and leaves approx 50ml in the each ventricle of End Diastolic volume. It is a valuable measure of ejection fraction. It is 65% of EDV.

4. E.C.G changes in heart

Myocardial Infarction

↓

Coronary heart disease (MI).

↓

'P' wave is accumulated in E.C.G graph.

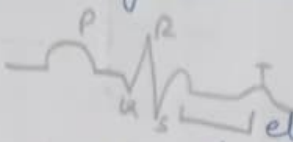
↓

It is determined on the baseline of ST segment. of elevation (or)

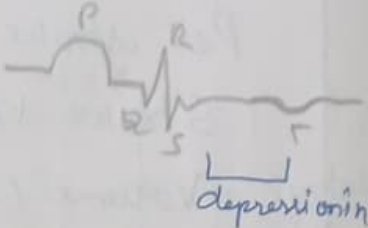
depression.

In E.L.B:-

* elevation of baseline in ST segment cause acute myocardial infraction.



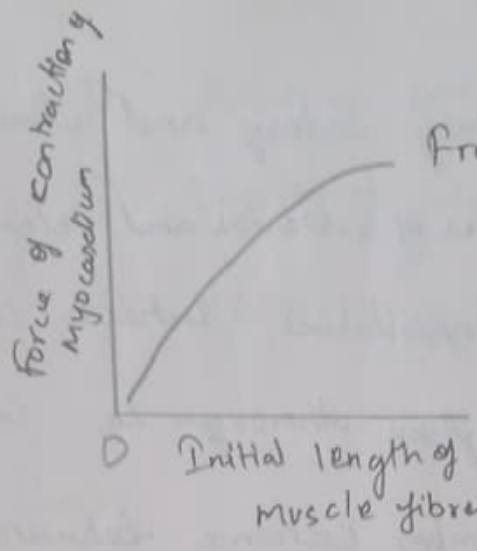
* depression of baseline in segment cause myocardial Ischemia.



* It may also cause the STMI and Sudden death cases.

5. Frank Starling law:-

The extent of pre-load. and the tension develops in Cardiac muscle & The is directly to the Initial length tension relationship is known as frank starling law.



6. Triple response of lewis.

It is due to the

1. Red 2. flare 3. wheel.

injury in the skin tissue of body. Precapillary of the blood vessels present in skin.

(i) Red line :- (injury of red blood line).

(i) Polypeptide eg:- Bradykinins.

(ii) Histamine.

~~Flare~~

~~Flare~~

7. Wind kessel effect :-

They are vessel caused by elastic recoil. (wind kessel reservoir). Eg: aorta, Pulmonary artery., and their large branches.

The rise intermitted ~~be~~ at each heart beat 70-72 beats per/min. The pressure and blood flow in the ~~large~~ aorta,

Pulmonary artery and their large branches of arteries and veins thorough the cappillaries which converts into steady flow thorough the cappillaries of maximum exchange between the aorta and pulmonary artery.

* The elastic recoil of aorta changes the cardic contraction and the produces the aorta and back to its orginal Position of this effect.

8. Reynold's number :-

To find out the blood flow turbelance and it is noisy flow. Where it is occurs in all over the atria and ventricles of the Chest. and Laminar.

$$RN_E = \frac{\rho D v}{\eta}$$

⇒ morethan 3000 is turbelance
more than 2000 is laminar flow
less than 2000 is normal flow intermediate.

P = Roent of concentration of blood.

D = Density of blood volume.

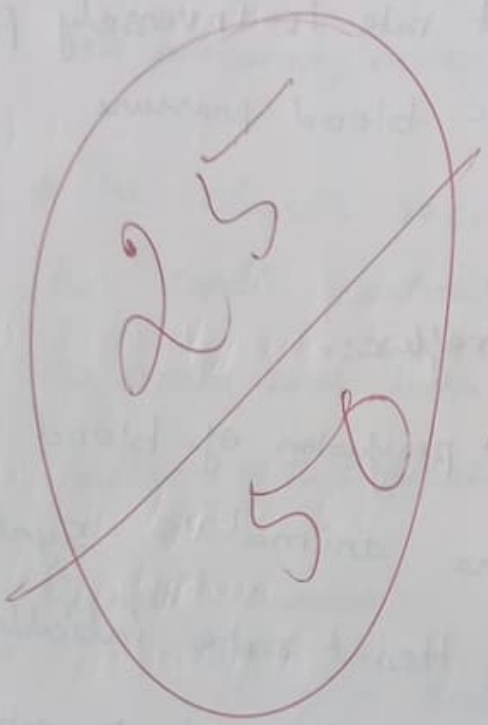
v = velocity of blood volume.

9. Mary's law :-

Heart rate is inversely proportional to Systemic blood pressure.

10. Brain bridge reflex :-

Rapid perfusion of blood in the reflex. The animal is synthesised the rise in Heart rate initially it is in slow rate. Arterial receptor of both side of each heart is pulsatile. The ejection of heart pulsatile the distension of the pulmonary vena caval orifice or distension LA of Pouch. Distension of the superior vena caval right artery produces the reflex tachycardia. It is called brain bridge reflex.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NAME OF THE EXAMINATION : 1st IA ○ / 2nd IA ○ / 3rd IA ○ / 4th IA ○ / 5th IA ○ / MODEL EXAM ○

SUBJECT OF THE EXAMINATION : Community Medicine internal assessment.

DATE OF THE EXAMINATION : _____ / YEAR :

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ROLL NUMBER : 88 V M C H & R I 2016

SUBJECT CODE :

K Hari Raj
Signature of the Candidate

Signature of the Chief Superintendent / Invigilator

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Q.No.	1	2	3	4	5	6	7	8	9	10
I	1	4								
II	8	9	11	12	13	14				
III	15	15	15	15	16					
IV										
V										

QUESTION NUMBERS / MARKS

VALUATION

	1	2	3	4	5	6	7	8	9	10	TOTAL
I											
II											
III											
IV											
V											
										GRAND TOTAL	38

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to long essay:

1) Dengue syndrome:

Epidemiology

* Dengue syndrome is caused by Aedes mosquito. (Mostly by Aedes aegypti)

* It is transmitted by the bite of infected Aedes mosquito.

* Incubation period 2 to 3 weeks

* It is world wide in distribution. more prevalent in India, Africa and Asian countries.

* It is a tropical disease

* Causative agent - Dengue virus I
Dengue virus II
Dengue virus III
Dengue virus IV

* The mortality is 1-5% without treatment

* It infects about 50 to 100 million people world wide.

* With 12,500 to 30,000 deaths

* Travellers returning from dengue epidemic area are unlikely to have dengue.

Medical management of dengue hemorrhagic fever.

* Blood transfusion (mainly plasma)
* Correction of dehydration by IV fluid (Plasma expanders) (colloids)
* Antipyretics.
*

DHF I & II

↓

Normal saline / Ringer lactate : 7ml/kg/hr.

↓

Assessment at 1hr : Vitals and hematocrit level.

↓

No improvement.

↓

NS/RL 10ml/kg/hr.

↓

Assessment at 2hrs.

↓

No improvement.

↓

NS/RL 15ml/kg/hr.

↓

Assessment

Improvement

↓

Ringer lactate 5ml/kg/hr

↓

further Improvement

↓

Ringer lactate 3 ml/kg/hr

↓

continue IV fluids until stable.

↓

No improvement

↓

colloids

↓

No improvement.

↓

Look for anemia, Myocardial dysfunction and treat accordingly.

↓

Discharge when stable

2. a) MCH Indicators:

1. Maternal Mortality Ratio
2. Stillbirth Rate.
3. Perinatal Mortality Rate.
4. Neonatal Mortality Rate.
5. Post Neonatal Mortality Rate.
6. Infant Mortality Rate.
7. Infant child Death Rate.
8. Under 5 Mortality Rate.

Janani Suraksha Yojana:

* A safe motherhood intervention replacing National Maternal benifit scheme.

* 100% Centrally sponsored.

* Includes cash assistance with
① delivery
② post delivery care

Vision:

→ To promote Institutional deliveries.

→ To Reduce overall

* Maternal Mortality Rate
* Infant Mortality Rate.

Strategy:

* early Registration.
* Identification of complication
* 3 ANC and PNC visits.
* organising referal services and Transport.

Features:

* Assistance for Cesarian section. Rs 1500.
* Compensation Payment for Laparoscopy.

short essay:

1) Bias in case control studies.

① Bias in selection of cases.

→ Selection Bias or diagnostic bias

② Bias in investigating controls

→ Recall bias → The controls are less likely to recall.

→ Investigating bias. } due to lack of diagnosis in controls.

→ Interviewer bias.

→

2. Covid 19 Vaccines:

* covaxin.
* covishield.

Covaxin

* covaxin is a completely killed vaccine.
* It is introduced by India.
* It is 3 doses with 1 month
* Vaccine is administered IM.
* Dosage: 3 doses at an interval of 1 Month.
* If the Individual is already covid infected Vaccine the shedule should be started after 3-6 months.

Covishield:

* * It provides 70% protection against the covid virus.
* It decreass mortality rate due to covid infection by 90%.

covishield.

* covishield is a partially killed vaccine.
* It is introduced in USA.
* vaccine is administered IM.
* Dosage: 3 doses at 1 Month interval.
* If the Individual is already covid infected the Vaccine administered after 3 month - 6 months.
* It provides 90% protection.
* It decreases the mortality Rate.

③ Enumerate the indicators of housing;

Physical Indicators	Economic Indicators
Floor space	Building cost
Cubic space	Rental rate
Room height	
Person per room	
Rooms per house	
Environement → Air, water, light, Sound	

Social Indicators:

* Prevention of illness

* Related to comfort:
  - Thermal comfort
  - Visual comfort
  - Acoustic comfort
  - Spatial comfort

* Social and mental well being Indicators
  - → Frequency of suicides in Neighbourhood
  - → Neglected Youth } in Neighbourhood
  - → Drug abuse

4. Role of family in Health and disease:

* child rearing
* Socialisation
* Personality formation
* care for dependant adults
* Stabelising the successful adult personality
* Family susceptibility to disease
* Broken family
* Problem family

5. Prevention and control of xerophthalmia

* Administration of vitamin A doses according to National Immunisation Schedule.

* Dietry counselling:
  Recommending dietry intake of vitamin A Rich foods:
  ① Papaya
  ② Carrot.
  ③ Mango
  ④ Red bananas.
  which helps in prevention of vit A deficiency.

3

* Eye health education.

* Vision 2020 was introduced to Prevent blindness.

6. Enumerate Principles of health education:

* credibility

* Interest

* Motivation

* Involvement of local leaders (Panchayat head)

* Learning by doing.

* Known to unknown

* By setting an example.

* Participation.

* comprehension.

* reinforcement

2.5

* Feedback.

* Good human conduct.

Short Answers

1) Stratified random sampling
Population that can be it is a method of sampling from population which can be partitioned into subpopulation called strata
These groups are organised based on characteristics.

2) Ergonomics
Is study of employee and His work place.
It is the developing body of knowledge whose role is to develop an user friendly environment.

3) Tracking Blood pressure
Monitoring and the blood pressure to manage an individuals disease condition and keeping a log of BP throut the day helps the doctor for treatment.

4) GOBIFFF

GO → Growth monitoring
O → Oral rehydration
B → Breast feeding
I → Immunisation
F → Female education
F → family spacing
F → food.

5) Triage in disaster management
Immediate category, requires immediate life saving treatment.

Urgent category, requires significant intervention within ... hrs

Delayed category, these people require medical intervention but urgency expectant ...

2018-19

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SUBJECT OF THE EXAMINATION : PHYSIOLOGY

DATE OF THE EXAMINATION : 01/10 / YEAR : 2018

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ROLL NUMBER : 036 V M C H & R I 2018

SUBJECT CODE :

Signature of the Candidate

Signature of the Chief Superintendent / Invigilator

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III	9	9	10	10	11	11	12	12	12	13
IV										
V										

QUESTION NUMBERS / MARKS

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I	2										
II	13	1	1	13	14						
III	0	1	1	3/4	2	1 1/4	0	1	1 1/4	1	
IV											
V											
										GRAND TOTAL	17

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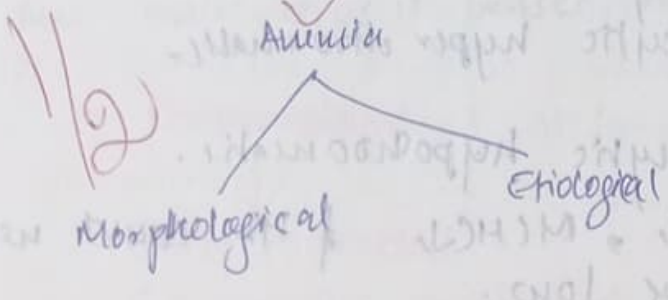
I

1. Anemia is defined as the decrease in Hb in red blood cells.



Imp. investigations

→ Hemoglobin count
→ Acid test
→ sickle test.

Pernicious anemia

This anemia is baisically due to physiological condition such as destruction in RBC. etc.

Sickle cell anemia

It is a kind of anemia due to a pt. ~~puta~~ mutation i.e 6th position of β-globulin chain. Here, the codon GAG → GUG.

Normal chain

6th position

β-chain GAG

↓

Glutamic acid

Abnormal chain

6th position

β-chain GUG

↓

Valine

There, due to this change the biconcave shape of RBC is changed to sickled shape because, it cannot hold more amt. of haemo-globin. ∴ Anemia occurs.

Morphological

- Microcytic hypochromatic
- Normocytic Normochromatic.
- Macrocytic hyperchromatic.

⇒ Microcytic hypochromatic.
MCV↓, MCHC↓ & Hb count will also be low.
eg: Talassimia.

⇒ Normocytic Normochromatic
MCV (normal), MCHC (normal) & Hb count normal.

⇒ Macrocytic hyperchromatic
MCV↑, MCHC, & Hb, count increase.

Ethiological

1. Erythropoesis - It is the process of formation of RBC.

The main steps it passes through are.

Pronormoblast
↓
Early normoblast
(Basophillic erythrocyte)
↓
Intermidiate normoblast
(Poly chromatic erythrocyte)
↓
Late normoblast
(Orthochromatic erythrocyte)
↓
Reticulocyte
↓
Erythrocyte

Pro normoblast is

It is the very early stage of erythrocyte.

Features

→ Mitosis takes place.
→ less cytoplasm.
→ Nucleus present upto 80% of cell volume.
→ Hb is absent.

Early normoblast

→ Active mitosis happens in this stage.
→ cytoplasm contains basophilic substance hence, this stage is called basophilic.
→ Nucleus is only 75% of cell volume. has larger no. of nucleolie.

Intermediate normoblast

→ Mitosis is slugish.
→ Nucleus is not much active and no nucleolies present
→ Cytoplasm contains basidephilic Haemoglobin & esnophilic RNA therefore, the appears to be a polychromatic.

Late normoplast

→ No mitosis.
→ Complete degeneration of nucleus.
→ Haemoglobin present in almost.

Reticulocyte

→ Immature erythrocyte.
→ Little larger in size than erythrocyte.
→ Haemoglobin completely present.

Erythrocyte

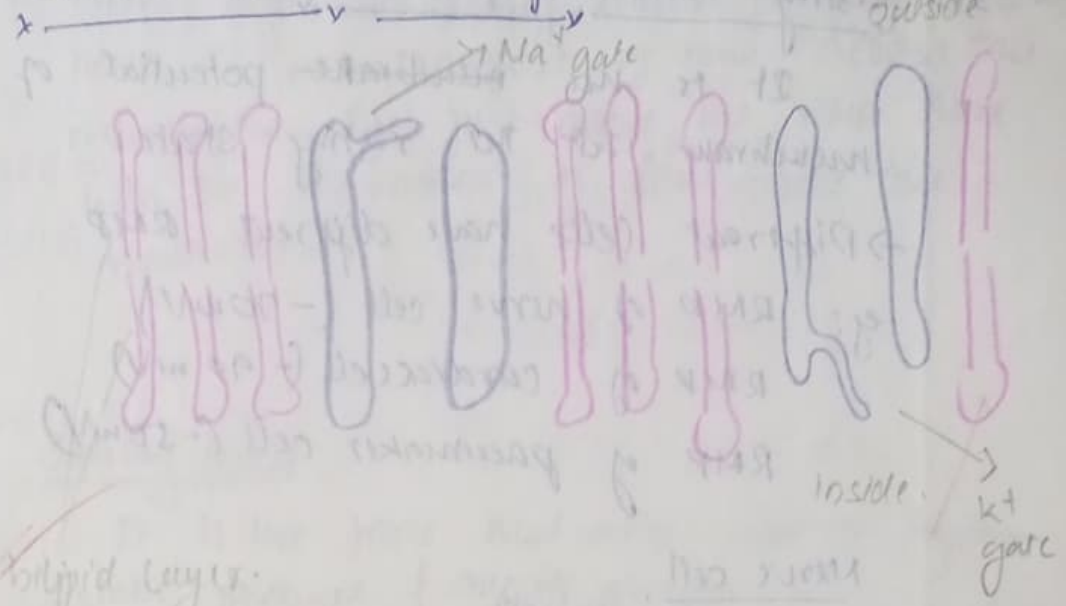
→ Mature RBC.
→ Carries gas & transport gases.

Factors affecting erythropoesis

Hormonal factors

→ Erythropoetin is a major factor in the process of erythropoesis.
→ Androgens.
→ Estrogens.

2. Sodium - Pottasium Pump



Sodium - pottasium pump helps to maintain an ionic ~~blance~~ balance across the membrane. It is generally seen at the time of nerve impulses.

→ When an action potential comes. there will be huge in flux of Na^+ into the cell.

→ And the cell become +vely charge.

→ So, as to maintain electrical equilibrium $3Na^+$ goes to ELF & $2K^+$ comes inside the cell.

→ So the sodium pottasium pump plays a great role in nerve impulse transmiss

→ The sodium-pottasium gates are made by polypriphide proteins.

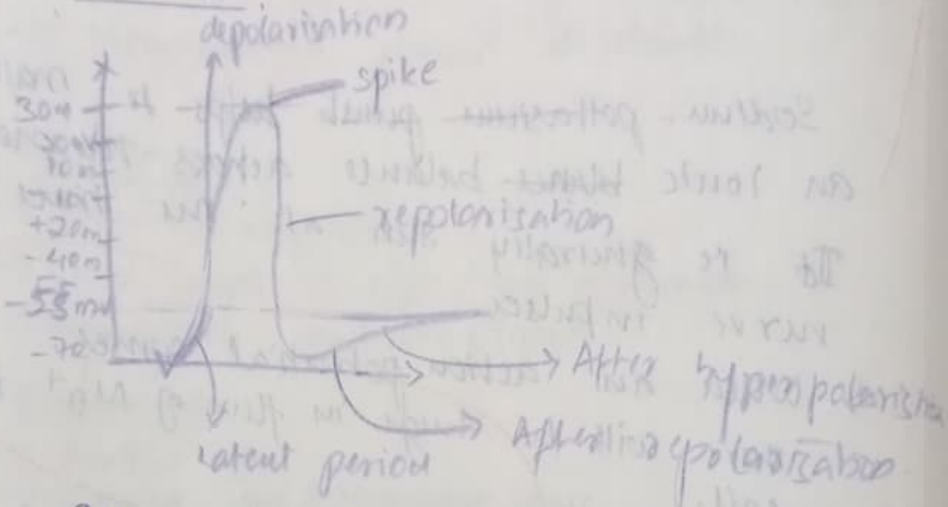
3. Resting membrane potential.

It is the ~~membrane~~ potential of a membrane at the resting state.

→ Different cells have different RMP.

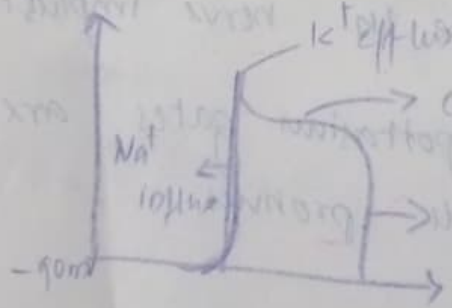
eg: RMP of nerve cell (-70mV)
RMP of cardiac cell (-90 mV)
RMP of pacemaker cell (-50mV)

Nerve cell



Here at resting potential. (-70 mV) not ions are transported across the membrane; all the gates are closed.

Cardiac cell:



Here also at resting memb. potential (-90mV) there is no transport of ions across the membrane. But just above the RMP there will be movement of ions across the membrane.

4. Starling forces.

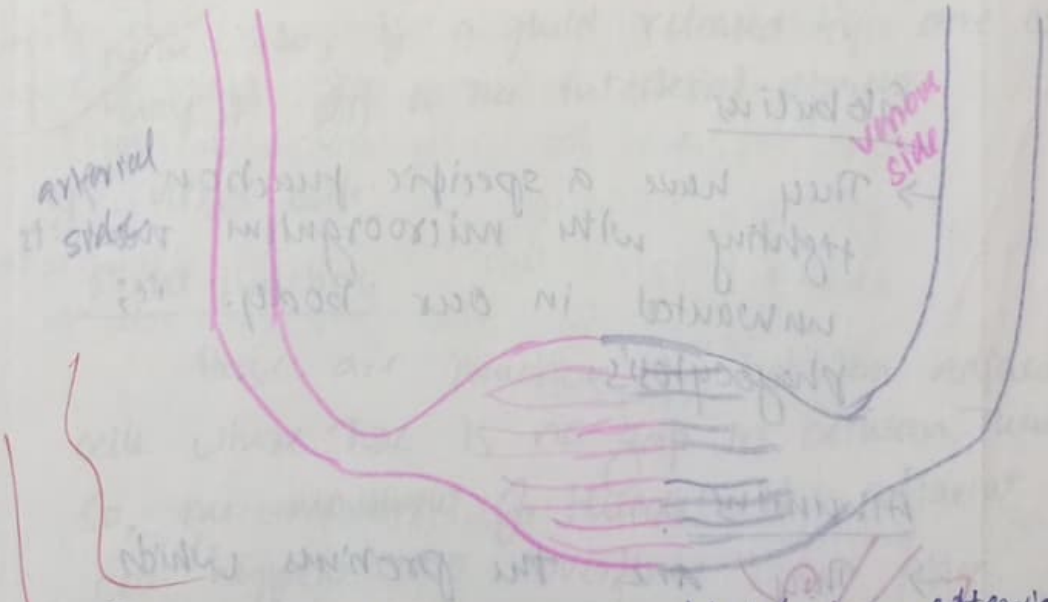
It is the force that arise due to hydro-static pressure & oncotic pressure.

Hydrostatic pressure.

It is the pressure that arises due to fluid in the intrstesial spaces.

Oncotic pressure

It is the pressure that arises due to proteins in intestisial spaces.



=) The concentration of fluid in arterial side is 25 ml/osm & in venous side is 12 ml/osm.

Edema

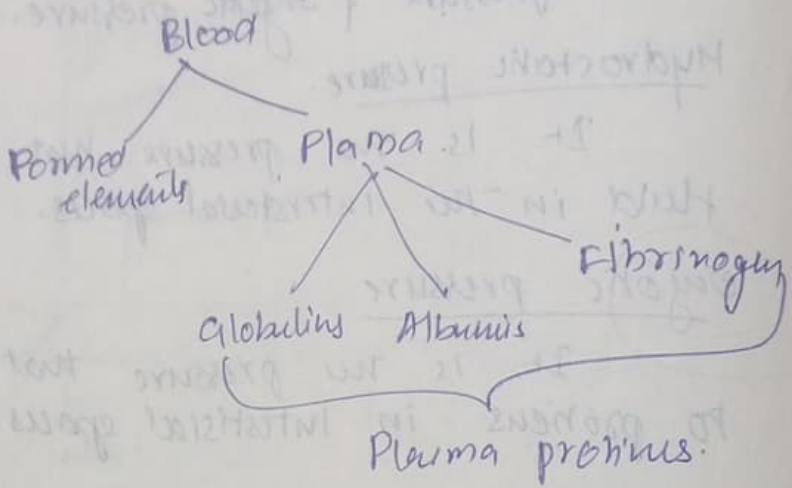
It is the accumulation of fluid in capillaries.

Eg: elephantiasis.

→ This occurs due to the variation in starling forces (hydrostatic pressure & oncotic pressure).

→ It may occur due to insect bites etc.

5.



Globulins

→ They have a specific function of fighting with microorganism that is unwanted in our body. ie; phagocytosis.

Albumins

→ They are the proteins which help in the osmotic function of the blood. In our body.

Fibrinogen

→ They help in ~~maintaing~~ coagulation of blood whenever there is an injury occurs.

III

1. Sucrose Span - It is the amount of sucrose present in our blood. If it increase there is a condition called Diabetes mellitus

2. Intercellular junction
   - Gap junctions
   - Tight junctions
   - Adhering junctions

Gap junction

These are junctions between the adjacent cell where there will be a small gap in between them. So, if a fluid released by one cell may go off to the interstesial spaces.

eg: nerve cells.

Tight junction

These are junction in between adjacent cells where there is no gap in between them. So, the movement of fluids b/w adjacent cell happens no overflow takes place.

Adhering junctions

These are the junctions in which both the adjacent cells are connected or stick together with each other.

eg: Osteocytes

But these cells have plasmodesmatal connections.

3. ORS

Oral rehydration solution is given to a person if he is suffering from dehydration. Dehydration may be due to many reasons.

1) Hot climate.
2) Diarrhoea.
3) Excess vomiting etc.

If ORS is given to a person having any of this problem will be treated with ors because. To give him glucose we ~~eg~~ add NaCl & sugar This is ~~due~~ for easy absobion ~~by~~ glucose, because the glucose will easily carried into the cell along with Na^+ ions. So, the person can be easily rehydrated.

4. Gibbs - Donan equillibrium

Soln. A	Soln. B
K^+	K^+
Cl^-	Cl^-
X^-	

→ The soln. must be electrically neutral
→ The product of diffusible ions must be equal in the solns.
→ There will be more no. of diffusible cation (K^+) in the solution where where is non-diffusible anions (X^-) are present.

5. Red cell Indices

Red cell indices are no. of Red cells present in respect to the total no. of cells.

$$\text{Red cell indices} = \frac{\text{Red cells}}{\text{Total no. of cells.}}$$

6.

HbA	HbF
• Heamoglobin Adult.	• Heamoglemin Foatous
• It has 2 α-chains & 2-β-chains.	• It has 2 α-chains & 2-γ-chains.
• Carries less amt of oxygen.	• Carries more amount of oxygen.
• It is present in normal living condition (after birth.	• It is present in foetal stage.
• Less active	• More active functionally.
• Present in normal condition.	• Present during hypoxic condition.

7. Reticulocytes are premature RBC's. Some times more amount of erythropoetin is released. As it is premature RBC's it do not functions of RBC It gives not same response as RBC give for no same stimulus.

8. Positive feedback mechanism.

It is no mechanism in which a stimulus is given & more will be more & more such stimulus will be produced.

eg:- Parturation reflex.
- LH surge.
- coagulation of blood.

During parturation the foetous produce a movement & touches no uterine cervix of mother & due to his more & more oxytoxin is released from anterior pituitary & as oxytoxin level rises uterine contraction increases. And finally no baby is ejected out.

9.

9. Pinocytosis.

It is no process known as cell drinking. It is same as endocytosis except vesicle has fluid compartments instead of solid compartments.

b. Osmosis

It is the process by which the water & solute particle get mixed in the presence of a semi-permiable membrane.

Osmolarity

It is the no. osmoles/particle. present in 1 litre of water.

10.

a. Lipids in cell membrane.

→ The cell membrane is made up of bilipid layer.

→ Therefore, permiability of substances through memb. also depends of ~~membrane~~ lipid solubility.

→ Lipid soluble substances easily pass through the membrane. Lipid insoluble substance won't cross the membrane.

b. Na^+ concentration in extracellular fluid is high. but Na^+ concentration in intracellular fluid is low.

Similarly; K^+ concentration in extracellular fluid is low but in intracellular it is high.

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Answered page Number to be filled by the candidate

Q.No.	1	2	3	4	5	6	7	8	9	10
I	1									
II	22	24	27	30	33					
III	14	15	NA	16	17	18	19	20	21	34
IV										
V										

QUESTION NUMBERS / MARKS

VALUATION	1	2	3	4	5	6	7	8	9	10	TOTAL
I	7½										
II	2	2	2½	2½	1½						
III	1¼	1½	NA	1¾	1½	3/4	1	3/4	1/4	0	
IV											
V											

GRAND TOTAL 26½

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I. Essay ①

(i) Blood pressure.

It is defined as the pressure exerted laterally on the walls of the arteries due to flow of blood.

Systolic B.P

It is the maximum pressure recorded during cardiac cycle. This occurs during systole of cardiac cycle.

Normal value: 100 - 119 mmHg.

Diastolic B.P

It is the minimum pressure recorded during cardiac cycle. This occurs during diastole of cardiac cycle.

Normal value: 60 - 79 mmHg

Pulse pressure

It is the pressure is the difference b/w systolic B.P & diastolic B.P.

> Pulse pressure = systolic B.P − Diastolic B.P

Normal value: 20 - 50 mm Hg.

Mean arterial pressure.

It is the average of all pressures : ie;

> MAP = Diastolic B.P + $\frac{1}{3}$ Pulse pressure

(ii) Factors determining blood pressure

Age

As age increases the Blood pressure gradually increase. But <140 mmHg is always considered as abnormal.

Gender

It is slightly less in females

Emotion & exitement

It increases BP due to symathetic activity.

Posture

From supine posture to standing posture B.P slightly decreases due to venous pooling.

Temperature

The increase in temperature slightly increases B.P.

Exersice

It also increased B.P due to symathetic activity.

(iii) Regulation of arterial blood pressu (4)

It is of 3 types:

1) Short Term regulation
2) Intermediate regulation
3) Long term regulation.

Short term regulation

It is subdivided into:

1) Neural regulation
2) Reflex regulation
3) Hormonal regulation.

1) Neural regulation

It is done by autonomic nervous system. i.e:

* sympathetic and parasympathetic fibers.

⇒ sympathetic has both vasoconstriction & vasodilator activity.

It has respective centers in medulla for control of B.P.

* Vasomotor centre

This is the cardiovascular centre in medulla. It has dorsal ventrolateral medulla which has:

1) central ventrolateral medulla
2) intermediate ventrolateral medulla

All these are cardio accelatory centers in medulla

* Cardio inhibitory centers

This is the centre in which cardiac functions are inhibited. They included inhibitory ~~structure~~ centers like:

1) Vagal tractus solitarius (NTS)
2) Nucleus ambigues (NA)
3) Dorsal motor nucleus of vagus.

~~Regulation of Blood pressure~~

Reflex regulation

According to change in B.P. there are reflex mechanism to correct it. Some of the reflexes are:

1) Baroreceptor reflex
2) Chemoreceptors reflex
3) Cushing's reflex
4) Atrial strach reflex
5) Bainbridge reflex.

Range?

Baroreceptor reflex

Increase in BP

↓

Detected by carotid & aortic sinus

↓

Impulses sent to NTS via IX & X cranial nerve.

↓

Stimulation of NTS

↓

Inhibition of vasomotor centre & stimulation of cardio inhibitory center

↓ Vagal fibes

Through bulbo spinal pathway impulse reach spinal cord.

↓ Vagal innervations.

Heart

-> decreases cardiac output

-> decreases heart rate

-> decreases BP

Blood vessels

-> vasodilation

-> decreased B.P.

Physiological importance of Baro receptor reflex

1) It is a life saving mechanism
2) It has a large working range C50 = 200 mmHg
3) It is an example for Marey's law

Heart rate $\propto \frac{1}{\text{Blood pressure}}$

Chemoreceptors reflex

Decrease in PO_2

↓

Detected by aortic & carotid bodies.

↓

Impulses through IX & X cranial nerve to NTS

↓

Stimulation of vasomotor centre

Small stimulation cardio inhibitory centre

↓ sympathetic fibers

↓ Bradycardia | ↓ Tachycardia.

=> Finally a mild tachycardia.

=> The stimulus for this reflex are hypoxia, acidosis & hypercaphia.

Cushing's reflex / CNS - ishemic reflex

Due to hypotension increase in intra cranial pressure

↓

~~Hypoxia & Hyper~~

Less blood flow to cranium

↓

Hypoxia & hypercapnia act vasomotor centre

↓

Resulst vaso constriction

↓

↓

Increased blood flow detected by carotid sinuses

↓

Action of baroreceptor

↓

Reflex bradycardia

Hormonal regulation.

BP is also regulated by hormones immediately.

* Catecholamines.
  → They increase B.P rapidly.
* Bradykinin.
  → They decrease B.P rapidly.

Intermediate regulation

It is of 2 types:

1) capillary shift mechanism.
2) Stress relaxation mechanism.

Capillary shift mechanism.

If more blood flow is there oncotic pressure in interstitium is less so no blood filters through capillaries and ~~and~~ blood flow is reduced hence B.P is reduced. & vice versa.

Stress relaxation mechanism

It is no mechanism in which when there is increased blood flow in a region of blood vessel that region dialtes and blood is hold there as blood flow it is again compressed. This is how BP is regulated.

Long term regulation

In this type of regulation BP is maintained during a long time duration.

* Renin - angiotensin mechanism
* ADH
* Aldosterone
* ANP

Renin - angiotensin mechanism.

Increase in BP

↓

Detected by JG cells

↓

Releases renin

↓

Activates angiotensinogen to angiotensin I

↓

Angiotensin I → Angiotensin II

↓

Decreases BP by increasing reabsorption.

ADH

→ Decrease in Blood pressure.

→ Action of ADH

→ increases reabsorption of water & Na^+

→ Increases BP.

ANP

⇒

(iv) Essential hypertension

Essential hypertension is nothing but a slight increase in Blood pressure, within the physiological limit. ie; 110 - 130 mm Hg. (pre hypertension stage)

Short answers

1. **Triple response of Lewis.**

It is type of response due to cutaneous circulation. When there is a hard pressing is made in our hand with a pencil. Following triple will occurs:

1) Red reaction
2) Wheles
3) Flare.

Red reaction

It is due to increase cutaneous capillary blood flow. Red colour appear at that spot.

wheles

Small edema is formed

Flare

The red colour spreads to ~~surrading~~ surrounding regions due to axon reflex.

2. **Rynolds Number.**

It is no number which is used for determining turbulance of blood flow.

$$Re = \frac{\rho D V}{\eta}$$

Re → Rynold no.

ρ → Density of fluid

D → Diameter of vessel

V → velocity of blood

η → viscosity.

* If Re is:

>2000 the flow is laminar

* If Re is:

<3000 the flow is turbulent

4. Marey's law

This law states that the heart rate is inversely proportional to Blood pressure but the reciprocal is not true.

$$\text{Heart rate} \propto \frac{1}{\text{Blood pressure}}$$

Laplace Law

It is a law which relates pressure of walls (P), tension on the walls & radius of vessels.

Eq:

$$P = T\left[\frac{1}{r_1} + \frac{1}{r_2}\right]$$

If $r_1 = r_2 = r$

$$P = \frac{2T}{r}$$

As we considers the system in one dimension.

$$P = \frac{T}{r}$$

5. Brady cardia

It is commonly know for decrease in heart rate. We

Normal rate = 60-100 beats/min.

In brady cardia the beats will be less than 60 beats/min.

-> It may occur due to

- venous return less
- decreased loading
- less symathetic stimulation
- vagal stimulation
- Baroreceptor reflex

6. a. Cardiac index

It is the ratio of amount of blood received by heart to the the amount of blood pumped by the heart.

$$CI = \frac{EDV}{SV}$$

b. Ejection fraction

~~It is~~

$$\text{Ejection fraction} = \frac{SV}{EDV} \times 100$$

It is the fraction of blood ejected during one min.

a. Hemophelia B

-> It is a disease in which IX clotting factor is absent.

-> It is six linked recessive disorder.

Features

-> Long bleeding time.

-> More loss of blood even for small injury.

-> Clot may occur with 1-8 weeks.

Diagnosis

-> Factor IX diagnosis assay.

3. Von-willebraud's disease

-> It is a disease in which von willibraud factor is absent.

->

→ Von- Willebraub factor is needed for synthesis of clotting factor VIII.

→ Normal bleeding time.

→ More clotting time

→ von willebraud diagnosis assay for its diagnosis.

8. Erythropoetin

→ It is glycoprotien which help in increased production of RBC.

→ It has a long polypeptide chain & 4 oligosaccharide chain

→ The oligosaccharide chains gives the physiological characteristics of erythropoetin.

→ It is mainly produced in kidneys : JG cells, mesangial cells. (85%)

→ Liver (Kupffer cells) 10%

→ Some amount by brain, uterus etc.

9. Pernicious anemia

→ It is an auto immune disorder.

→ It is also called megaloblastic anemia.

→ Etiologically it is a haemolytic anemia.

→ In this size of RBC increases and as it passes through capillaries. The RBC will rupture.

→ Hence, increase in bilirubin content in body may occur.

II Short Notes

1. Hypovolemic shock.

Shock

It is a synotrome in which where there is inadequate tissue perfussion occurs.

Hypovolemic shock - This shock occ during when there is decrea amount of blood in the body

This may occurs due to:

1) Surgery.
2) Trauma.
3) Acute hemmorage.
4) Injury.
5) Dehydration.

(25)

Treatment

1) IV infusions
2) Blood transfusions.
3) Drugs that increase reabsorption.

It is of 2 types:

1) Reversible shock
2) Irreversible shock.

Reversible Shock

The shock in which we can bring volume back to normal.

It is controlled by:

Reflex mechanism.

1) Baro receptors
2) Chemoreceptor
3) Cushing reflex
4) Increase venous return

Irreversible shock

The shock in which we can bring back it volume to normal and it may be fatal too.

2. Rh system of blood groups.

Rh system is another important blood group other than ABO.

-> It is mainly concentrated during pregnancy time.

-> Landsteiner's Law

If an antigen is present in the RBC the corresponding antibody must be absent in blood plasma. This is applicable for Rh system.

- If an antigen is absent in RBC membrane and corresponding antibody is present in blood plasma this is not applicable for Rh system.

* During pregnancy:

If Mother is Rh -ve and foetus is Rh +ve

→ During delivery there will be intermixing of maternal blood with foetal blood.

→ But at this time mother's body starts to produce $Rh^{+}ve$ antibodies

→ During next delivery if the foetus is $Rh^{+}ve$. The antibody present in mother's body will enter into foetus and destroys the foetal RBC's.

→ This condition is known as erythroblastosis fetalis.

This may cause:

1) Anemia
2) Hemolytic jaundice (produce bilirubin)
3) Kernic nirus.

Cbilirubin accumulates in basal ganglia due to lack of blood brain barrier in brain of child.).

4) General edema.

3. Frank starlings Law of Heart

This law state that initial length of muscle fibers is directly proportional to force of contraction, within the physiological limits.

Measurement of cardiac output:

Cardiac output (CO) is defined as product of stroke volume (SV) & heart rate (HR)

CO = stroke volume × Heart rate.

Measurement of cardiac output is done by 2 methods:

1) Direct method
2) Indirect method.

Direct method

→ In direct method an electrometer is placed on the chest and the reading is taken.

→ This is not an accurate method.

Indirect method.

It is 3 different methods.

1) Fick's method.
2) Indicator dilution method.
3) Thermodilution method.

Fick's Method

This method is based on oxygen intake and measuring the arterio-venous difference.

$$CO = \frac{\text{Oxygen Intake (ml/min)}}{A(O_2) - V(O_2)}$$

→ This is one of the accurate method.

-> But catheters are used.

Indicator dilution method

-> In this method an Evan's blue dye is used.

-> uptake by heart

-> and blood from the artery is collected.

$$CO = \frac{\text{Dye uptake}}{A(O_2) - V(O_2)}$$

Advantage

-> It is also an accurate method.

Disadvantage

-> Using dye is not good to the body

4. Coronary circulation.

It is a circulation that supp
blood to the heart.

Special features.

→ Heart has end arteries.

→ Due to presence of end arteries. it do not have anastomosis.

→ So due to damage of any arteries may leads lack of blood supply to heart mus which will cause ischemia.

→ The heart recives blood during diastole. ie; during Systole the whole heart gets contracted.

-> So, blood vessel get compressed and blood cannot enter into the heart.

Regulation of coronary circulation

Neural regulation

It has sympathetic & parasympathetic activity.

-> Sympathetic ~~the~~ cause vaso constriction

-> Parasympathetic cause vaso dilation.

Metabolic regulation

-> Hypoxia.

-> Hydrogen, potassium ions increases heart rate.

Auto regulation

Auto regulation is not well developed in heart. It is generally controlled by neural & Metabolic regulation.

5. Role of platelets in coagulation of blood.

Sol:

Intrinsic pathway

Stimulation of platelets

XII → XIIa

Ca+ phospholipids

XI → XIa

Ca+

IX → IXa

VIIIa, V, Ca2+

X → Xa

Extrinsic pathway

Injury to blood vessels

VII → VIIa

Ca2+

X → Xa

XIIIa

prothrombin → thrombin

Fibrinogen → Fibrin

→ Platelets also causes primary haemostatic plug.

→ This is done by adhering the platelets to each other at the site of injury. and a primary clot is formed.

V.

10. Reticulo endothelial system

This are macrophages that releases cytokines etc.

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SUBJECT OF THE EXAMINATION : PHYSIOLOGY

DATE OF THE EXAMINATION : 13/05/2019 / YEAR :

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I	1									
II	7	10	11	13	14					
III	15	16	16	NA	17	17	.	.	15	
IV										
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QUESTION NUMBERS / MARKS

VALUATION

	1	2	3	4	5	6	7	8	9	10	TOTAL
I	2										
II	3	1	½	0	~~W~~						
III	2	0	~~W~~	NA	¼	¼	–	–	½	–	
IV											
V											
										GRAND TOTAL	11½

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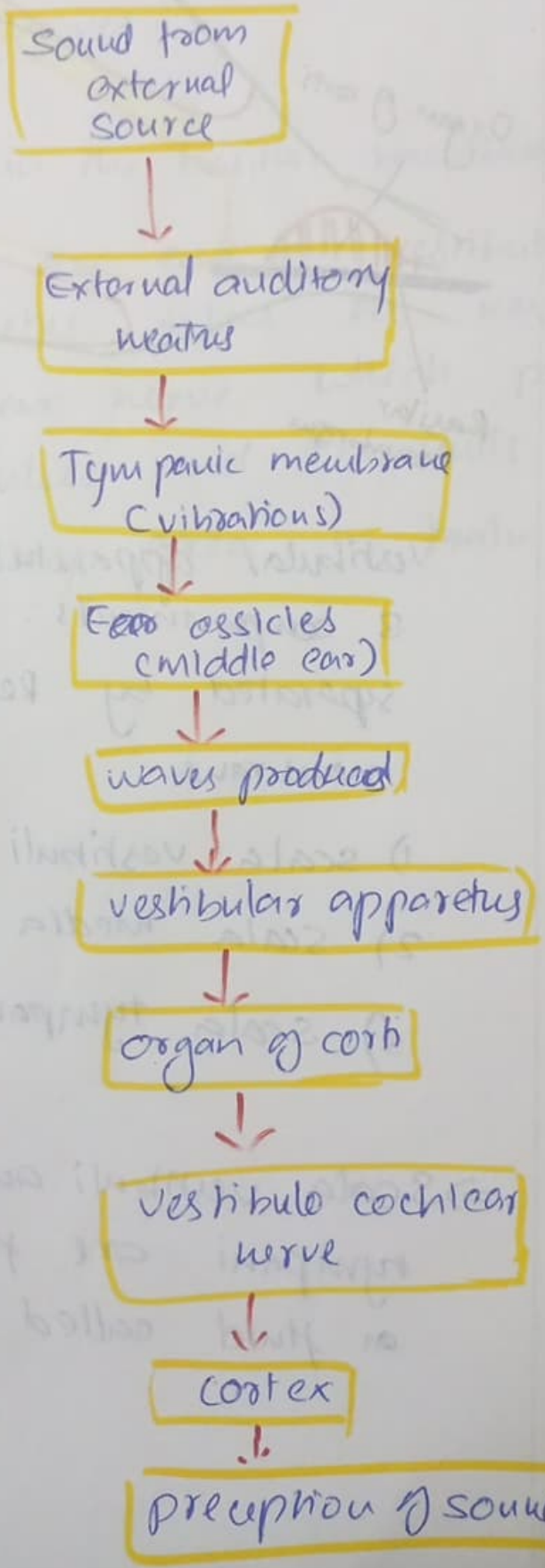
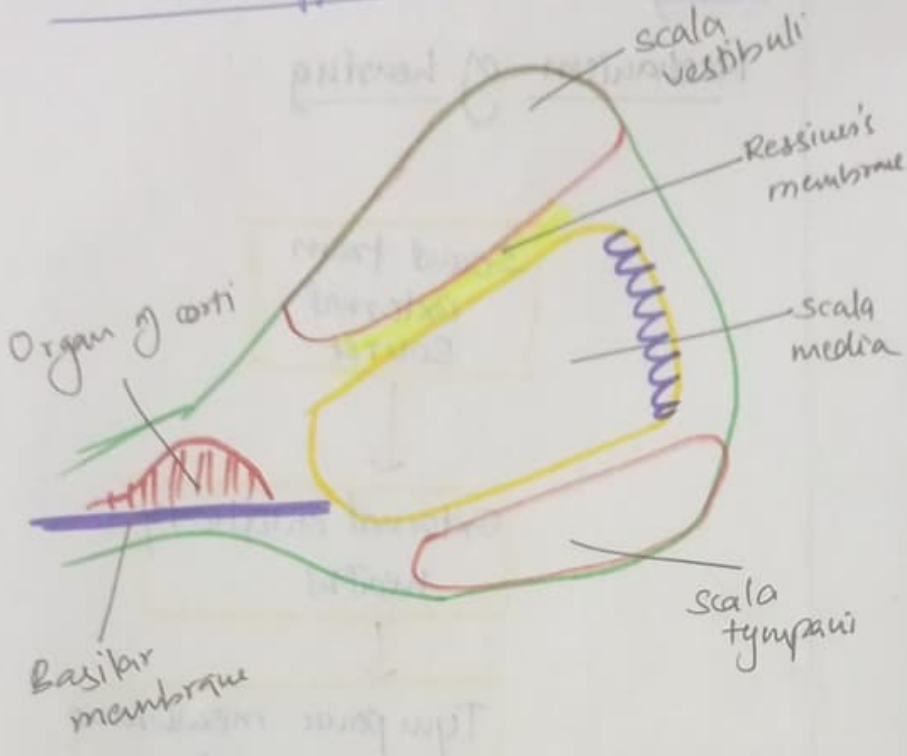
① Essay ①

Mechanism of hearing



Vestibular apparetus



Vestibular apparetus has 3 compartments: which is separated by Ressiners membrane.

1) scala vestibuli
2) scala media
3) scala tympani.

⇒ Scala vestibuli and scala tympani are filled with a fluid called perilymph.

⇒ Scala media is endolymph. (3)

Then to the medial side there is organ of corti which precives the sound waves.

⇒ It lies in the basillar membrane.

⇒ From the end of vestibular apparetus arises the vestibulo cochlear nerve which produces impulses and transmits to Auditory area in brain.

II.

1. Visual pathway

Light rays
↓
photoreceptor cells (rods & cones)
↓
bipolar cells
↓
ganglion cells
↓ optic disk
optic nerve
↓ ~~optic disk~~
optic chiasm
↓
optic tract
↓
lateral geniculate body
↓
geniculocalcarine tract
↓
calcrine cortex

Occipital
Visual

→ light rays from the external surroundings hit the photoreceptors

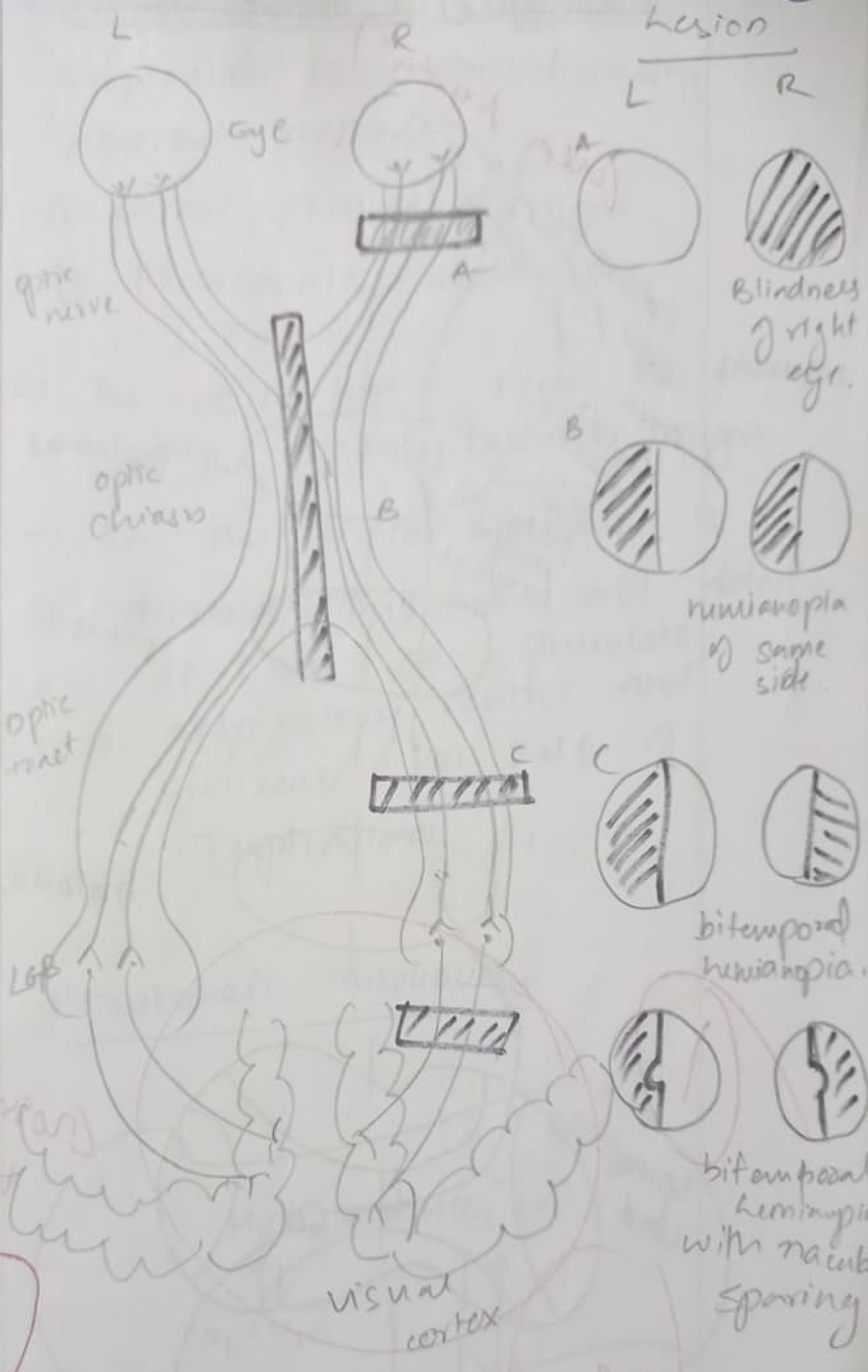
→ This creates an stimulus and bipolar cells transmit into ganglion cells.

→ then transmits to optic nerve.

→ at optic chiasm the nasal fibers decussate and temporal travels in same pathway.

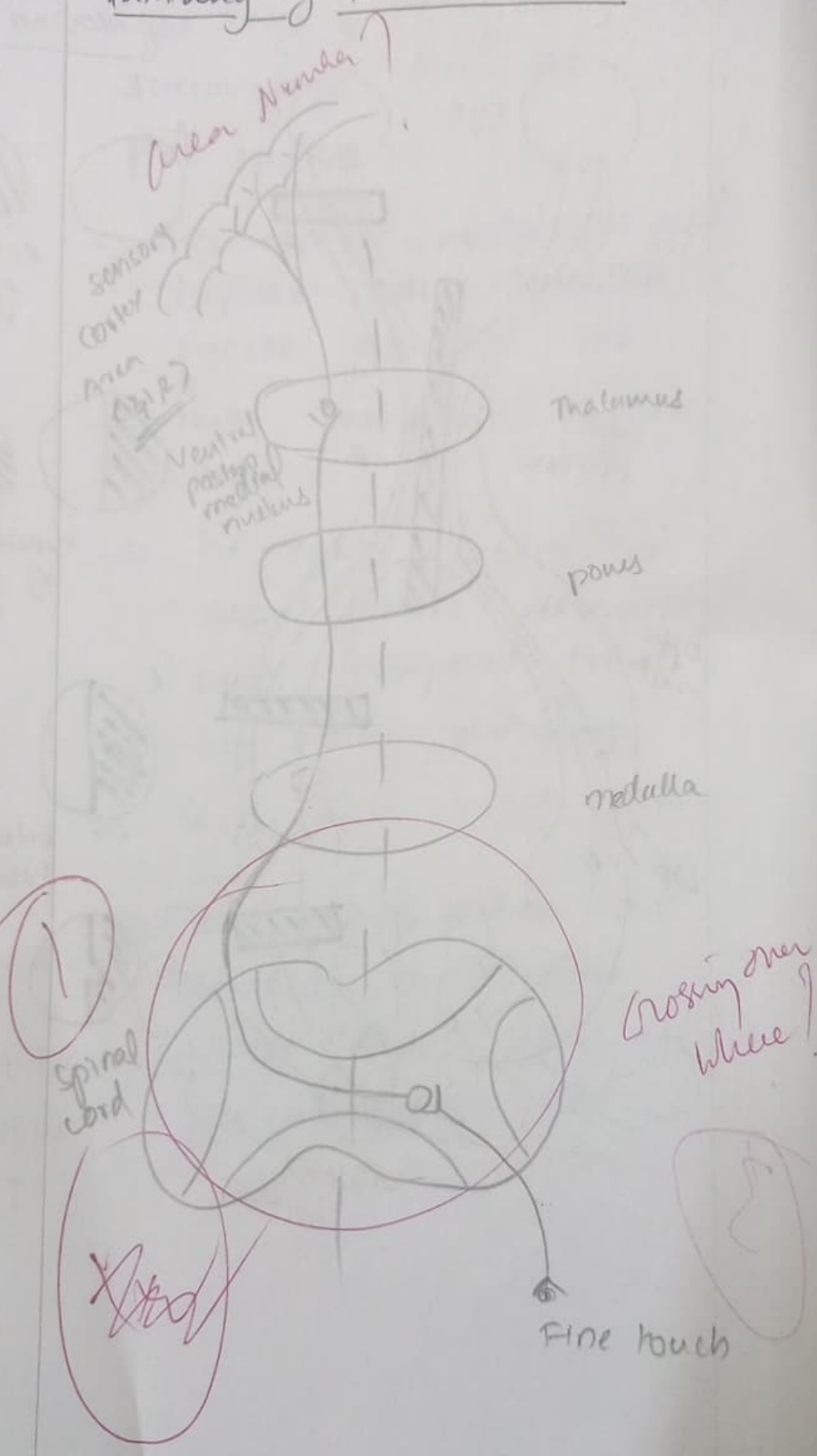
→ Then they reach LGB.

→ From LGB fibers are travelled to calcrine cortex these fibers are. geniculo calcrine tract.


L
R
eye
optic nerve
A
optic chiasm
B
optic tract
C
LGB
visual cortex
Lesion
L
R
A
Blindness of right eye.
B
hemianopia of same side
C
bitemporal hemianopia
bitemporal hemianopi with macul sparing

(10)

2. Pathway of taste sensations



3. **Chemical control of respiration**

Respiration is controlled using different methods.

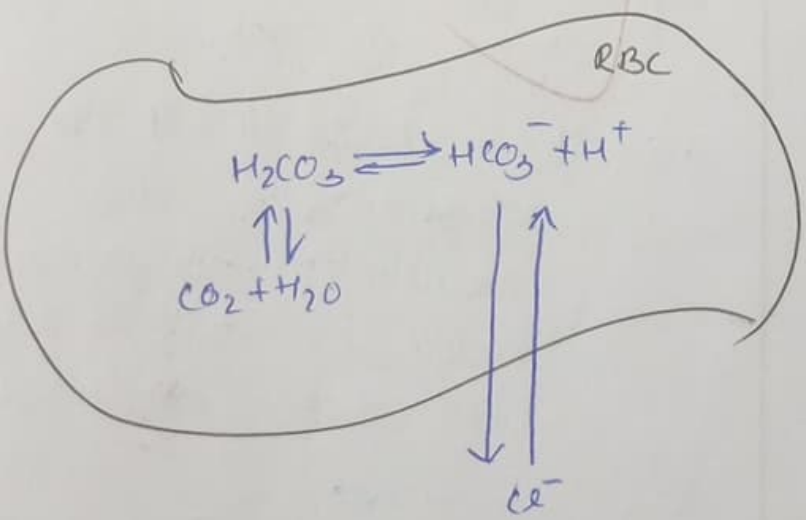
① partial pressure of oxygen.

② Bicarbonate mechanism.

→ The carotid bodies sense the changes in the partial pressure oxygen

→ If the partial pressure is decreased this area will detect it an and stimulate respiratory centre and increase the rate of respiration.

Bicarbonate mechanism

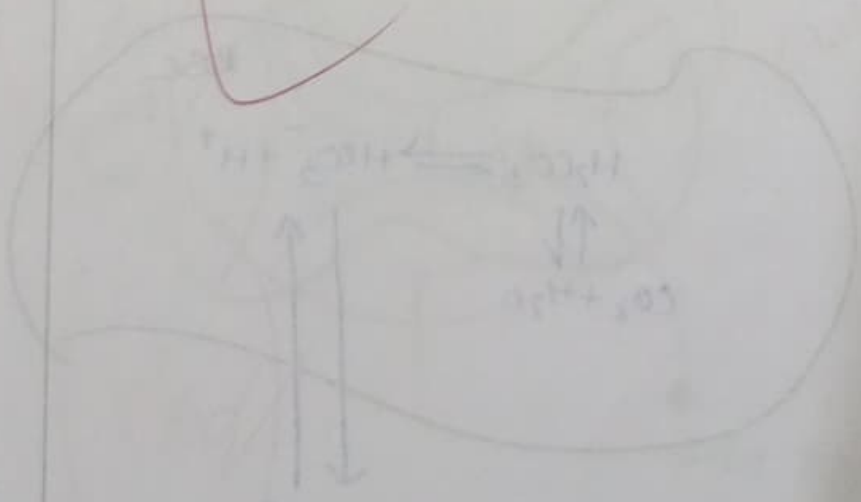


Chloride shift mechanism.

→ If CO_2 increases the rate of respiration is also increased as to maintain $CO_2 - O_2$ balance.

→ In RBC CO_2 will combine with H_2O to form $HCO_3^- + H^+$

→ This HCO_3^- comes out of cell and one Cl^- goes in to maintain electrical neutrality.



4. Short term regulation of blood pressure

The blood pressure is controlled ~~xxxx~~ in short term is by baro receptor mechanism.

It is a mechanism in which aortic and carotid bodies will sense the change in blood pressure.

5. Functions of vestibular apparatus

→ Main function of vestibular apparatus is maintaing static equillibrium.

→ It is done by maintaing the fluid level in its compartments.

→ It also converts sound waves to electrical impulses.

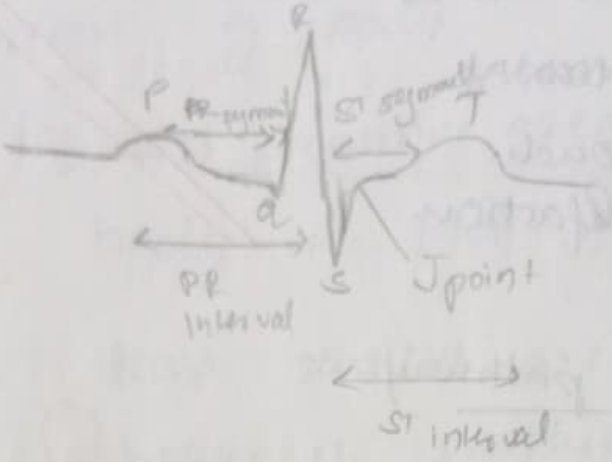
→ The waves produce in the fluid detects what kind of sound it is.

→ It give protection to organ of corti

→ The fluids inside the compartments also maintain a pressure inside it which helps in static equilibrium.

Short Notes

(1)



- Normal ECG (It has P, Q, R, S & T) waves.

(2) → QRS during complex during ventricular depolarisation.

→ T wave ventricular repolarisation.

→ Q & S are negative waves

→ P, R, T are positive waves.

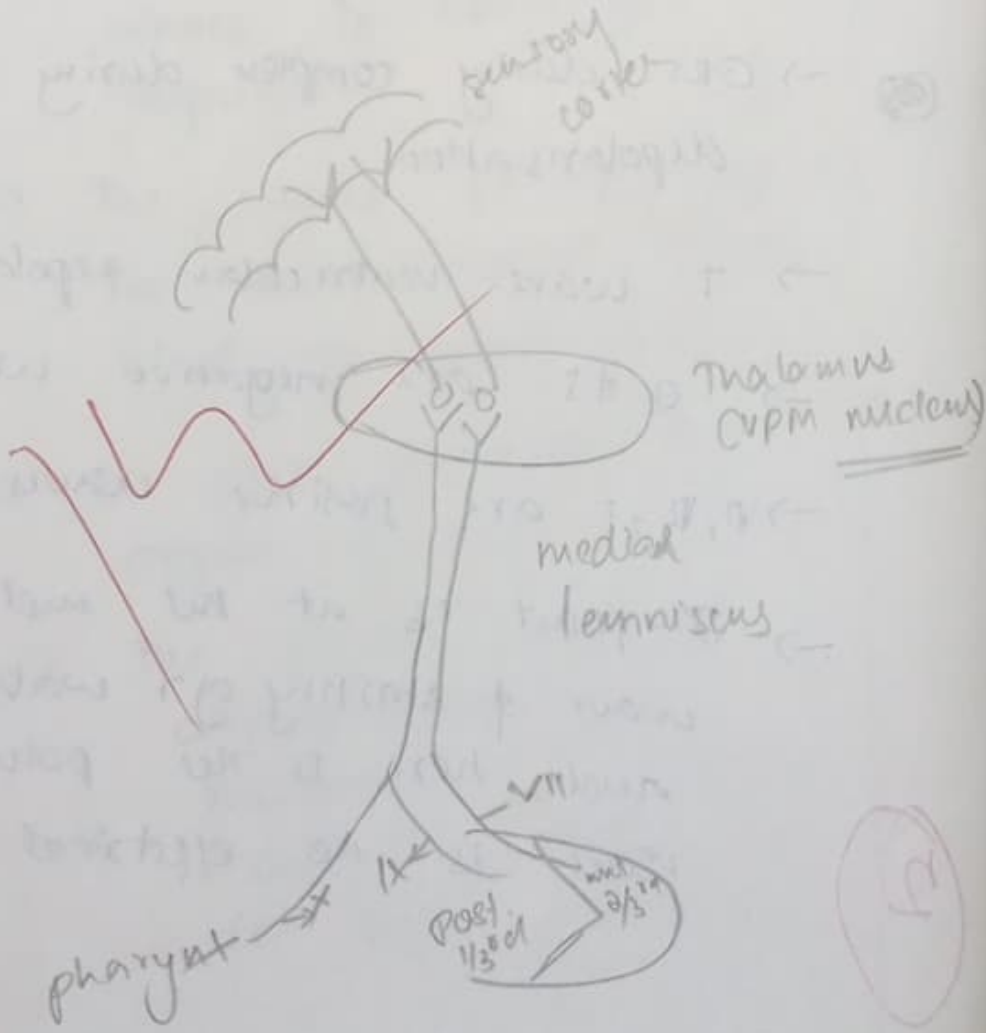
→ J-point is at the end of S wave & starting of T wave and here is the point where there is no electrical activity.

(2)

2. Functions of prefrontal lobe

→ Main function is vision.
→ Integration of movements.
→ Emotions and feelings.
→ ~~Memory~~
→ Touch.
→ Olfaction.

3. Taste pathway



5. Homencalus

It is the part of sensory cortex which are related to specific part of body

ie; most sensitive area in the body is face

least sensitive are in the body is peripheral part of lower limb.

6. FRC & measure mod.

It is the functional residual capacity of lungs

→ It is the volume of air that is present inside the lungs after a deep inspiration followed by deep expiration.

9) Dark adaptation

If a person is moved from a bright lighted area to dim light area.

→ At the very moment he won't be able to see any thing.

→ It needs 20 minutes of time.

→ It is controlled by rodes cells.

→ The 20 mins time is for the production rodopsin pigment

2019-20

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SUBJECT OF THE EXAMINATION : Physiology

DATE OF THE EXAMINATION : 10.12.2019 / YEAR :

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III	16	~~17~~ 15	NA	16						
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V					2					

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II	3	—									3
III	½	½	½								3 1/2
IV	0	1/4	1	NA	1						2 1/4
V	1/2	0	0	NA	1/4						3/4
V											
											GRAND TOTAL 9 1/2

III 2. 1 1/2

80

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17.5

100

II Essay

1. Pancreatic Juice

. Pancreatic Juice is Secreted about 1-1.5 l per day

. Pancreatic Juice is Secreted from pancreas

. Pancreatic Juice is important for breaking down of Proteins, Enzymes, Carbohydrates

. Pancreatic Juice is Composed of Aqueous and Enzymatic Component

. Aqueous Component - 98% and enzymatic Component - 2%

. Enzymatic Component

. lipids - Cholipase, phospolipase

These two enzymes Reducts and Converts the lipid molecules into Simpler Components

Trypsin → Trypsinogen
(inactive)

. proteins. Such as Trypsin, Chymotrypsin pepsin pencarboxypeptidase.

. however proteins Such as trypsin are activated at Intestine.

. Trypsin Contains molecules that Could digest pancreatic tissues So trypsin activated at intestine

Carbohydrate Which Enzyme ?

. The enzyme breaks the Starch molecule into Simpler Compounds

. Breakage of Starch into Simple Compound Glucose provides energy and acts as intial Stage for Certain metabolism

. These are the functions of pancreatic Juice which breaks the Compound Substances

. Pancreatic Juice Converts inactive protein to active protein

. Pancreatic Juice is Secreted from hepato bilary duct Which is innervated by Sphicter of oddi.

. Pancreatic Juice has PH of 6 Which is Slightly acidic

. The Component produce by Gastric Juice Mucin helps in protating the layer of Stomach wall Which has abundant HCO3 electrolytes

. It Counteracts against the acidic medium.

. Pancreatic Secretion Regulated by binding of Certain molecules

. if there is excess amount of Protein and lipid Content in Chyme present at Intestine

Automatically, Pancreas Secrete Pancreatic Juice to decrease (or) Break down the Substance

. Pepsin produced pancreas is essential for break down of protein where pepsin act as Secretes peptone which break down the proteinic Compounds

. Pancreatic Juice is essential at time of Chyme entering Intestine Where the Compounds ~~are~~ such as proteins lipids are accumulated at wall of Intestine

. Some molecules get denatured at pancreas, Some like trypsin which get denatured only at intestine

. The defect in Secretion of Pancreatic Juice, leads to accumulation of Component which are meant to be treated by pancreatic Juice are accumulated

. The accumulation these Components leads to defect in Body.

- As excessive accumulation of certain component leads to defect.
- Accumulation of lipid content causes Steatorrhea.
- Steatorrhea is a disease where pancreatic juice fails to degrade the lipid content thus excessive accumulation of lipid content in Steatorrhea.
- Steatorrheas is most common in cardiac patient where the excessive lipid content accumulate at vessels leading to Blockage of Blood.
- There are many other reasons for Steatorrhea by but failure of pancreatic juice is most common.

3

1. Extrinsic mechanism of Blood Coagulation

. Coagulation of blood takes place at certain Steps

. Vaso Constriction
. Platelete plug formation
. Clot Retraction
. Defenitive Clot formation

Vaso Constriction

. Neuro Vaso Constriction - Constriction of damaged neuron
. Muscular Vaso Constriction - Contraction of damaged Muscle.

Platelete plug formation

. Cell adhesion
. Cell formation
. Cell aggregation - Platelet plug formation

Cell adhesion

. Von willibrand factor which acts as receptor for platelet.
. After binding of platelete to specific site it secrete thromboxin A2 and fibrinogen.
. Where it attracts other platelets to bind with it platelette aggregation

· one end of plattete bind to damage site and another end binds to ~~platelet~~ one side of another platellete Such that enormous platelet are combined together

· But this is a temporary method for Coagulation which could only decrease the ~~blood~~ Clotting time

· The Spreading of platelets to other sites is inhibited by Certain molecules

· These two methods are useful if only damage is superficial

· To get ~~per.~~ Clotting permenantly, there are 12 Clotting factors which are useful in decreasing the bleeding and Clotting time.

* hemolytic disease of newborn

. The abnormalities in developed RBC's leads to hemolytic diseases

- heterosperolysis, Thalaessemia, Sickle cell anemia

i heterosperolysis.

. It is a disease where the shape of cells turns into sphere.

. This is due to deficiency or defect in progress of spectrin protein

. due to spherical structure cell become Rigid in nature

Thalassemia

. It is differentiated into Beta and alpha thalaessemia

Beta thalaessemia

. It is disease where Beta chains are accumulated excessively where α polypeptide chains are absent

α thalaessemia

. It is disease where α chains are accumulated excessively where β-polypeptide chains are absent

Sickle Cell anemia

. It is a disease where RBC get transformed into Sickle shape

. due to Sickle Shape it lost property of flexibility

. So it get accumulated at certain ~~Spotting~~ Spot causing blockage

. Such that it blocks the vessels that supplies liver causing megaly of liver.

These disease are Classified into Normocytic Normochromic Macrocytic macrochromic, Microcytic or normochromic

The disease is evaluvated by the Size and Shape of the RBC which are is very useful in identification of disease.

~~The Breaking~~ of hemoglobin ~~also~~ Cause Jaundice where hemoglobin is broken down into heme and globin

. globin Compound gets Converted into Bilirubin that exccessive amount of Bilirubin due to some unavoidable Causes leads to Jaundice.

3. Gastric emptying

. Gastric emptying is a process where Balance Chyme present at Distal to proximal part of Stomach are moved by a small and repetitive movement

. Gastric emptying is a process which could prevent secretion of excessive Gastric Juice since all the Chyme are moved to intestine.

. Gastric emptying is slow wave movement where movement is initiated by an action potential and slow peristaltic movement take place.

. While Gastric emptying Chyme present at Distal part also taken and moved to intestine

. esophageal sphincter get closed while Gastric emptying to avoid intake of other Chyme Compounds inside.

. Motor Migrating Complex it is the movement which is very much essential for gastric Emptying

. MMC slowly starts a wave from Distal part to proximal part in a rhythmic repetitive fashion.

• Migrating Motor Complex takes place every Ninety minutes.

• Migrating motor Complex take place by Slow Actionpotential

• MMC makes a peristalic movement which almost Rolls up every particles in Stomach to Duodenum

• It prevents entry Bacterial, microbes etc

• It also prevents Secretion of Gastric Juice in empty for very low amount of Chyme.

4 Carrier mediated transport

. It is a type of transport Compne Comes under passive transport

. Where the ~~tran~~ Compound need to transfered get attached to the Carrier Element

. Reason for this type of transport Could be Molecule donot have tendency to Penetrate the membran

. It Couldnot have that much energy to be for tranporting itself to that Specific area

. Example for Carrier mediated transport is Glucose transport

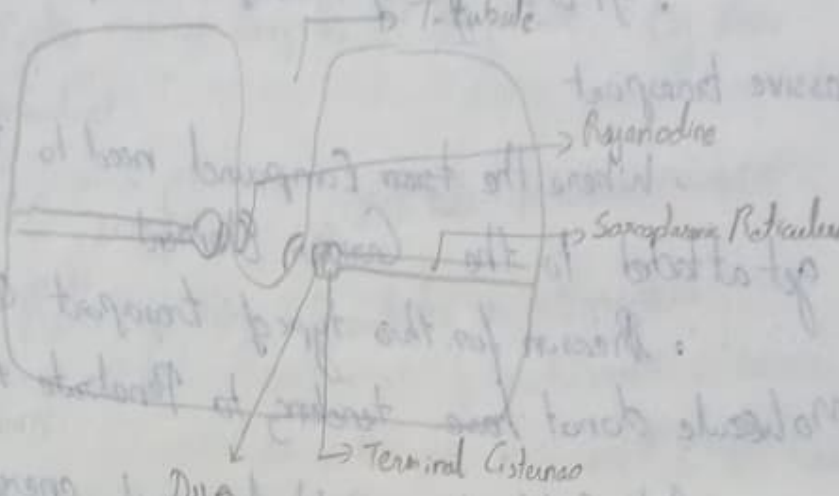
. Since Glucose donot have the ability to penetrate the Cell membrane

. Glucose get get attaches with Na element then transfer into the Cell.

. there are many other molcules like glucose which transported by a Carrier mediated element.

. ~~It is~~ The Rate of transport depends upon Carrying molcule.

5] Excitation and Contraction Coupling



- At first action potential travels along the T-tubule acts as Stimulus for DHP Receptor.
- Since DHP is intiated it releases the Ca^{+2} ions in Sarcoplasm
- The Elevation of Ca^{+2} Concentration in Sarcoplasm act as favourable environment for Muscle Contraction
- Et Troponin C get binds with Ca and leaves way for for Myosin head
- Such that Contraction of Muscle take place.

. Since these process take place by Excitation of Receptors to form elevate Ca^{+2} Concentration

. Which act as Step for Contraction of muscle.

. So it is known Excitation Contraction Coupling

. The Ca^{+2} ions released by SR ~~enters in~~ enters into Cytop Sarcoplasm

. As taking this as a induce Ryanodine Receptor produce Calcium inside the cell

. This is known as Calcium induced Calcium Release

. Mostly Skeletal muscle do not Require this CICR

. Cardiomuscle needs Calcium Induced Calcium Release.

C Small intestinal movement

. Movement of Intestinal walls to move the Chyme towards large intestine

. It is slow wave movement where Cyme proved slowly

. The slow movement is due to intestinal villi absorbs the Compounds from Chyme

. Such that Compound Chyme is moved from Duodenum to Ileum

, Slowly movement Causes a way for absorbtion of Contats

IV Short answers

3. A Pathophysiology and treatment of ulcer

. ulcer distinguished to peptic and gastric ulcer

. The main pathophysiology of ulcer is fault in intake of food where Gastric Juice enters the Stomach which is without food

. The damage to wall of Stomach due to less Content of Mucin

. Stress is unavoidable cause for peptic and Gastric ulcer

Treatment

. Antihistamines - Which block H_2 receptors

Cimetidine ✓

Ranitidine

. Omeprazole Controls the Ach reaction

. The HCl is Secreted manly due to Gastrin but there are no Specific medication for blocking Gastrin. Compound.

5 Tropp effect

- It is also known as Staircase phenomenon
- Repeated addition of Stimulus to First Still in Continuation of First Contraction i.e Stimulus given while Relaxation period of first Stimulus
- due to this ~~first two~~ Starting Contraction are very Strong
- At last it maintains at Constant phase due to Saturation of Ca^{+2} level.

1. Achalasia Cardia

- It is a disease where ~~St~~ Stimulations Contraction of Cardia muscle is affected
- It is due to decrease in Ca^{+2} level
- Calcium induced Calcium Release is affected hence Contraction of Cardia muscles affected

2 Phagocytosis

Engulfing of Compounds and digesting inside the intra Cellular Compartment and releasing the unwanted Compound

. Endocytosis Where the unwanted material is released out

v] Reasoning out

1. Conduction velocity is more in myelinated neuron it is due to presence of Teliglia a modification of Schwaan cells where it speeds up the Velocity of Conduction 1½

5] Von willebrand disease Where Von willebrand factor is absent So platelet Cauldnot identify the VWF on damaged Site So Bleeding and Clotting time is Prolonged.

2. lactobicilli release Ca ion inside the Stomach Which Cause a mild ~~Cont~~ Closure of Spincter present at top and Bottom So the ~~Bolu~~ Bolus movement is arrested

3. liver disease Cause edema

· Edema is Caused by excessive accumulation of lymp in intestial Spaces So damage to liver Causes accumulation of lymp in lymphate vessels Which Cause edema

7.2.20

Physiology Test

II

1. Neural Centres for regulation of respiration

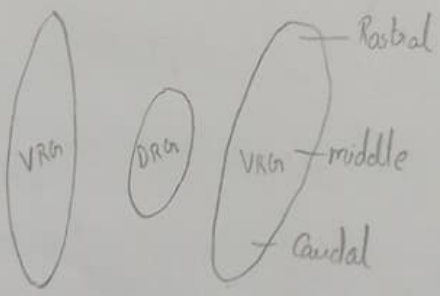
. The respiration takes place in body by voluntary and involuntary action

. Voluntary Control takes place at Cerebral Cortex impulses shared via Cortico Spinal tract

. Automatic Control is from Brain Stem and Converges on C5-C6 Nerves

. Automatic Control in medullary region divided into neural Groups DRG, VRG, CPG

. DRG, VRG, CPG present at medullary Rgon



location of DRG and VRG

DRG

. Dorsal Respiratory group which is located bilaterally at Nucleus Tractus Solitarius

. It get impulses from Abdominal and thoracic Viscera

- It get impulses from Chemoreceptors, Baroreceptors Via the C_9 And C_{10} Cranial nerve
- It intergrates the nerve impulses
- It is actives only in Inspiration
- It innervates only the inspiratory muscles

VRG

- Ventral respiratory grap which is present at nucleus ambiguous and Retro facialis
- It is active during both inspiratory and expiratory
- Nucleus ambiguous divided into retroambiguous and paraambiguous
- Retroambiguous and Retrofacialis are active during expiration
- parambiguous is active during inspiration
- VRG is divided into Rostral espiratory, Caudal espiratory and middle inspiratory

Rostral espiratory - It drives the Caudal espiratory grap only

Caudal espiratory - It innervates the espiratory muscles.

Middle inspiratory. It innervates inspiratory muscles as well as the increase the Size of Caliber

CPG

. Central pattern generator. It appears to be at pre botzinger Complex

. It Controls the respiratory rythm

Interaction between DRG and VRG maintain the Rhythm Synchronously and harmonously

Pons

Pneumotaxic Centre

. It is present as parabrachialis and Kolliker fuse Centre

. It is active during both inspiratory and expiratory

Apneustic Centre

. It activates prolonged inspiration interrupted by brief expiration

. It is induces the DRG Middle inspiratory which in turn increases the inspiration

. Pneumotaxic Centre inhibits the apneustic Centre

2

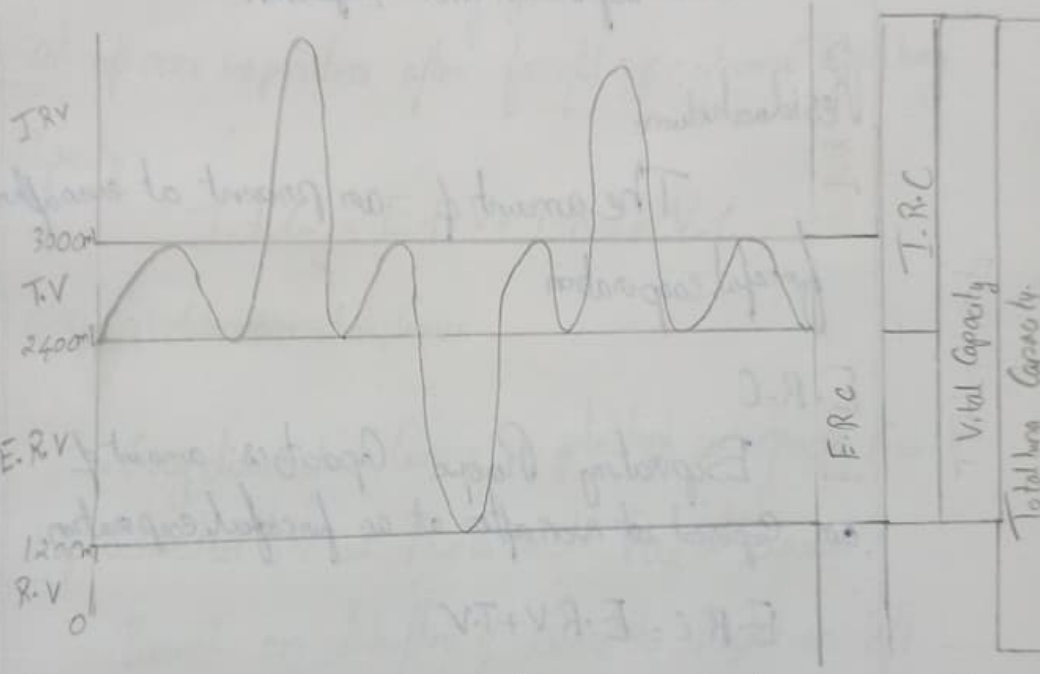
Rest
high Centres

. RAS and limbic System are both high Centres at brain

• RAS activated during at time of waking

• limbic System Controls the Respiration during Emotional Situation

2. Spirogram



Spirogram is used to measure the amount of gas present at lungs at each phase

Expiratory Reserve volume

The amount of gas expired after the Tidal

The amount of gas expired at end of an Inspiration is Expiratory reserve volume. ERV = T.V + E.R

Normal value is 1200 ml

Inspiratory reserve volume

The amount of gas inspired after an forceful expiration is Inspiratory reserve volume

. I.R.V + T.V

. Normal value is

Tidal volume

Volume of air present at lung after a normal expiration and inspiration

Residual volume

The amount of air present at even after forceful expiration

E.R.C

Expiratory Reserve Capacity is amount of air expired at even after at an forceful expiration

E.R.C = E.R.V + T.V

I.R.C

Inspiratory Reserve Capacity is amount of air that inspired at forceful inspiration

I.R.C = IRV + T.V

Vital Capacity

- The amount of air present that can be In
- The amount of air expired forcefully after a normal inspiration is Vital Capacity
- V.C = E.R.V + I.R.V + R.V

Total lung Capacity

The amount of gas that is totally can be Stored at off ones inspiration after forceful expiration is Total lung Capacity

T.L.C. = E.R.V + I R V + V.C

3. Oxygen dissociation Curve

- Oxy dissociation Curve is plotted in Graph f. with % of Saturated Hb at Y axis and Po_2 at x axis.
- Based on Shifting of Curve to Right or left Binding affinity of Oxygen to hemoglobin is determined
- Oxygen ~~dissoci~~ dissociation Curve is Sigmoid Curve what Where it posses Steep and plateau phase.

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Rats
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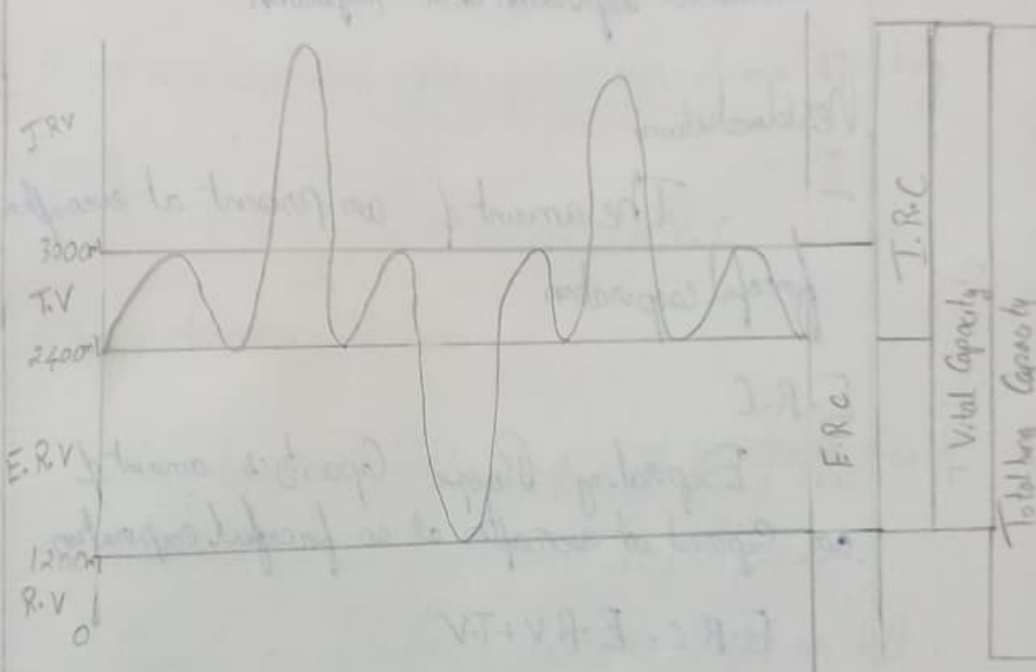

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. I.R.V + T.V

. Normal values is

Tidal volume

Volume of air present at lung after a normal expiration and inspiration

Residual volume

The amount of air present at even after forceful expiration

E.R.C

Expiratory Reserve Capacity is amount of air expired at even after at an forceful expiration

E.R.C = E.R.V + T.V

I.R.C

Inspiratory Reserve Capacity is amount of air that is inspired at forceful inspiration

I.R.C = I.R.V + T.V

Vital Capacity

- The amount of air present that can be In
- The amount of air expired forcefully after a normal inspiration is Vital Capacity
- V.C = E.R.V + I.R.V + R.V

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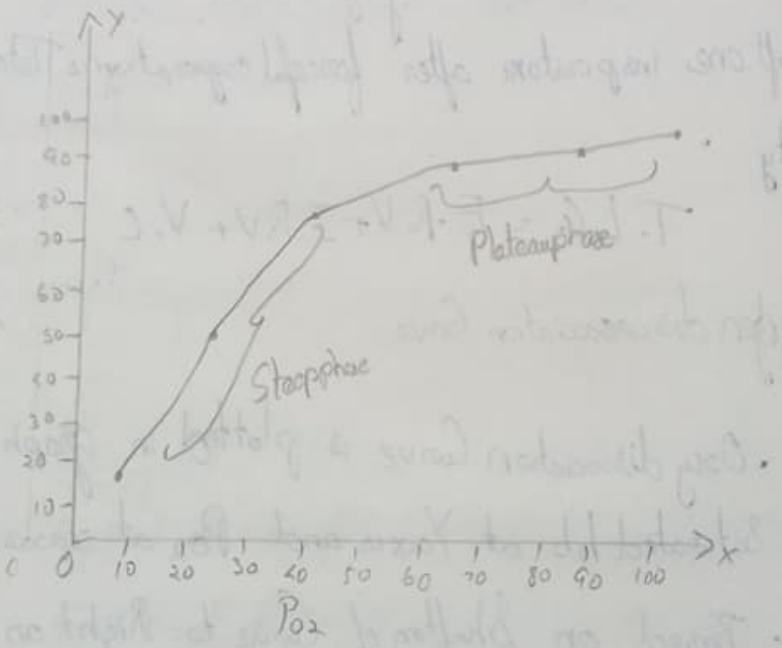
- Based on Shifting of Curve to Right or left Binding affinity of Oxygen to hemoglobin is determined
- oxygen dissociation Curve is Sigmoid Curve what Where it posses Steep and plateau phase.

P_{O_2}	% Saturated Hb
100	98
80	95
60	90
40	75
27	50
10	13.5



Steep phase

- The line descends steeply after P_{50}
- It indicates the binding affinity of Hb to Oxygen.

Plateau phase

- The Saturation of hb remains Constant towards oxygen even after the decrease in Respiration
- decrease in P_{O_2} decrease only 98→95% of hb saturated

Step - Saturation point of hb doesn't change abruptly

Shifting of Curve to right - decrease the binding affinity of O_2 towards hemoglobin

Shifting of Curve to left - increased the binding affinity of O_2 towards the hemoglobin

Reasons for Shifting of Curve to Right

- Increased Co_2 Concentration
- Increased Temperature
- Decreased PH
- Decreased O_2 (Hypoxia
- Hyper Capnia
- Increased 2,3 DPG

Shifting of Curve to left

- Decreased Co_2
- Increased pH
- Decreased temperature
- Decreased 2-3 DPG

Co_2

- Co_2 binds with hb instead of O_2 Since hb has more affinity towards Co_2 than O_2
- In decreased PO_2 tissues utilizes the oxygen so hb donot have O_2 to bind so it binds with Co_2

PH pH

- It increase H^+ Concentration which in turn increases the Co_2

2,3 DPG

- It displaces the O_2 present at hemoglobin
- Increased DPG during Anemia. Causes Shifting of Curve to Right.

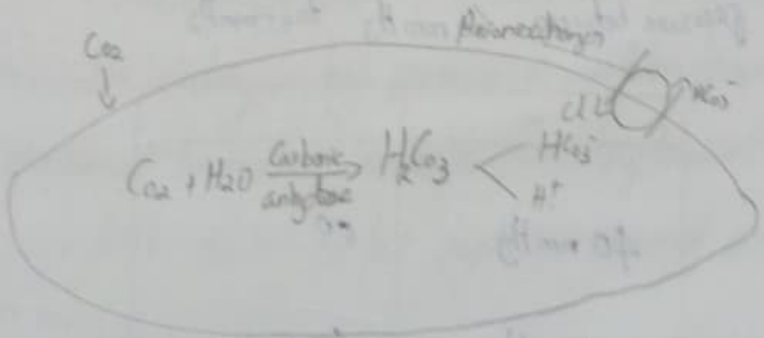
4] Co_2 transport

Co_2 Transport takes place by

- Bicarbonates - 70%.
- Carbamino haemoglobin - 23%.
- Dissolved in plasma - 7%.

Bicarbonates

- Most of Co_2 is transported as Bi Carbonates as which is due to haem bungen effect
- Co_2 enters the Cell and reacts with H_2O, to form Bicarbonate
- By Anion exchanges Co_3 is exchanged for Chloride to interstial fluid which is known as Chloride Shift.
- Co Reaction between Co_2 and H_2O is possible only by Carbonic anhydrase



Chloride Shift - Exchange of Bicarbonate ion for Chloride into the Cell by anion exchanger.

• Due to imbibible Chloride Shift most of water molecules binds with Chloride So. Swelling of Cell takes place.

• It is reason for increased Sized of cells in Venous blood than arterial blood which is about 3 times

Dissolved in plasma

Henrys law States that the amount of gas dissolved in Solution is directly Proportional to the partial pressure of gas

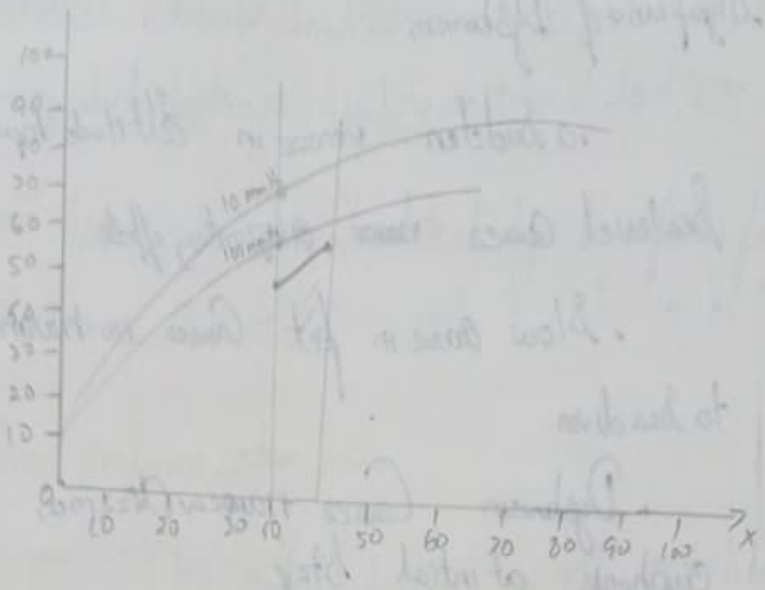
P_{Co_2} at arterial blood - 40mmHg

P_{Co_2} at Venous blood - 45 mm Hg

Carbondioxide dissociation dissociation Curve

• Co_2 dissociation Curve exists at pressure between 40 mm Hg to 45 mm Hg

P_{Co_2}	% Sat Hb
40 mm Hg	50
45 mm Hg	60



- The P_{CO_2} at 40 mm Hg 50 % of Hb binds with hemoglobin
- It is adapted

---

5. Dysbarism

- It is also known as Caisson's disease where the the person is transported from low pressure to high pressure
- When people working at Caissons Chamber under Seawater undergoe high pressure a Sudden / rapid increase in movement towards Sea level Causes Dysbarism
- At each 10 feet depth 1mm of pressure increases
  - 10 feet - 1 mm Hg
  - 20 feet 1+1 - 2 mm Hg
  - 30 feet - 3 mm Hg
  - 50 feet - 5 mm Hg

Significance of Dysbarism

• a Sudden increase in altitude towards Sealevel Causes respiratory effects

• Slow ease in fet Causes no harm to to Sea diver

• Dysbarism Causes nausea or dizziness euphoria at initial Stage

• Dysbarism Can also be Seen in airplanes without proper pressure Controlling Chambers

2

III Short

1. Dead Space

• It is the Space present between the Nose to Terminal / Respiratory bronchioles.

• Usually 500ml of air is inspired at Tidal volume Volume 150ml got wasted at this dead space

• This dead space is known as anatomical dead space

• Physiological dead space = Anatomical dead space + Alveolar dead space

2

• Usually Alveolar dead space is negligible but mostly Physiological dead space is equal to anatomical dead space

• Dead Space can be Calculated by Radford's formula and Bohr's equation.

3. Ventilation perfusion ration ratio

The ratio between air flow (A) to blood flow (Q) in lungs is known as Ventilation perfusion Ratio.

. But Ventilation perfusion ration Changes with Apex and Base

. Apex Base has more blood flow and Ventilation due to gravity

. Ventilation perfusion ration at apex is 0.6

. Ventilation perfusion ration at Base is 3.6

6 Asphyxia

. It is Combination of hypoxia and hypercapnia

. It is divided into Stages The Stage of exaggeration Stage of Convulsion and Stage of Termination Stage

. At Stage of exaggeration Subject tends to inspire a lot but eb due to Block defect in Pulmonary tracts it is not possible

- All Respratory Centres work Vigorously for inspiration

Stage of Convulsion all muscle Contracts and lung Cannot function properly

At last Stage with a deep inspiration Subject get blocked lung and dead.

SCUBA diving

- Self Contained Underwater Breathing apparatus
- It is a breathing apparatus where a tank filled with oxygen and ~~hemo~~ helium mixtures Connected to the mouth.

Q. Type of hypoxia

- hypoxic hypoxia
- Stagnant hypoxia
- Anemic hypoxia
- histotoxic hypoxia

- hypoxic hypoxia is due to decreased P_{O_2} in blood
- Anemic hypoxia is due to anemia which decrease the hemoglobin Count
- Stagnant hypoxia - Situation where tissue Cannot utilise the O_2

1. Essay

(1) Layer of Respiratory membrane

- Surfactants
- Epithelial Cell of Alveolar
- Basement membrane of Alveolar
- Intestat fluid
- Basement me Basemembrane of Capillary
- Endothelial Cell of Capillary.
- Plasma
- Red Cell membrane
- hemoglobin

2. Timed forced Vital Capacity

It is the forced expiration after normal inspiration Based on percentage of air expired Seconds it is Classified into FVC(1), FVC(2), F.V.(C)

F.V.(1) - Forced vital Capacity at one Second which is about 80-90%

F.V.C(2) - Forced vital Capacity at 2 Second is about 90-98%.

1. Chemoreceptors

1) The receptors which activates the the Respiration based on Chemical present at blood are known as Chemoreceptors

P_{CO_2}, P_{O_2}, H^+ Concentration are the Chemicals used by chemico Chemo receptors

. It is Classified into peripheral Chemo receptors and Central Chemo receptors

2) Peripheral Chemo receptors Contains Aortic and Carotid bodies

Carotid bodies present at bifurcation of Common Carotid arteries

. Carotid bodies is Spherical and, it passes Typ Type I and Type II Cell

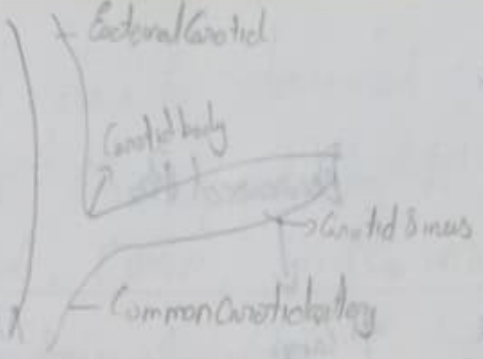
Type I Cells are glomus Cells

Type I Cells

. It is Spherical Shape

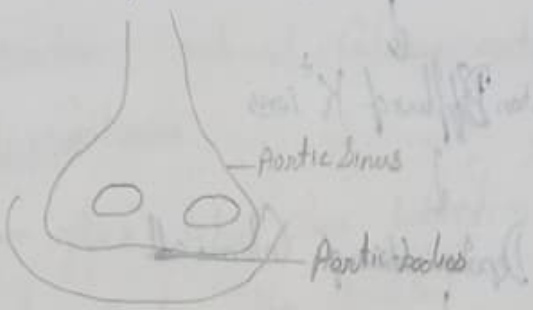
. It produces Chemical like Catecholeamine Dopamin

. Dopamine monitors the gas exchange of Blood



Type II Cells present around the Type I Cell

Aortic bodies present at the aortic Sinuses



3. Mechanism of Chemical regulation

. The Change in value of PCO_2, PO_2, H^+ Concentration decides the ventilation process

. All three Stimuli has Sway of inhibiting the K^+ Channel.

. Which further opens the Ca^{++} Channels and release of Calcium induced neurotransmitters

. Respiratory Centre Stimulated and ventilation occurs

. These Steps are Same for every Stimuli

hypoxia

Decreased PO_2

↓

loss of at heme protein	↑ Camp	NADPH oxidase in mitochondria

↓

Inhibition of K^+ Channel

↓

Inhibition Efflux of K^+ ions

↓

Depolarisation of Glomus cell

↓

Depolarization induced Ca^{++} ion gate opened

↓

Ca^{++} influx

↓

Ca induced neurotransmitter Secreted

↓

Stimulation of Respiratory Centre

↓

Ventilation occurs

In hypoxia due to decreased Pa_{O_2} with it increases the chance of inhibiting K^+ channel by three methods, cAMP, loss of Ca_{2+} ion heme protein NADPH oxidase in mitochondria

. It inhibits the K^+ channels which causes the inhibition of efflux of K^+ ions

. Depolarisation - induced Calcium gate opening leads to influx of Ca^{++} ions

. Calcium influx takes place which in turn produce Ca induced neuro transmitter secreted

. Stimulation of respiratory centre and ventilation takes place

hyper Capnia

↑ Co_2

↓

Inhibition of K^+ channels ~~by dec.~~

↓

Inhibition of K efflux

↓

Depolarization of Glomus cell

↓

Depolarization induced Ca^{++} ion gate opened

↓

Ca^{++} influx

↓

Ca induced neuro transmitters secreted

↓

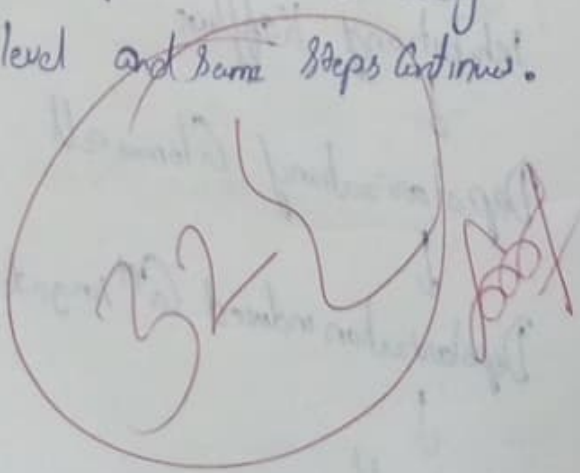
Stimulation of Respiratory Centre

↓

Ventilation

Due to Decrease d level of Co_2 K channels get blocked and efflux of K ions are inhibited

- Depolarisation of Glomus Cells which causes opening of Calcium Channels.
- Influx of Calcium ions which leads to release of hormones by Respiratory Centres to increase the Ventilation.
- Increase in H^+ Concentration directly enters into the CSF so it automatically increases the Co_2 level and same steps continues.



VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

Velammal Village, Madurai - Tuticorin Ring Road, Anuppanadi, Madurai – 625009.

NAME OF THE EXAMINATION : 1st IA (●) / 2nd IA ( ) / 3rd IA ( ) / 4th IA ( ) / 5th IA ( ) / MODEL EXAM ( )

SUBJECT OF THE EXAMINATION : Physiology

DATE OF THE EXAMINATION : 10/12/19 / YEAR : ~~2019~~ Ist year MBBS

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ROLL NUMBER : 27 VMCH&RI 2019

SUBJECT CODE :

Lahyaam
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Q.No.	1	2	3	4	5	6	7	8	9	10
I										
II		12								
III	6		7	8	9	11				
IV	4	5								
V	1	1	2	2	3					

QUESTION NUMBERS / MARKS

VALUATION

	1	2	3	4	5	6	7	8	9	10	TOTAL
I	NA										
II		2									2
III	~~n~~	~~NA~~	~~n~~	2	1¼	2					6¼
IV	~~1¾~~	~~3¼~~	~~NA~~	~~NA~~	~~NA~~						~~2~~ 1½
V	1½	1½	~~NA~~ 2	~~1~~ ¼	~~1~~						6¼

GRAND TOTAL 17/80

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

Signature of the Examiners

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INSTRUCTIONS TO THE CANDIDATE

1) Kindly check whether your register number, subject code etc. printed correctly on the Answer Booklet. If not, please contact the Chief Superintendent.
2) You are prohibited from writing your name in any part of the answer book including the Bar Coded sheet.
3) Write your Register Number, Subject Code etc., in the Bar Coded Sheet in the Column specified Register Number should not be written anywhere else in the answer book
   Illustrations for Writing Numerals VMCH & RI 2018
4) Verify that given question paper of subject, Regulation, title etc., before answering
5) Use both sides of the paper for answering questions, In each page not less than 25 lines to be written.
6) Possessions of any incriminating written / printed / Xerox material, calculator, cell phone or any other electronic devices are totally prohibited.
7) Malpractice of any nature is punishable as per college Statutes.
*) Write the answers according to the order in the question paper.
9) Additional sheets are incorporated in the Answer Booklet. Additional booklet should not be used.
10) Write the page number of the written answer in the Tabulator column provided for the candidate.

32/100

V) Reasoning out:

1) Conduction speed is more in myelinated neuron as nodes of Ranvier are present. Concentration of Na^+ ion channels in the nodes of Ranvier are is more than the ion channels present in the unmyelinated neuron. Hence conduction velocity is more. 1½

2) In children with ~~fatal~~ lactose intolerance, the enzyme lactase is absent, hence lactose does not get absorbed in the duodenum and jejenum of the intestine, instead lactose reacts with the intestinal flora to produce gas, and increases the intestinal motility, thereby producing diarrhoea. 1½

Lacto bacilli produces the enzyme lactase, which helps in the digestion of lactose, and prevents diarrhea.

3.) Plasma proteins are required to produce Starling's forces i.e. oncotic and hydrostatic pressure, which maintains the blood volume in the blood. These plasma proteins are synthesised in the liver.

In the presence of liver diseases, the plasma proteins are not synthesised adequately. Hence this leads to decreased oncotic pressure and thus leads to edema.

4.) In Gastrectomy, HCl secretion by the gastric parietal cells are absent, hence, this leads to ~~vitamin~~ reduced iron absorption and reduced Vitamin B_{12} deficiency, thus this leads to microcytic and Megaloblastic anemia respectively. Hence dimorphic anemia is seen.

5> In von Willebrand's disease, vWF factor is absent. Due to it's absence, addhesion of platelets on does not take place, this in turn leads to absence of prolonged temporary hemostatic plug formation. Hence clotting time is prolonged.

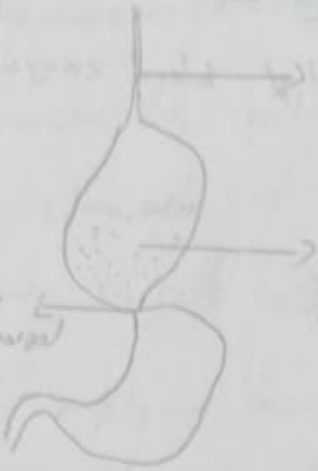
Due to absence of THP, thromboplastin is not secreted adequately and hence blood coagulation does n't take place. Thus bleeding time is prolonged.

IV > Short answers.

1> In Achalasia cardia, the lower esophageal sphincter fails to relax on stimulus, thus food accumulates in the esophagus and ~~blo~~ swells, and the upper esophagus shrinks and gives a rat tail appearance. Achalasia cardia can be cured by three methods, namely mechanical method, botulinum toxin or surgical intervention. Small amounts of botulinum toxin is injected in the lower esophagial sphincter ~~and~~ and relaxes the muscle, but this method is temporary and ~~that~~ lasts upto 5-6 days, where as surgical method is by partial vagotomy and it's effect is permanent.

3

Cause?

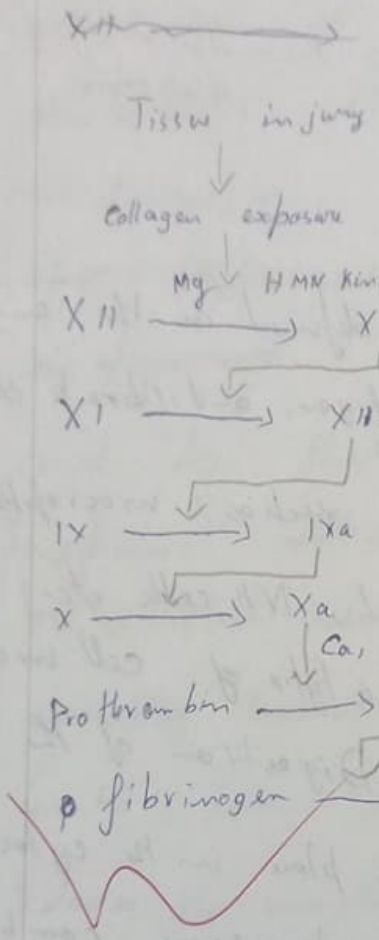


2> Phagocytosis is defined as the engulfing of a foreign microbe / antigen, and it's break down by a phagocyte such as macrophage, monocyte, Neutrophil, NK cells etc. Phagocytosis is a type of cell mediated immunity. Digestion of the the antigen takes place in the cytosol of the phagocyte. primary lysosome combines with the antigen present in a vesicle, and gets converted into a secondary lysosome and secrete lysozymes in the antigen containing cell via perins, or by embedding perforins and causing cell lysis by influx of water.

3/10

III) Short notes on

1) Extrinsic method of blood coagulation:



Defective Hemostatic Plug formation due to clotting of blood.

3) ~~Hemolytic anemia of newborn occurs~~

The process by which the contents of the stomach is emptied into the jejunum is called gastric emptying.

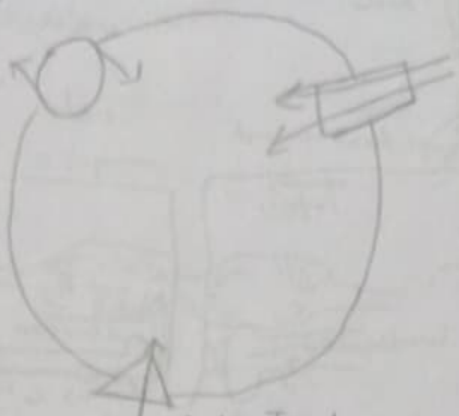
Gastric emptying occurs when the chyme is thoroughly mixed with the gastric secretions of the stomach. The pyloric sphincter plays a vital role in the gastric emptying. The sphincter slowly releases the gastric contents into the duodenum. ~~And~~ Peristaltic contractions and gastric contractions push the chyme against the pyloric sphincter. When the stomach is empty, MMC occurs every 90 mins, this ~~peristaltic~~ peristaltic movement clears out the ~~food~~ remaining fragments and pieces of food in the gastric wall and pushes it in the duodenum.

4) Transport of a substance is divided into two types,

i) Passive transport
ii) Active transport.

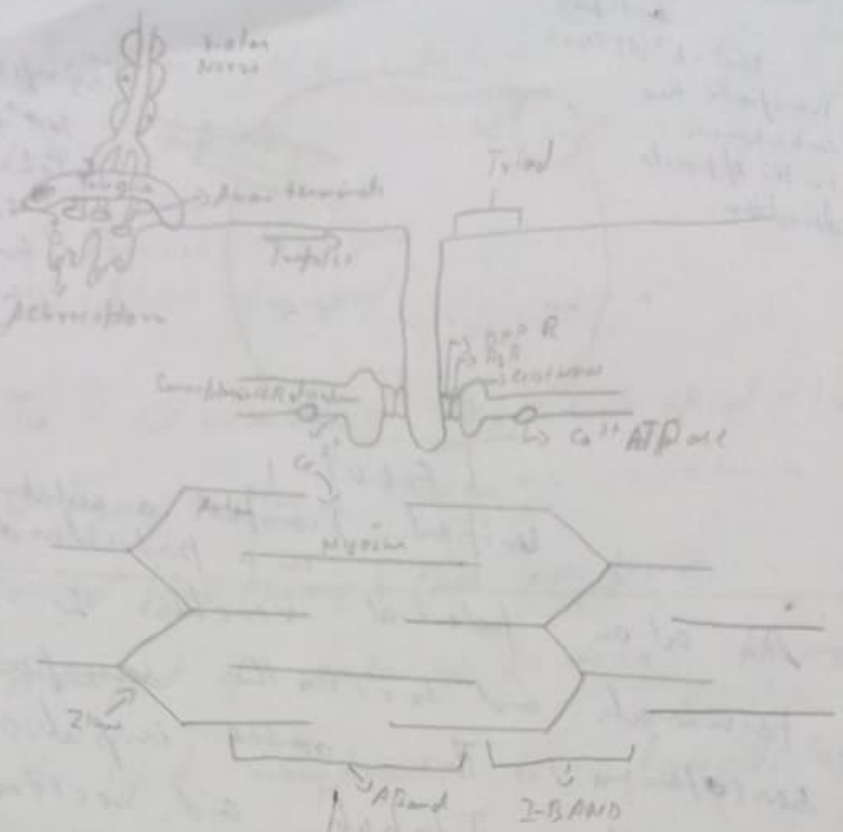
The cell membrane is made up of a lipid bilayer, thus lipophobic substances can not pass through this membrane. Transport of such substances through the lipid membrane is facilitated by carrier proteins.

Transport via carrier proteins may be active or passive. Active facilitated transport uses ATP and transports the substance against it's concentration gradient. Passive facilitated transport ~~dif~~ transports the substance along it's concentration and electrical gradient across the membrane and do not consume ATP. Facilitated transport may be three types: uniport, symport or antiport.

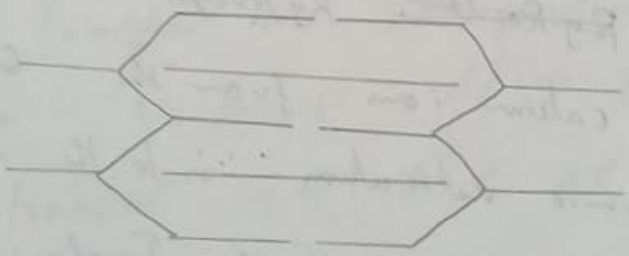


5) An action potential reaches the axon terminals and excites the sarcolemma. This impulse reaches the T tubule and excites the DHP receptors, which in turn excites the Ry Receptors, which releases calcium ions from the sarcoplasmic reticulum into the sarcoplasm. The calcium binds with the Troponin complex and exposes the myosin - actin binding site on the actin & myosin filament and causes the contraction of muscles & by power stroke

(10)



Causes contraction



6.) Types of intestinal movements:

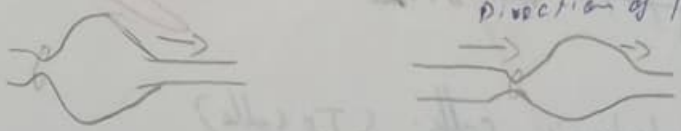
-> segmentation
-> Propulsive.

-> 

Segmentation:

This type of movement occurs due to the contractions of smooth muscles in the muscularis mucosa. It helps in the proper mixing of chyme with the intestinal secretions. This movement does not helps in propulsion of food. ~~forw~~

Propulsion:



These movements pushes the chyme forward slowly, assisting in mixing and absorption of digested food.

II) Essay:

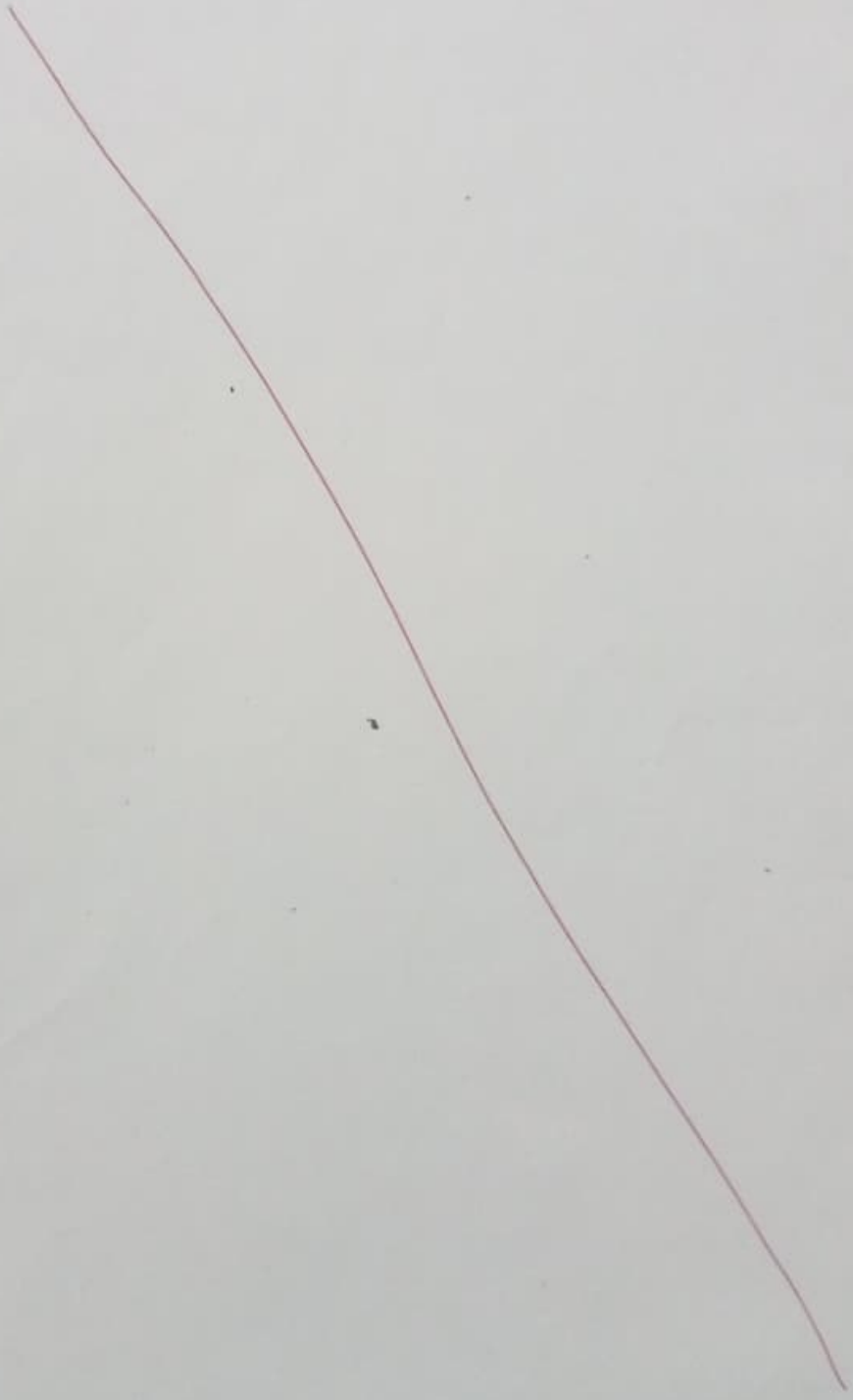
2) Cell mediated immunity is a non-specific immunity mediated by cytotoxic T-cells. Cell mediated immunity is effective against intracellular antigens such as viruses, tumor etc.

Types of T-cells:

→ Helper T-Cells (Inducer T cells):
These cells help in identifying the foreign antigen and mounting an action against it, by attracting NK cells and B cells. It is also called C_4 cells as it has CD_4 receptors on it's cytotoxic membrane.

→ Cytotoxic cells: (T_8 cells)
These cells are phagocytic in nature. These cells bring about cell lysis by perforins, lyase enzymes etc. They possess CD8 receptors on it's membrane.

→ Memory T cells: These cells remember the immunological insult and when the same antigen presents itself, it mounts a response, several times the initial response. It gives rise to millions of cytotoxic & B cells and



RS Class test

Section 1 : 1 X 15 = 15

1.) What are chemoreceptors (2). Explain location and structure of chemo receptors with diagram (5). Discuss the mechanism of chemical regulation of respiration with appropriate flow charts (8). Add a note on Cheyne - Stokes breathing (2).

Section 2 5 X 5 = 25

1.) Neural centres for regulation of respiration
2.) Spirogram
3.) Oxy haemoglobin dissociation curve
4.) CO_2 transport.
5.) Dysbarism

Section 3 (2 x 10 = 20)

1.) Dead space
2.) Hering Breuer reflex
3.) Ventilation perfusion ratio
4.) Hyaline membrane disease (IRDS)
5.) Complications of lungs
6.) a.) Asphyxia
b.) SCUBA Diving
7.) a.) Valsalva manoeuvre
b.) Muscles of Inspiration
8.) Timed vital capacity
9.) Types of hypoxia and it's causes
10.) Draw the diagram of respiratory capillary membrane and mention the thickness of it.

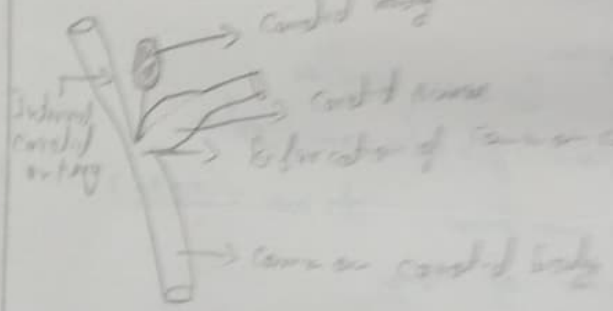
Case no 1

1) i) Chemoreceptors are receptors of the body which sense the chemical composition of the blood, such as pco_2, po_2, pH etc.

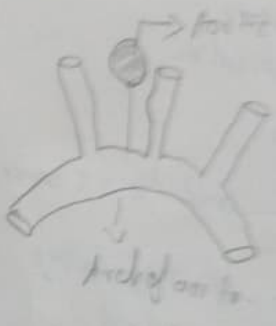
ii) Chemoreceptors are of two types, central and peripheral

→ Central chemoreceptors are present in the medulla

→ Peripheral chemoreceptors are carotid and aortic bodies. The carotid body is found at the bifurcation of the common carotid artery, and the aortic body is present in the arch of aorta.



a. Carotid body



a. Aortic body

The carotid body is made up of two types of cells: glomus cells (Type I) and sustentacular cells (Type II).

The carotid body is closely related by fenestrated capillaries and the nerves from the 9th spinal nerve.

The carotid body is a 2 mg ~~mass~~ weighing tissue with a blood supply of 2L/100g of tissue/min. The carotid body has high metabolic activity.

a carotid body.

The glomus cell contains various vesicles containing Dopamine, & synthesised by the mitochondria of the glomus cells.

iii) Mechanism of regulation of respiration by chemoreceptors.

Ans

Peripheral chemoreceptors.

High altitude

↓

↓ PO_2, hypoxia

↓

Sensed by carotid body.

↑ cAMP — Closure of K^+ channels — Activation ↓ NA

↓

loss of oxygen from O_2 containing Heme pigment

↓

↑ cAMP — Closure of K^+ channels — ↓ in mitochondrial NADPH oxidase.

↓

cessation of K^+ efflux

↓

Depolarisation of cell

↓

opening of Ca^{2+} channels

↓

Influx of Ca^{2+}

↓

release of Dopamine → Binding of Dopamine D_2 receptors of the nerve endings

↓

Action potential stimulated in the 9th cranial nerve.

↳ Stimulation of respiration → ↑ ventilation

hypoxia, hypercapnia, ↑ in H^+ concentration is detected by the peripheral chemoreceptors and impulses are sent to the respiratory centres in the medulla to initiate hyperventilation to compensate for the decreased pO_2, increased pCO_2. Thus hyperventilation ↑ pO_2, washes out pCO_2 and increases ↓ pH, thereby bringing the oxygen content of the blood to normal.

Central chemoreceptors:

The central chemoreceptors in the medulla are only stimulated by the H^+ concentration. But it takes a long time for H^+ to stimulate the receptors as it diffuses poorly across the blood brain barrier. But CO_2 easily diffuses across the blood brain barrier. ~~In the~~ After crossing the barrier, it enters the respiratory centre cells and gets converted into H^+ & HCO_3^- by the activity of carbonic anhydrase present in the cell. The ↑H^+ concentration stimulates the respiratory centres directly and indirectly hyperventilation to wash out the CO_2, decreasing pCO_2.

↑ pCO_2

↓

CO_2 diffuses through blood brain barrier

↓

CO_2 binds with H_2O and gets converted to H^+ & HCO_3^-

↓

H^+ stimulates the respiratory centre

↓

↑ in ventilation rate

↓

CO_2 is washed out

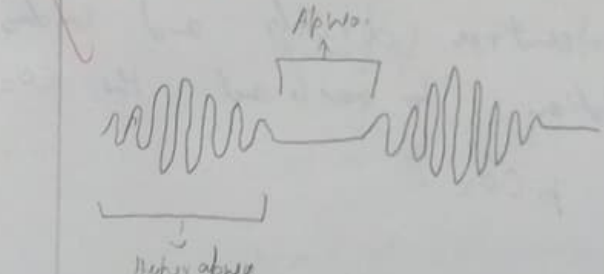
↓

↓ pCO_2 levels

iv) Cheyne - Stokes breathing:

In this type of breathing, a cycle of hyperpnoea is followed by a period of apnoea is observed.

During apnoea, pO_2 levels falls down, thus stimulating the respiratory centres, producing hyperpnoea. After pO_2 levels have reached normal levels (140 mm of Hg), ventilation rate reduces and again slowly apnoea is produced.



Δ Cheyne - Stokes breathing.

Section 2:

1.) Neural centres are present in the Medulla and pons, voluntary neural regulation is by the cerebral cortex.

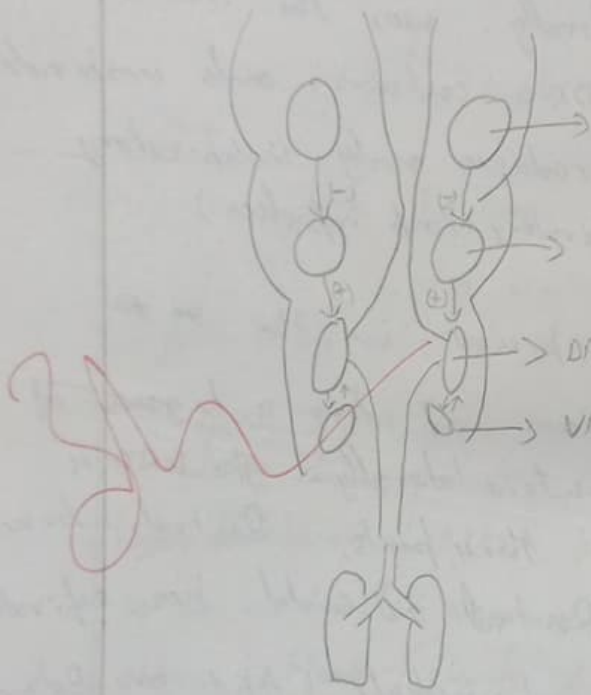
In Medulla Respiratory centres called Ventral groups of respiratory neurons and Dorsal groups of respiratory neurons are present.

DRG is present in the dorsal of the medulla, bi laterally, near the Nucleus Tractus Solitarius. DRG contains only inspiratory neurons and produces only inspiratory impulses (Inspiratory Ramp impulses.)

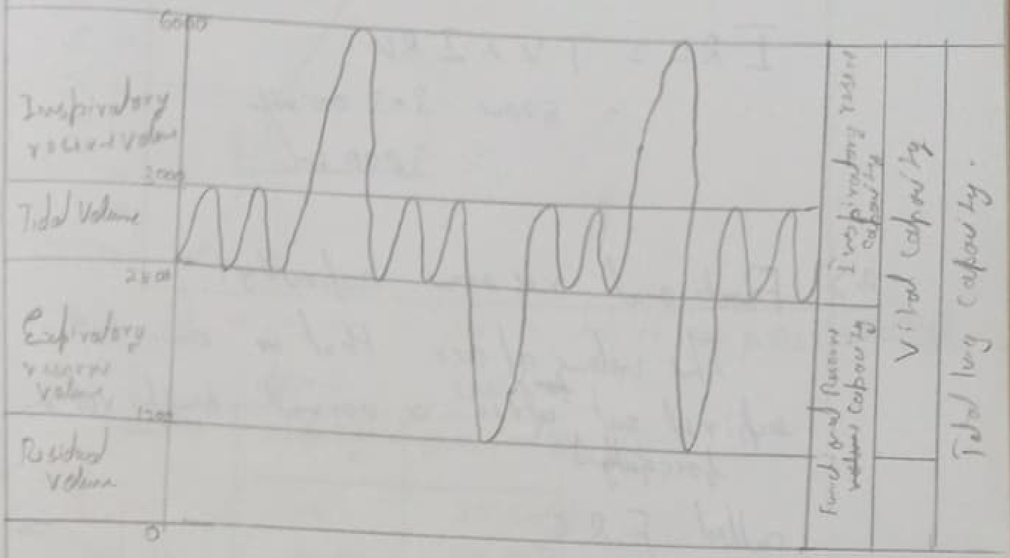
VRG is present in the Nucleus Ambigous and retro ambigous of the medulla ventero laterally. The VRG is divided into three parts, Rostral, intermediate, and caudal. Rostral and caudal has espiratory neurons, and intermidiate (AKA pre-Botzinger complex) produce inspiratory impulses. Normally VRG is inactive during quiet breathing.

In the pons we have Pneumotaxic centre in the upper pons. The Pneumotaxic centre shifts the phase of inspiration and expiration. It functions by inhibiting the Apneustic centre in the lower pons

The Apneustic centre is stimulates DRG to produce inspiratory impulses. It produces Apneusis.



2) Spirogram..



Lung volumes:

Tidal volume: The volume of air inspired or expired during quiet breathing.

volume = 500 mL

~~Residue~~ Inspiratory. Reserve volume: The amount of air that can be inspired in excess forcefully after a normal inspiration

volume = 3.3 Litres in men
1.2 litres in women

Expiratory reserve volume: The amount of air that can be expired forcefully after a normal expiration.

volume: ~~2 litres~~. 1.3 litres

Residual volume: The amount of air present in the lungs even after a forceful expiration is called residual volume.

Volume = 1.2 litres.

Lung capacities

1.) Inspiratory reserve capacity: The volume of air that can be inspired forcefully after a normal tidal inspiration

IRC = TV + IRV
= 500ml + 3000 mL
= 3500 mL

2.) Functional residual capacity:
The volume of air that is can be expired out after a normal inspiration is forcefully
called FRC:

FRC = RV + ERV
= 1200 + 1300 mL =
2500 mL

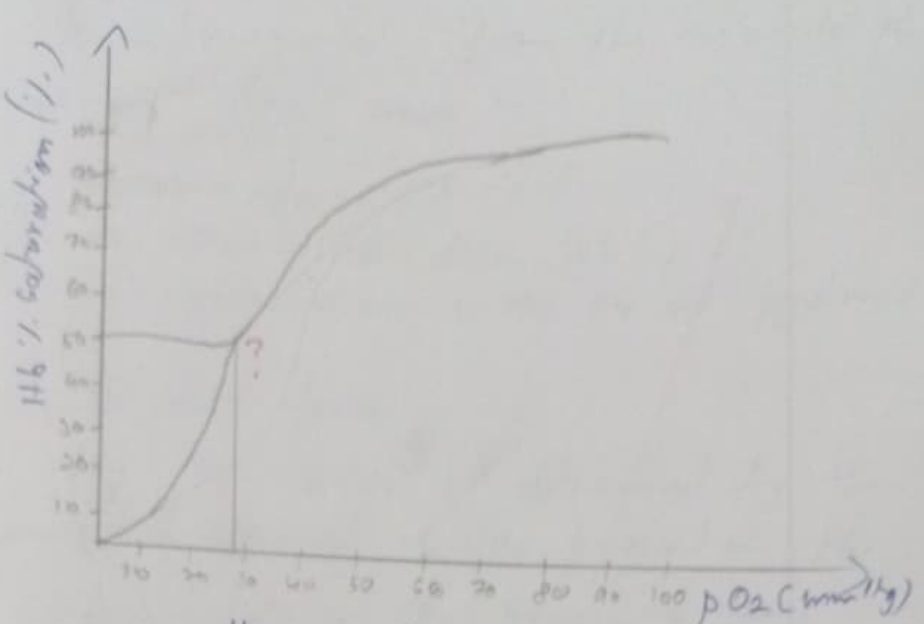
3.) Vital capacity: The volume of air that can be expired forcefully after a forceful inspiration:

VC = TV + IRV + ERV
= 500 + 3000 + 1300 mL
= 5.1 Litres

4.) Total Lung capacity: The total volume of air that can be filled in the lungs

∴ TLC = VC + RV
= 5.1 + 1.2 = 6.3 Litres

3) O_2 dissociation curve



Yaxis	Xaxis
Hb % saturation	pO_2 (mm Hg)
100 %	97.5 mm Hg
80 %	95 mm Hg
60 %	89 mm Hg
50 %	27 mm Hg
40 %	13 mm Hg
20 %	10 mm Hg

Factors shifting ODC to the right

-> ↑ PCO_2
-> ↓ PO_2
-> ↑ H^+ concentration
-> ↓ ↑ 2,3 DBG
-> ↓ Temp.

Factors shifting ODC to the left

-> ↓ PCO_2
-> ↑ PO_2
-> ↓ H^+ concentration
-> ↑ 2,3 DBG
-> ↑ myoglobin content
-> ↓ Temp

4) CO_2 Transport:

CO_2 is transported from the tissues to the lungs via three ways

i) Dissolved form (7%)
ii) Bicarbonate form (63%)
iii) In combination with Hb and proteins. (30%)

i) Dissolved form:

The pCO_2 is determined by the amount of dissolved CO_2 present in the plasma. This is by Henry's law.

The normal value of dissolved CO_2 in the plasma is 6 mg/dl of plasma. It accounts for 7% of the total methods of CO_2 transport.

ii) Bicarbonate form:

The CO_2 is transported in the form of bicarbonate ions. CO_2 enters the RBC due to partial pressure gradient where it reacts with H_2O in the presence of carbonic anhydrase to produce H_2CO_3. H_2CO_3 is unstable acid that dissociates into H^+ & HCO_3^-

HCO_3^- enters the plasma from the RBC in exchange for a Cl^- ion entering the RBC via the anion exchanger 1 (Band 3 protein) This is called chloride shift.

$$CO_2 + H_2O \xrightarrow{CA} H_2CO_3 \longrightarrow H^+ + HCO_3^-$$

iii) Combined form with Haemoglobin.

CO_2 combines with Hb to form carbamino haemoglobin in the RBC.

Section 3:

1) Dead Space is divided into two types

-> Anatomical dead space
-> Physiological dead space.

Dead space is denined as the area where exchange of gases is not possible.

i) Anatomical dead space: The volume from the nose till the terminal bronchioles volume is 150 ml

ii) Alveolar dead space is the space or alveoli with no or insufficient blood supply, and exchange of gases cannot occur

Physiological dead space is the sum of anatomical and alveolar dead space.
Usually alveolar dead space is very negligible, hence in healthy individuals anatomical dead space is almost equal to physiological dead space.

In restrictive lung diseases like emphysema, physiological dead space is more than anatomical dead space.

2> Hering Breuer reflex is a protective reflex to prevent the over inflation or over deflation of the lungs.

It is of two types

-> Hering Breuer inflation reflex:

The receptors for this reflex are present in the smooth muscle of the bronchi & bronchioles. This prevents the over inflation of lungs and prolongs expiration, by inhibiting DRG

-> Hering - Breuer's deflation reflex.

In this reflex, the receptors are not stimulated, hence inhibition of DRG is removed and produces inspiration

3.) Ventilation perfusion ratio is the ratio between the amount of air in the tissues by the amount of blood perfused in the tissues

$$\frac{V}{P} = 0.84.$$

If ↑ if ventilation rate is ↑ed with no change in perfusion rate.
and decreased if ventilation is ↓ed with no change in perfusion rate.

4.) Hyaline membrane disease is common among pre matured babies where the surfactant is yet to be synthesised and spread in the lungs. This leads to lung collapse and ~~inability~~ inability of the baby to inhale air.

6) a.) Asphyxia is the condition where hypoxia and hyper capnia is seen due to hypoventilation or ↓ PO_2 in the air.

b) Self contained Under water Diving Apparatus
-> Tank contains 20% O_2 & 80% Helium

7) a) Expiration of air against closed glottis is called as Valsalva maneuver

b) Primary muscles
-> Diaphragm
-> External intercostal muscles

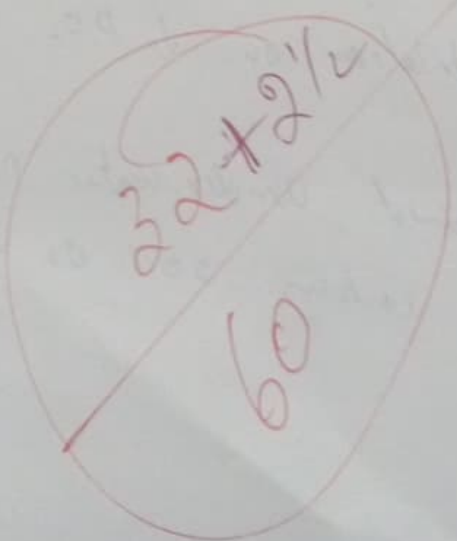
Accessory muscles
-> Pectoralis muscles
-> Scalenus
-> sternocleidomastoid.

8) -> Hypoxic hypoxia due to ↓ PO_2 in blood

-> Anemic hypoxia: due to anemia
-> low Hb content (or)
-> low RBC content

-> Stagnant hypoxia: due to ineffective circulation of blood.

-> Histotoxic hypoxia: due to chemical poisoning.



2020-21

12.03.2021

Class Test -2

Essay

1) Describe in detail the importance, mechanism & applied aspects of cell mediated immunity. Add a note a). MHC antigens. b) Transplant rejection.

Short notes

1) Name the clotting factor & explain the mechanism of blood clotting by intrinsic & extrinsic pathway

2) Phagocytosis

3) Hemolytic disease of newborn. Name 4 hazards of mismatched blood transfusion

4) Anticoagulants

5) Stages & general factors regulating erythropoiesis

Cell mediated immunity

=> Cell mediated immunity is due to presence of T lympocytes

=> Cellular mediate is long losting

=> Immunity is particulary againt Intracellular organisms like pacteria, paracites, tumour cells, fungui

Mechanism

=> Antigen recognition, processing, presentation

=> Activated T lymphocytes

=> Eliminate the invaders.

Flow chart

Antigen Enters the body

↓

Caputure by Macrocytes

↓

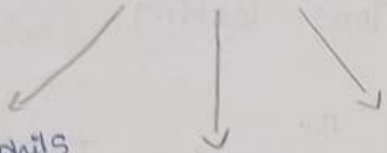
Partially digestive

↓ released IL-1, MHC-2 attached

activated T lymphocytes.

activated Helper T cells (TH_1)

Exocytosis

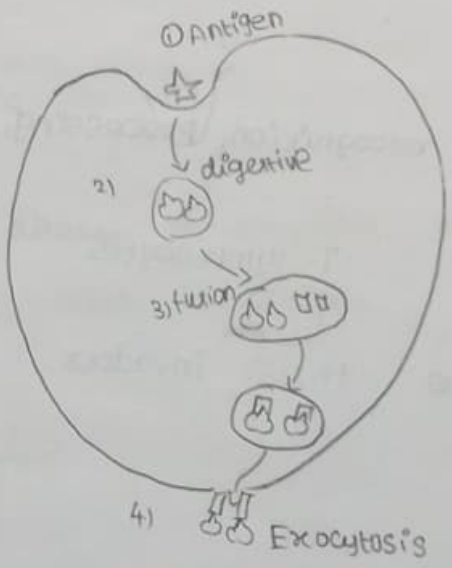


Neutrophils (Phacocytoes)

B Cell (complement Systems)

Dentrit cells.

Diagrams



1) Antigen enters the cells

2) digestive

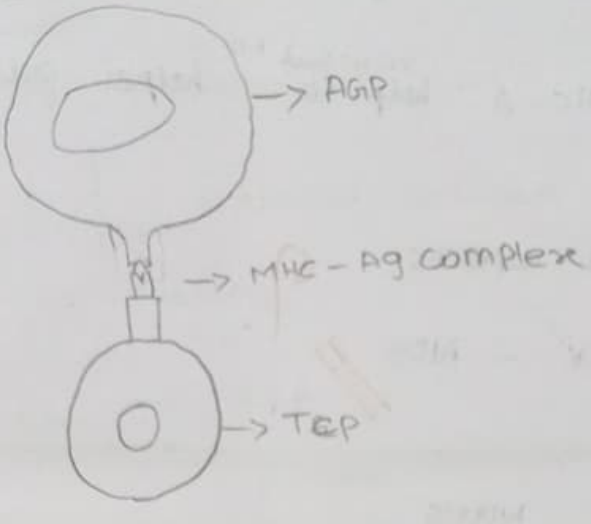
3) fusion of Polypeptide

4) Vesicles fused to MHC &

5) It Produced to antibody

6) Elimate the anti

Immunoglobulin Synapse



This 2 signals very Important

1) AGP binding the TCP

2) Surroding the proteins attached to MHC - Ag complex

First Antigen enters the body. And Next macrophages digestive the antigen partialy. Partialy antigen attached to MHC-2 and releasing IL-2. MHC-2 activated T cells. T cell activated to helper Tcells. Helper T cells produced to IL-2. IL-2 activated from in the cells.

MHC antigens:-

They are two types of antigens here

1) MHC-1

2) MHC-2

1) MHC-1 ~~help~~ activate to Killer cells.

2) MHC-2 ~~help to~~ released to helper cells

Applied aspects 9.

HIV – AIDS

III Short Notes

1) Name the clotting factors

I – fibrinogen

II – Prothrombin

III – Thromboblastin

IV – calcium

V – proaccelarin

VII – labile factor

VII – Anti – Phasophillic A

IX – christmas factor

X – Stuart – Prower factor

XI – Anti – Phasophillic B

XII – Hageman factor

Intrinsic Pathway

Injury vessels

↓ exposed collagen

- ve surface,

XII ⟶ XII A

↓ HMW kininogen

XI ⟶ XI A

↓

IX ⟶ IX

↓ Ca^{+}, PL, VII ⟶ VII A

X ⟶ X A

↓ Ca^{++}, PL, Va

Prothrombin activator

Intrinsic pathway is - ve surface and activated XII factor or exposed collagen

Activation (Factor XII) A

Factor XII activated to XII A. This Important co-factor was HMW kininogen activated the XII

Activation XIA

factor XI activated to XIA.

Activation IXA

=> factor IX activated IXA.

=> calcium, VII → VIIA, Phospholipids

Activation XA

=> factor X activated to X

=> Calcium, Platelet phospholipids, VIII → VIIIA Activor factor

Activation prothrombin activator

Extrinsic Pathway

Tissue Injury

↓

release thrompoblastin

↓

VII → VIIA

↓

X → XA

↓ Ca^{++}, PL, Va

Prothrombin activator.

Release Factor III

Thrompoblastin is key to extrinsic pathway.

Activation VIIA

factor VII activated to VII A

Activation X

=> factor X Activated to X

=> calcium, factor activated, phospholipids

Prothrombin activator

Next prothrombin activator

↓ Ca++

Prothrombin —> ~~pro~~thrombin

↓ XIIA~~←~~ XII

Fibrinogen —> Fibrin

↓ (common pathway)

4) Anticoagulats

Substance which postpone blood Cloting of blood

=> Anticoagulates used to prevent blood cloting in the body (in vivo)

=> Anticoagulates used to prevent blood cloting from the body (In vitro)

=> Anticoagulates used to both In vivo and In vitro

1) Heparin

2) coumarin derivatives

3) EDTA

4) Oxalate compounds

5) Citrate

Heparin :-

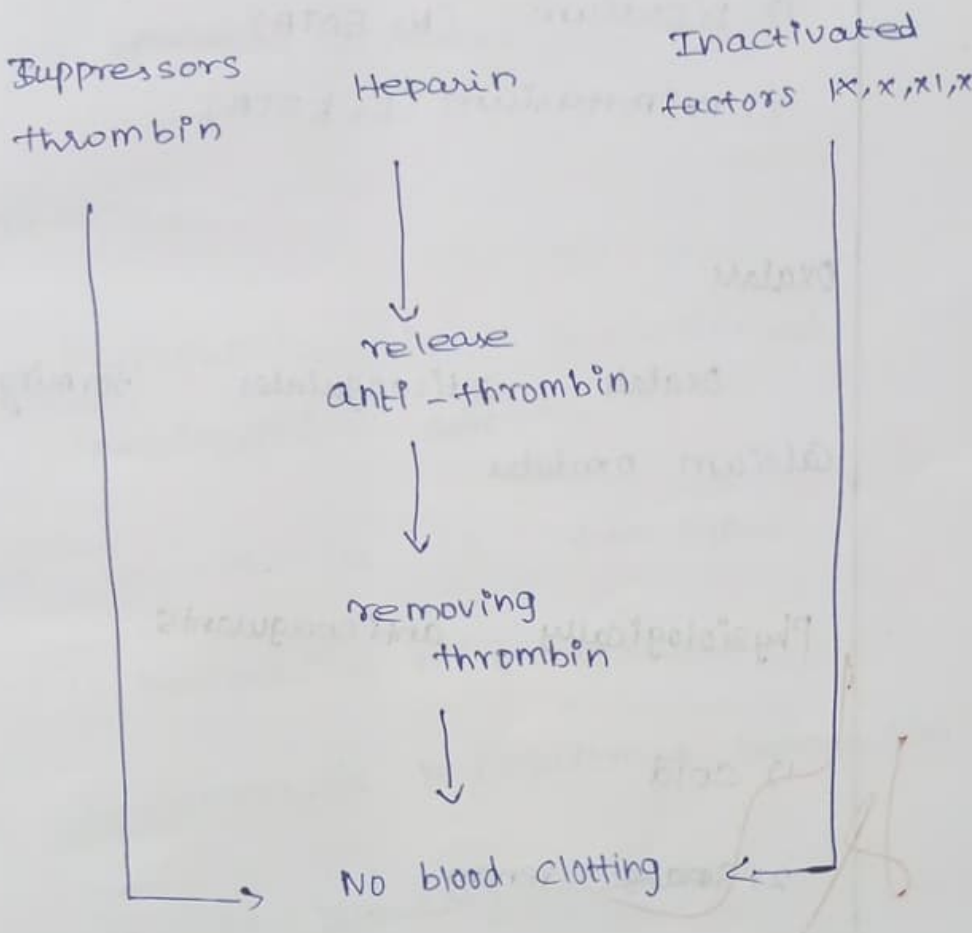
=> Heparin produced naturally in body by anticoagulats

=> It's produced to mast cells.

=> It is most abundant liver and lungs.

=> Basophils also produced Heparin.

Mechanism of Heparin



Use :-

=> During Heart cardiac surgery, Involved heart - lungs machine.

Coumarin derivatives.

It prevents blood clotting.

=> Myocardial Infarction, Stoke

EDTA :- Most strongly anticoagulants.

This Two Types,

1) Disodium (N_2 EDTA)

2) Tripottasium (K_3 EDTA)

Oxalate

Oxalate anticoagulates forming Calcium oxalates

Physiologically anticoagulants.

1) Cold

2) Snake venom

3) Calcium - Sodium alginate

Tests for anticoagulants

1) Bleeding time

2) Clooting time

3) Prothrompin time

4) Partly Prothrompin time

5) International stabilized ratio.

Bleeding disorders.

1) Hemophilia

2) Purpura

3) Von willebrand diseases

Hemophilia.

=> Hemophillia is sex-linked inheritance disorder

=> Hemophillia is two types.

1) Hemophilia A (classical)

2) Hemophilia B (Christmas Hemophillia)

=> It is Bleeding disorders.

Purpura

Purpura is bleeding disorders.

Vonwillebrand diseases.

It is Bleeding disorders.

5) Erythropoiesis

=Erythropoiesis is the process of formation RBC's cells

Stages

There are th

Sites

These are three sites

1) Megaloblastic stage
2) Hepatic Stage
3) Medually stage

Myoblastic stage :-

During intrauterine life, from 1st week to 4th week RBC produced in Mesoderm of yolk sac

Hepatic stage :-

During intrauterine life, from 5th week RBC produced in spleen and liver, lymphoid organs.

Medually stage :-

RBC produced in only bone marrow.

Stages of erthyopoiesis.

Stem cells

=> It is primary cells

=> Self - renewal

=> ditteranciated to specialised cells.

Plupotent Stem cells

It can restricted to give one group of blood cells.

During change erthropoiesis

1) Reducing cell size

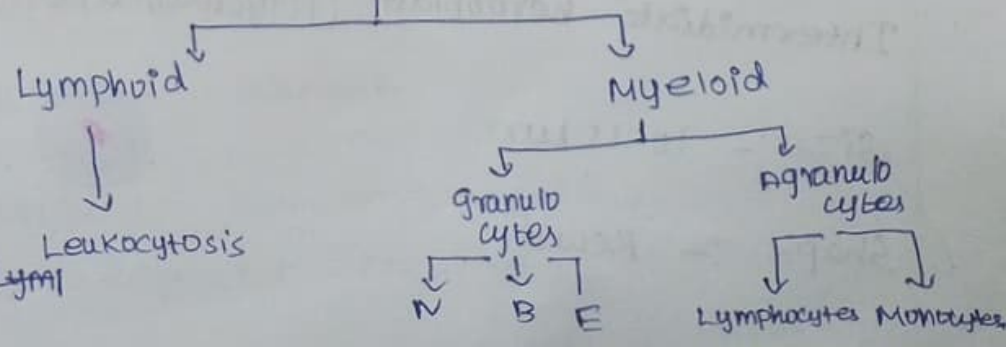
2) disappearance Nucleus

3) appearance Hemoglobin

uncommitted pluripotent stemcells

↓

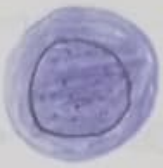
committed pluripotent stemcells.



Precursor cell

Pronormoblast

Size :- 15-20 µm



Shape :- Round

Hb :- NiL

Mitosis :- Present

Nucleus :- large, multi Nucoli

Cytoplasm :- basophillic

Early normoblast (Basophillic erythroblast)

Size :- 10-18 µm

Shape :- Round

Hb :- Synthesid

Mitosis :- Present

Nucleus :- large, Nucoli not seen

Cytoplasm :- basophillic

Intermidiate normoblast (Polychromatic erthoblas

Size :- 10-15 µm

Shape :- Round

Hb :- appearance

Mitosis :- present sluggish

Nucleus :- large, No Nucleoli

Cytoplasm :- acidophillic

Late normoblast (orthochromatic erthroblast)

Size :- 7-12 Mm

Shape :- Round

Hb :- Increasing

Mitosis :- absent

Nucleus :- Small,

Cytoplasm :- acidophillic

Reticulocytes (immature)

Size :- 7.2 Mm

Shape :- Round

Hb :- well developed

Mitosis :- absent

Nucleus :- absent

Reticulo network is ramnants of dis indergrated organelles.

RBC (Mature cells)

Erthrocytes is disc and biconcave shaped.

=> T - 8 µm

=> Nucleus nil

=> Life span 120 days.

RBC count Male :- 4.5 - 6 mill / cumm
Female :- 4.5 - 5 mill / cumm.

General factors :- Hyporia

Hormonal factor

1) Erthropoietin -> Intersitial cells of Peritubul

2) Antrogen

3) Estrogen

4) cortico steroid

5) Interlukines.

Dietry factors :-

1) Vitamins

2) proteins

3) Minerals

Other factors.

1) Environmental factor

2) drug

3) Intrisic factors.

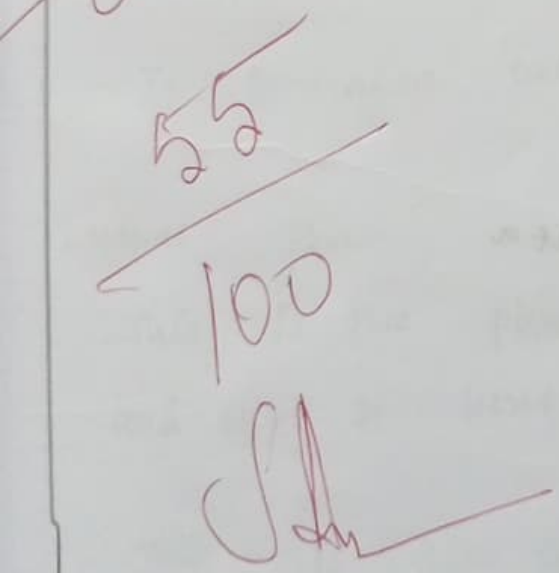
Applied aspect :-
=> Renal failure, pernicius anemia.
RBC ~~count~~ ~~Increased~~

3) Hemolytic disease

=> Anemia

=> jundice

=> Renal failure.



M. GOKILAVANI

M Gokilavani
Roll No:-37
First year MBBS
(1)

Assessment
Internal ~~Assignment~~ - 3

1) Gastric Juice

composition :-

=> Water
=> Solids < organic / Inorganic

organic	Inorganic
① Intrinsic factor	=> Sodium
② HCl	=> pottacium
③ Pepsinogen	=> chloride
④ Gastric Juice	=> bicarbonate

=> Intrinsic factor digestion the Vitamin B_{12}

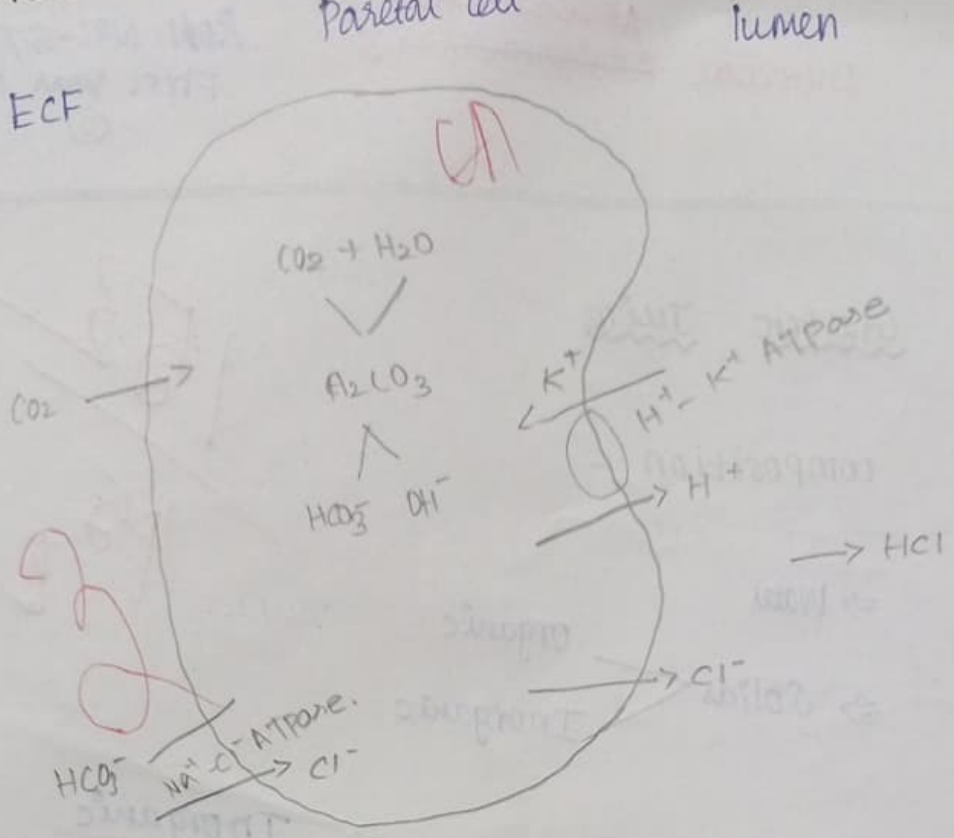
=> HCl prevent Bacterial Infection

Some other function

=> Pepsinogen digestive the protein

=> HCl activated Pepsinogen to Pepsinogen

Mechanism



=> Hydrocholoric secretion in the parietal cells.

=> Extra cellular fluid CO_2 come to the Paretal cells.

=> Paretal cells inside the H_2O

=> H_2O and CO_2 join to form a Carbonic acid

=> HCO_3^- Exchanges the Extra cellular fluid.

=> H^+ Exchange the K^+

=> Exchange the H^+ and Cl^- to form the HCl acid

=> To use the Enzymes are $H^+ - K^+$ ATPase, $Na^+ - Cl^-$ ATPase.

Regulation of Gastri secretion

Hydrochloric acid is secreted by the oxynitic or parietal cells located in the oxyntic glands area of the stomach. Acid Secretion is regulated by several chemical messanger that appear to act separated on the Parietal cell.

Pathophysiology :-

=> NAIDS

=> acnbodies

=> vomiting

=> abdomeral pain something

Treat Ment :- < specific type
Sugical type

specific type

① yoga therapy

② antacids

Surgical type

① Vagotomy

Short Notes

1) Degulition

Swalling or Degulition, is a complex reflexe mechanism by which food is pushed from the oral cavity into the esophagus and then pushed to the stomach. ~~by~~ ~~Pushing is called~~ & This movement of food from the oral cavity on to the esophagus and stomach by pushing is called propulsion and it is an important part of the degestive system.

The ~~article~~ ~~with~~ overview ~~das~~

Three phases occurs in this process

1. oral Phase
2. Pharyngeal Phase
3. esophageal Phase

Including ~~Involved~~ Muscle involved Innervation and Clinical aspects.

2) Rugulation of pacreatic secretion :-

=> cephalic phase

=> gastric phase

=> Intestinal phase.

3) Intestinal movements :-

Two types of Movements Present in Sent

Intestinal movements.

=> One is

① ~~Slow~~ ~~Rear~~ wave like movements.

② Round Movement

Peristalsis

This Peristalsis Movements. This like wave like movements.

Enter the Chyme from Fundus and Move to the Intestine peristalsis occuss in this Place. This Movement occuss food easy to Move the Intestine.

Peristalsis

Peristalsis is a radially symmetrical contraction and relaxation (which is expansion) of muscle that propagates in a wave down a tube, in an anterograde direction

In Much of a digestive tract such as the human gastrointestional tract contracts in sequence to produce a peristaltic wave, which propels a ball of food along the tract. Peristalsic Movements comprises relaxation of circular smooth Muscles, then their contraction behind the Chewed matrels to keep it from moving backwards, then longitudin -al contraction to push it foreward.

4) Functions of bile salts

=> bile salts digestion the vitamin)

=> It is Regulate the blood level

=> Bile salts Regulate the salt level in Liver

=> It is one of the most important thing Bile Salts are very high in Blood. Some diseases are affected.

=> Bile salts are excrete cholesterol and potentially toxic compounds

=> Ingested fat and fat soluble vitamins, facilitating their digestion and absorbtion

Excitation- contraction coupling in Skeletal Muscle

=> Action Potential come to the NMJ to sarcomere

=> Action Potential Spread to the T tubles

=> T tubles Rapidly carry the Action Potential so enter into the ~~t tubles~~ Sarcoplasmic Reticulum.

=> Sacroplasmic Reticulum release the Calcium : So calcium concentration is very high. It high occur the Muscle contraction.

=> This called Excitation - contraction coupling in Skeletal Muscle.

=> It occurs in the many Muscle contraction.

Mechanism of Skeletal Muscle

Action potential Enter the nerve terminal

↓ come to the nerve impuses

Sarcomere

↓ come to

T tubles (Rapidly conduction the ACtion Potential from t tubles to Sarcoplasmic reticulum

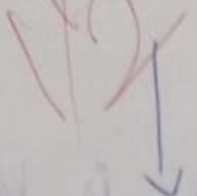
↓

Sarcoplasmic reticulum Ca^+ Channals open the site

↓

Ca^+ Ions release the Sarcoplasmic reticulum

⇒ Ca^+ ions bind to the troponin C



Increasing occurs Muscle contraction

b) Types of

a) Skeletal Muscle Fibers.

Skeletal Muscle Fibers having a two types of Fibers present

① Type 1 Muscle Fibers

⇒ Many capillaries and Myoglobin

⇒ It is red colour. So It is called Red Fibers.

⇒ As it has a Mitochondria and oxygen binding Myoglobulin, ATP

=> Synthesise ATP in oxycelative pospharelation.
So It is called Oxidative fibers.

=> ATP synthesize is very slow, and cross bridge cycle occurs very slow, but Muscle contraction is Prolonged time.

Type II Muscle Fibers.

=> It is called White Fibers

=> This Present in Iris Muscles

=> Muscle contraction is very short period.

b) Smooth Muscle Fibers.

Two types of Smooth Muscle Fibers Present in Smooth muscle

- Viceral Smooth Muscle (single unit Smooth Muscle)

⇒ They have a gab junction

⇒ Action potential conduction is very fastly.

⇒ Example:- Gastro Intestronal tract (GIT), including gall bladder and stomach, Intestine, Rectum

⇒ These are viceral organs. These viceral organs present in Muscle is called viceral ~~organs~~. Muscles.

Multi unit Smooth muscle:-

⇒ They do not have a gabjunction

⇒ This is not voluntary Muscle.

⇒ This is a neural control Muscles

=> ANS is stimulated the Muscle

Ex:- Iris and ciliary body Muscles, Capillary Muscles.

4) Function of Bile salts.

=> Bile

16.08.2021

Internal assignment

Class Test

1) What is Menstrual cycle ? Various Phases with diagram. Add note on Hormone Regulating Menstrual cycle and Menstrual disorders.

short Notes

2) Physiological pregancy Test

2) spermatogenis

3) Test for ovulation

4) Male Infertility test

5) pills

6) puberty

7) Functions of placenta

1) Menstrual cycle

Periodic preparation of female reproductive system of fertilized and inflammation of fertilized ovum

Phases of Menstrual cycle

Menstrual cycle has 2 phases

1) Follicular phase
3) Luteal phase

Follicular phase

- This is the phase of onset of bleeding to day of ovulation
- It is also called preovulatory phase

Luteal phase

- This is the phase of between ovulation and onset of next menstrual bleeding.
- This is also called secretory phase, because this phase secrete progesterone.
- It is also called post ovulatory phase.

Changes in the Menstrual cycle

Follicular phase

i) ovarian changes

ii) uterine changes

iii) vaginal changes

iv) cervix changes

ovarian changes

i) one Follicle select the prominent Follicle, it develop into Mentrue Follicle

ii) Theca interna and granulosa cells Secrete Estrogen

iii) antrum willbe increases in size, stromal fluid increasing volume

iv) degrated of the follicle at 14days after will ovulation occur.

uterine changes.

i) uterine Endometrium undergo hyperplasia and hypertrophy

ii) Endometrium more thickness

iii) Endometrium more vasularised, spiral artery number will be increases

iv) And also Endometrium vein also increases.

v) Myometrial Excitibity will be increases.

Uterine cervix

=> Uterine cervix secrete more amount of mucus

=> Mucus will be alkanility and elasticity

Vaginal changes

=> Corfication index will be increases

Lutear phase

ovarian changes

i) Follicle filled with blood, it is called corpus hemorragium

ii) It pregancy will be occurs, the corpus luteum persists, otherwise it will be degenated, to form the corpus albicans.

Uterine changes

=> Uterine Endometrium have further ^More spiral artery

=> Endometrial glands also coiltus and tortuous

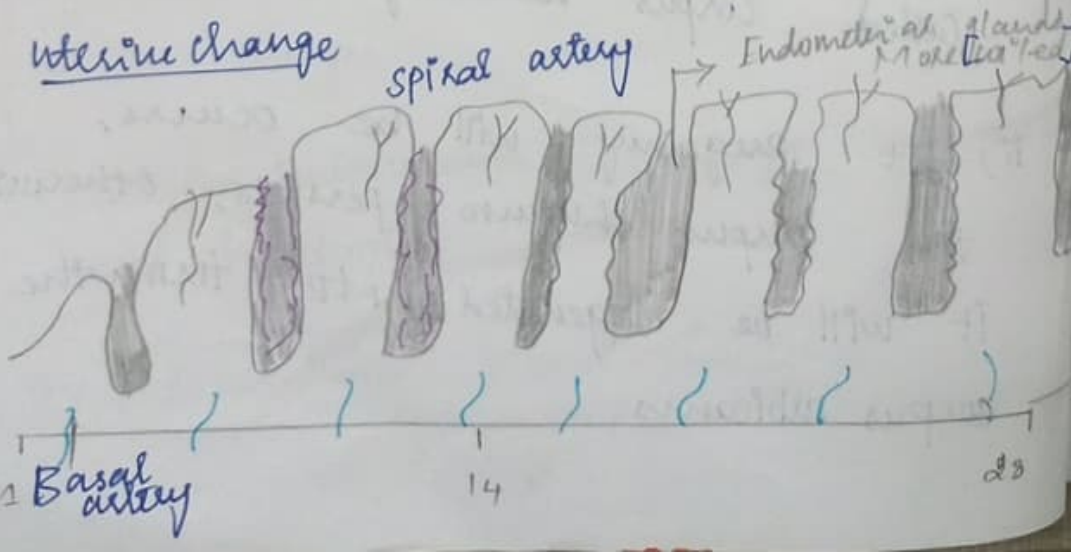
=> Venous laks will be occuring and anastomosis

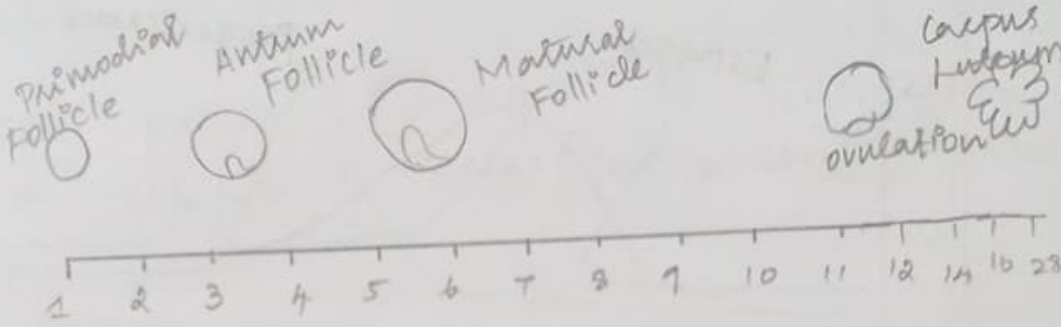
Cervix

=> cervix Mucus will be decrease alkalinity and thickness, so Sperm cannot Enter the Uterine

Vaginal changes

=> cornification index will be decreases.





Hormonal changes

1) Estrogen
2) Progesterone
3) FSH
4) LH
5) Inhibin

Estrogen

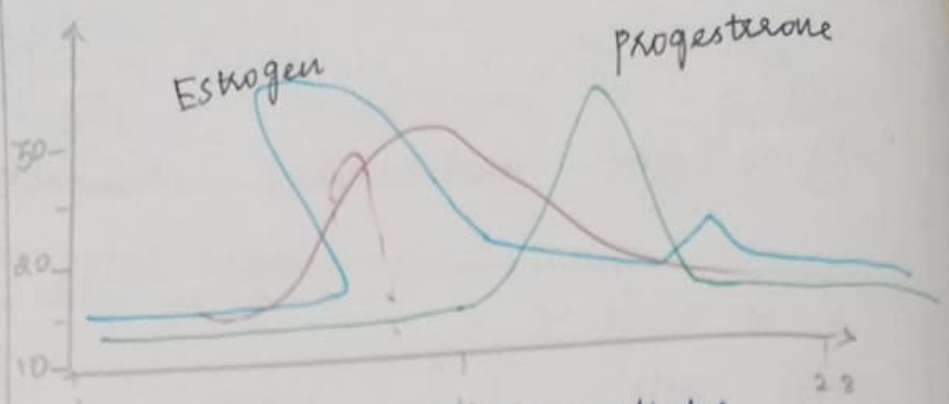
- Estrogen has 2 peeks, There are Major peeks and Minor peeks.

=> The Major peeks occuring in the 8th to 14 day

=> This time time Estrogen level will be increases.

=> Follicle cells secrete More amount of Estrogen

=> And then Minor peek, it occuring in the after ovulation. Corpus luteum Secrete Small amount of Estrogen.



Estrogen and progesterone changes

Progesterone

=> Progesterone level will be increasing in the after ovulation

=> Corpus Luteum secretes the progesterone

=> regression of progesterone, carpus ca Luteum, progesterone level will be decreases.

FSH

=> Follicle Stimulating hormone level increasing in the Follicular phase

LH

=> LH secretion increasing in the ovulation.

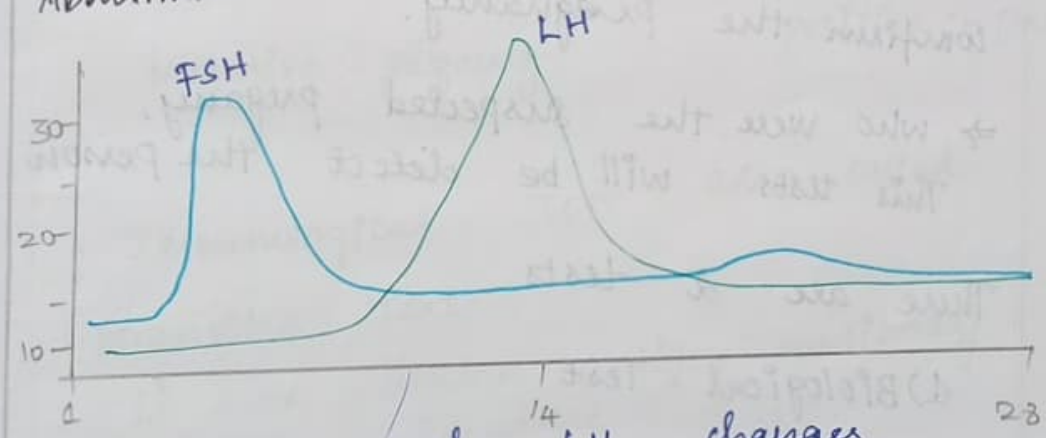
=> LH will be more secretion. This is called LH surge. after that ovulation occurs after ovulation LH level slightly decreases

Inhibin

- The pattern changes of concentration of Inhibin B with concentration of LH

- The pattern changes of concentration of Inhibin A with concentration of FSH

Abnormalities of ↑↓



FSH and LH changes

Disorders

Amenorrhea - absence of Menstrual cycle

Oligomenorrhea - decreased frequency of Menstrual bleeding

Polymenorrhea - Increased frequency of Menstrual bleeding

Hypomenorrhea - decreased Menstrual cycle

dysmenorrhea - painfull menstrual cycle

Metrorrhagia - Uterine abnormal bleeding

Menorrhagia - Increased Menstrual bleeding.

Short Notes

1) Pregany Test

=> Pregany Test definid as detect or confirm the pregnancy.

=> who were the suspected pregany, This tests will be detect the person

There are 2 tests

1) Biological Test

i) Friedmain Test

ii) Kuppermann Test

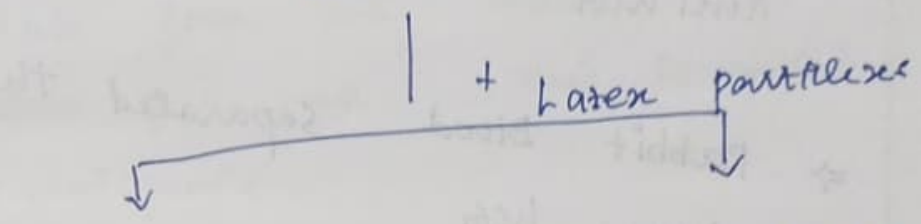
iii) Galli Mainni Test

2) Immunogical Test

- This Test used the anti-hcg Serum

- This test More accurate, so this test will be recommend

hCG antiserum
+
Who were the detect the Pregancy, that urine will be urine



agglutation → Negative :- pegancy

No agglutation → positive :- Pregancy

- Immunological Test also called Granvidex Test
- It acts double antigen - antibody

Principle :- Procedure

=> Seprate the ~~aa~~ hcg in the Pregancy women

=> And add a anti serum hcg

=> add Latex particles

Schemes Experiment :-

=> Rabbit Pregancy women Blood ~~urine~~ will be collected and separated the hCG

=> HCG insertion the Rabbit.

=> Rabbit Blood coated with anti hCG

=> Rabbit Blood separated the serum hCG

Sheep RBC

=> Sheep RBC separated, and that uses Latex particles.

So, Rabbit Serum hCG antigen and Sheep Latex particles. and Pregany women urine added.

=> Mixed well

Procedure

=> one drop antiserum will be take, in the slide

=> and Latex particles and urine added

=> May be agglutation will be occurs Pregancy test should be Negative

=> No agglutation showed be pregany positive

Spermatogenesis

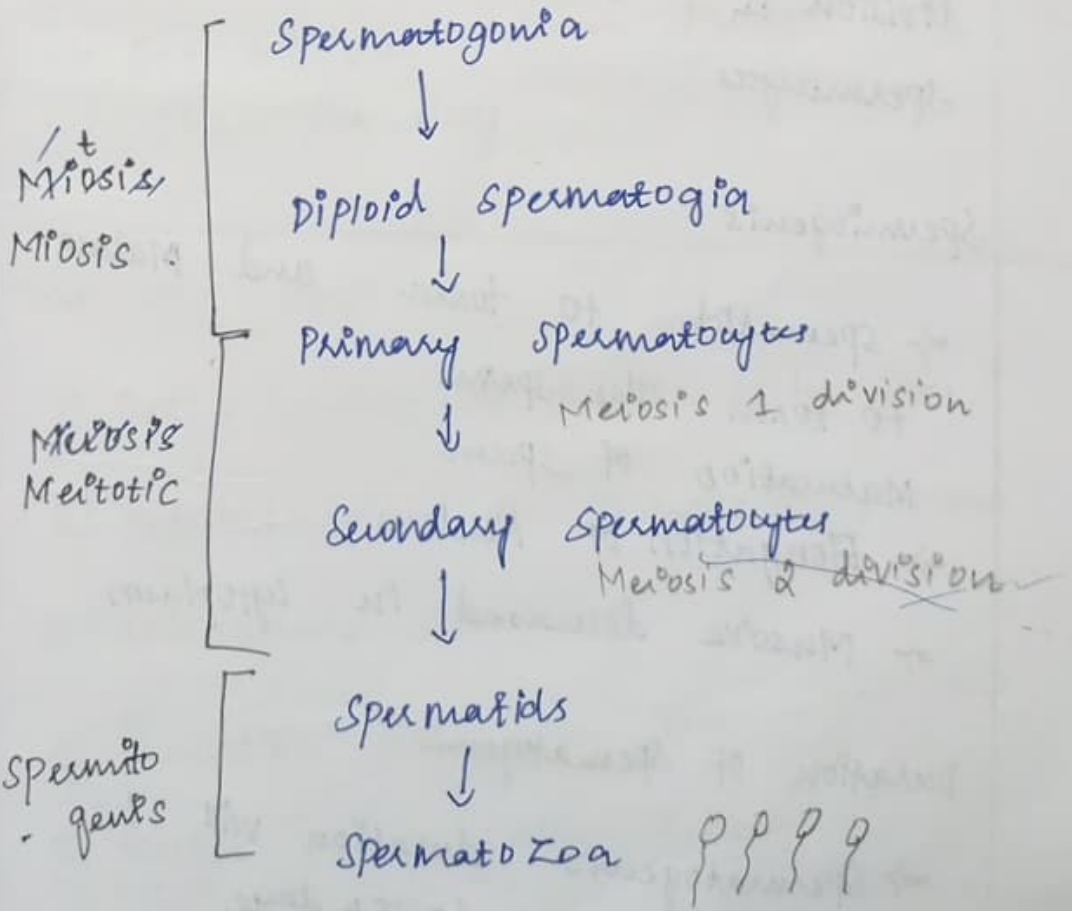
-Male germ cell develop into Mature germ cell, This is called Spermatogenesis.

Phases of spermatogeneses

i) Mitosis Miosis

ii) Meiosis Meiotic

iii) Spermiogenesis



Meiosis

=> primodial gem cells developind into spermatogonia

=> Spermatogonia developed into diploid spermatogonia

Miototic

-> Diploid spermatogonia developed into primary spermaytes

=> perimary spermocytes undergo Miototic division II to form the secondary spermaytes

Spermiogenis

=> spematid to form and mature to form the sperm.

Maturation of spum

=> Elongation of Nucleus

=> Massive decreased in cytoplasm

Duration of Spermatogenis

=> Spermatogenis duration will be ocuring in the 65-74 days.

=> Spermatogonia to primary spermatocytes to form 16-20 days

=> primary spermatocytes to secondary spermatocytes to form 23-25 days

=> secondary spermatocytes to spermatids 1 day

=> Spermatid to spermatozoa form 25-26 days.

Rate of Spermato

=> A single Spermatogonium form 512 Spermatids

=> 600 Millions sperm produce in the per day.

---

3) Test for ovulation

1) Determination of Basal body Tem

2) Determination of Hormone in Plasma

3) ultra Sound Scanning

4) ovulation prediction Test

5) cervix Mucus Fern pattern

ovulation predictor Test

⇒ This is the test detect the Excretion of LH Hormone in urine, or Increasing salt content in the saliva

⇒ once up of LH level Exertion will be increases, it detect the prior of the ovulation.

⇒ only one disadvantage will be there, everytime increasing LH level, it doesn't indicate ovulation will be occurs.

determination of Basal body temperature

⇒ only of the Important Factor Temprature

⇒ Temperature detect will be Morning

⇒ Placed on the thermometer in Vagina (or) ~~and~~ Rectum

⇒ May be Temprature will be altered prior of ovulation,

=> Temperature will be increases, It doesn't occuring the ovulation

=> Thermogenic Effect of progesterone, so Temperature will be increases.

Ultrasound Scanning

=> ovulation will be occur, observed the ovulation in the ultra sound scanning

Cervix Mucus pattern

=> one drop mucus will be spread in the slide, appear in the Fern pattern, ovulation will be occuring.

=> after ovulation Fern pattern will be disappear

Determination of Hormones

=> Determine the hormone level in the plasma such as FSH, LH, Estrogen, Progestrone, at the time of ovulation and after the time of ovulation

At the time of ovulation.

⇒ FSH level decreases

⇒ LH level increases

⇒ Estrogen level increases

after ovulation

⇒ progestrone will be increases.

H) Male Fertility test

⇒ Physical Examination of varicoceles (Enlargement of scrotum veins)

⇒ Semen and sperm analysis

⇒ Vasography, it explore the seminiferous tubules

⇒ Testicular biopsy, it determine the the testis healthy

⇒ Ultrasonography, it detect the seminiferous tubules, testis and other genital organs

5)

7) Functions of Placenta

1) Nutrient Functions

2) Anchoring Functions

3) Respiratory Functions

4) Endocrine Functions.

Nutrient Functions

=> Placenta give to fetus, May Nutrition things, Electrolytes and Essential antibody.

=> Endocrine Functions

Placenta Secrete Many hormones

i) human chroamic gonatotropin

ii) human chroamin somato trophin

iii) Relaxin

iv) Oxytogen

v) Estrogen

vi) prolactin

vii) Progesterone.

Anchoring
Prolactin

Prolactin helps to Secretion to Milk into Breast

Relaxin

It helps in the parturation

Oxytocin

⇒ It Make the bonding from Mother to fetus

⇒ Ejaction of Milk into Breast

Estrogen - helps into the secretion of Many steroid hormones.

Respiratory Functions

- The Fetus doesn't use the Lung to breath,

- The placenta helps to act like lung

- Most Important Function of Placenta in this

Anchoring Functions

- placenta acts like achoring to Mother and Fetus.

Puberty

-transition of Non reproductive state to Reproductive state to form, it is defined as puberty.

Age onset of puberty 8 years

=> 12 - 16 days in girls

=> 16 - 18 days in boys

Initiating of Puberty

=> ^ adrenal Androgen will be initiating

=> Adrenal anrogen stimulating hormone.

Stages of puberty

classified into Tunner Method,

In boys

Stage :- i) No pubic hair development

ii) No Genital organ development

iii) Increasing secretion of adrenal androgen level.

Stage 2:-

=> pubic hair will be scantty development

=> testis above 2.5 cm increases

Stage 3

=> pubic hair will be thickenss and darker

=> penis will be enlarged

Stage 4 :-

=> EJaculation of Speems

Stage 5 :-

=> Full adulesent will be there.

In girls

Stages 1 :- i) No pubic hair development

ii) No Breast development

iii) Increasing secretion of adenal androgen

Stage 2 :- i) Breast development will be there

ii) pubic hair will be developed

iii) hair

Stage 3 :- i) decreased development of scalp hair

ii) pubic hair will be increasing

iii) pigmentation of the alveolar

Stage 4 :- Menstrual cycle will be occuring

Stage 5 :- Full adult pattern will be there.

=> Leptin act in puperty very important role.

=> Leptin, increasing secretion of gonadotrophin realising hormone, and ovulation of follicle.

abnormalities of puberty

i) precocious puberty.

5) pills

=> Pills is the method of oral contraceptive, it will be taken by mouth.

There are four type of pills are there

i) combined pills
ii) sequential pills
iii) Mini pills
iv) post coital pills

These are the contain the synthetic estrogen and progesterone

Effects

1) CVS

=> In CVS, it affect the heart attack, and coronary artery blockage

ii) decreasing the HDL cholestrol

iii) atherosclerosis

iv) Breast cancer

combined pills

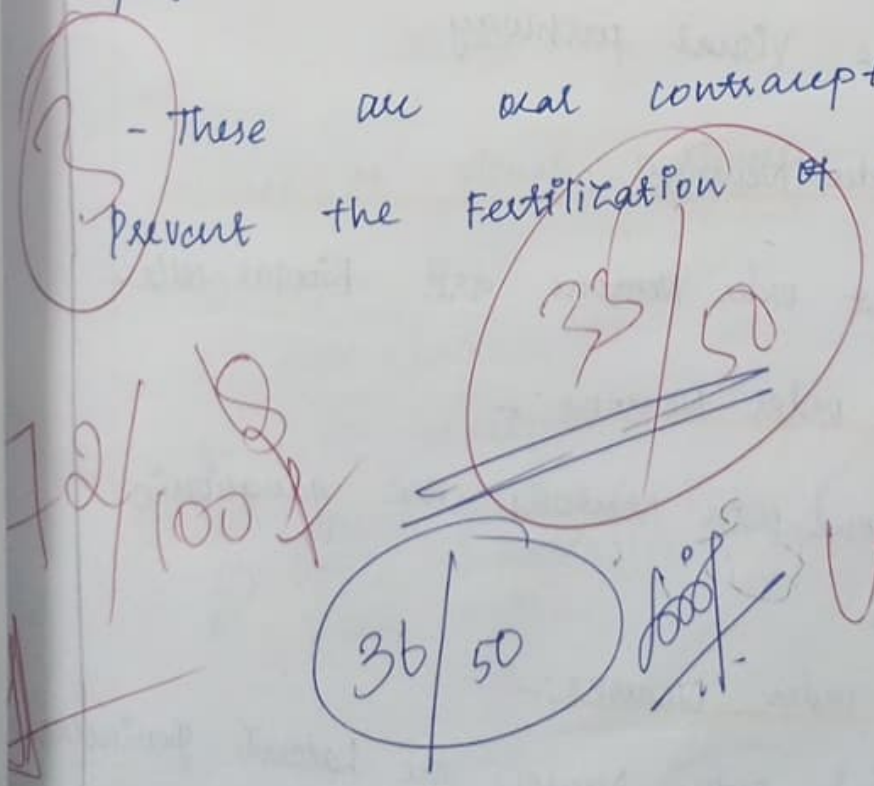
-It contains the Synthetic Estrogen and progestrone

=> It prevent the fertilization of ovum

postcoital pills

- postcoital pills is the emergency pills

- These are oral contraceptives Prevent the Fertilization of ovum.



2021-22

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

Velammal Village, Madurai - Tuticorin Ring Road, Anuppanadi, Madurai – 625009.

NAME OF THE EXAMINATION : 1st IA ○ / 2nd IA ● / 3rd IA ○ / 4th IA ○ / 5th IA ○ / MODEL EXAM ○

SUBJECT OF THE EXAMINATION : PHYSIOLOGY

DATE OF THE EXAMINATION : 6-5-2022 / YEAR : 2022

For College use only

ROLL NUMBER : 8487 VMCH&RI 2022

SUBJECT CODE : 8 8 8 8 8 8

R Hari Pr — Signature of the Candidate

Signature of the Chief Superintendent / Invigilator

HARI PRASHADHA R

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

Answered page Number to be filled by the candidate

Q.No.	1	2	3	4	5	6	7	8	9	10
I										
II	1	5								
III	12	13	14	16	17	17	18	18	18	19
IV										
V										

QUESTION NUMBERS / MARKS

VALUATION

	1	2	3	4	5	6	7	8	9	10	TOTAL
I											
II	A	13									
III	2	2½	2	1	0	½	½	NA	½	½	
IV											
V											
GRAND TOTAL											29½

Signature of the Examiners

1. 12
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6.
7.
8. 8 (MCQ)

Total - 37.5

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   Illustrations for Writing Numerals 8 8 8 VMCH & RI 2 0 2 8
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II Essay:

1) a) Immunity:

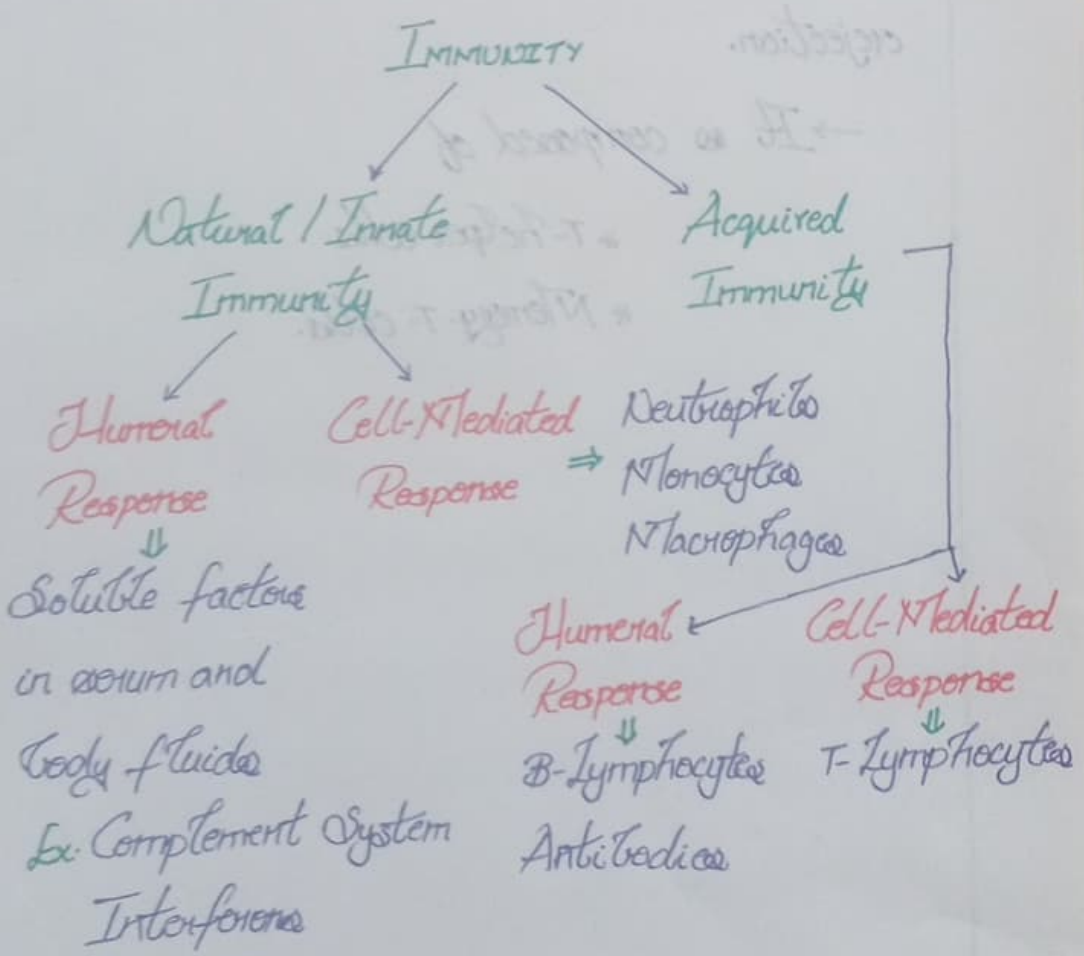
The power on our body produced against the invading micro-organisms.

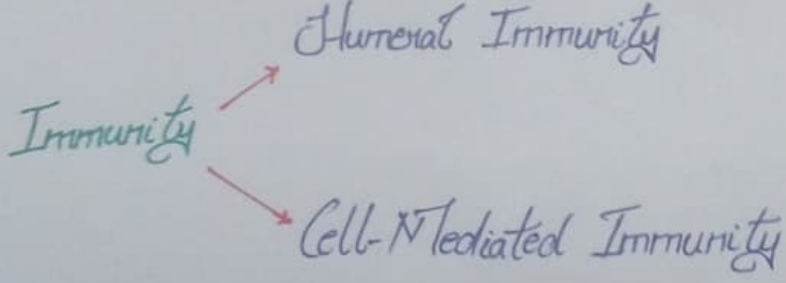
Like, * Bacteria

* Virus

* Fungi, etc..,.

Classification of Immunity:





b) Cell Mediated Immunity:

→ Cell Mediated Immunity is the immunity where the cell directly involved in the invasion of micro-organisms.

→ Cell mediated immunity is mainly includes T-Lymphocytes.

→ It is used for Organ transplantation ejection.

→ It is composed of

* T-Helper cells
* Memory T-cells.

c) Mechanism of HIV:

HIV into body

Macrophages

Reverse

Increased HIV

(4)

2) Erythropoiesis:

→ Erythropoiesis is the process of

⇒ Production and

⇒ Maturation of Red Blood Cells.

→ In below 20 years, it occurs in all bones of the body.

→ After 20 years, it occurs only in flat bones.

Stages of Erythropoiesis:

In infant,

Mesoblastic → Upto 3 months after implantation
Occurs in Yolk sac.

↓

Hepatic → After 3 months
Occurs in Liver and Spleen

↓

Myeloid → After birth
Occurs in Red bone marrow

In adults,

Haemocytoblast

↓

BFU-E

↓

CFU-E

↓

Proerythroblast

↓

Early Normoblast

↓

Intermediate Normoblast

↓

Late Normoblast

↓

Reticulocyte

↓

Erythrocyte

⇒ STAGES OF ERYTHROPOIESIS

Haemocytoblast:

* It has large Nucleus
* It has thin rim of Basophilic cytoplasm
* Size is 18-23 Mm in diameter
* It is a Pleuripotent Stem cell.

BFU-E:

* It is called Blast Forming Unit.
* It has less affinity towards Erythropoietin.

CFU-E:

* It is called Colony Forming Unit.
* It has more affinity towards Erythropoietin.

Proerythroblast:

* It has large nucleus with distinct nucleoli.
* It has basophilic cytoplasm.
* Vitamin-B12 and Folic acid are needed to convert to the next stage.

Early Normoblast:

* It has dense nucleus.
* It has basophilic cytoplasm.

Intermediate Normoblast:

* It has dense and condensed nucleus.
* Haemoglobin is produced in this stage.
* It has polychromophilic cytoplasm.

Late Normoblast:

* It has dense nucleus (Pyknotic)
* Mitosis stops in this stage.
* Nucleus disintegrates and starts to degenerate.
* It has acidophilic cytoplasm

Reticulocyte:

* It has same size as Erythrocyte.
* It has acidophilic cytoplasm.
* In this stage, in the surface of the cell there will be a small reticulum.

Erythrocyte:

* Final stage of Erythropoiesis.
* It is fully matured RBC.
* It is devoid of Nucleus.
* It has acidophilic cytoplasm.

Factors regulating Erythropoiesis:

They are,

* Erythropoietin
* Hypoxia
* Vitamin
* Hormones
* Protein.

⇒ Erythropoietin:

→ Erythropoietin is the hormone produced by the "Kidney."

* Erythropoietin acts on Red bone marrow tissues to produce Erythrocytes (or) RBCs.

[Increase in Erythropoietin:]

* When the body condition is in Hypoxia, there will be increase in Erythropoietin level.

[Decrease in Erythropoietin:]

* When the estrogen is present, there will be decrease in Erythropoietin level.

Hypoxia:

→ It is a condition where, oxygen amount is less for breathing.

* It helps in increase of Erythropoietin level.

Hypoxia / less O_2

↓

Kidney

↓

Increased Erythropoietin

↓

Erythropoiesis

↓

Increase in RBCs

Vitamin:

* Vitamin-B_{12}
* Folic Acid

} → Maturation factors

⇓

* They help in Erythropoiesis.
* Also, in synthesis of DNA.

* Vitamin-C also involved in erythropoiesis.

Proteins:

* Fe → Useful in synthesis of Haem Part.
* Ca → Useful in synthesis of RBC.

→ And also minerals in Erythropoiesis.

Hormones:

→ Hormones also involved in erythropoiesis.

Some are, * Creatinine

* Uric acid, etc...,

→ These are all the factors, that regulate the Erythropoiesis.

Applied Aspect:

→ If erythropoietin is not secreted, erythropoiesis process not occurs.

→ So, no production of RBC causes death.

* Vitamins & Proteins, if not present also, there is a collapse in erythropoiesis.

* Mutation during Erythropoiesis causes diseases (or) disorders like sickle celled anemia.

13 diagram

III. Short Answers:

1) Erythroblastosis Fetalis:

→ It is caused by the Rh-antibodies of our body.

→ It is associated with the Rh-blood group.

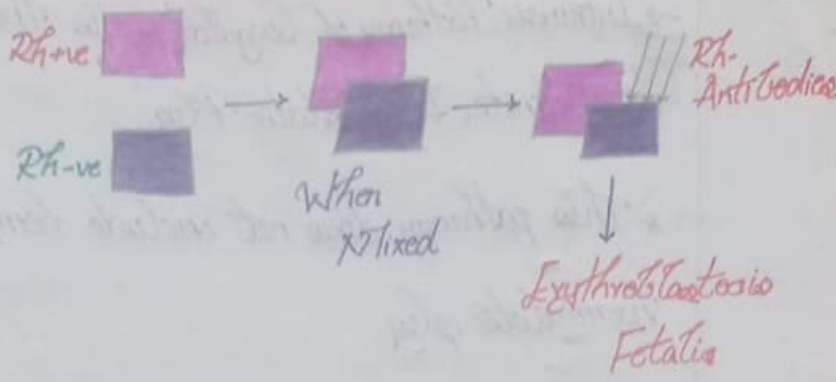
→ When the mother is Rh+ve and the first formed baby is Rh+ve, then when blood is mixed, the mother produces Rh-antibodies.

→ But, the first formed baby will come out as normal.

→ If the second formed baby is also Rh+-ve, then the, antibodies from mother will affect the baby.

→ So, the second baby will be caused by Erythroblastosis Fetalis.

→ At first, mother's antibody got the memory of Rh+-ve blood, so, second time it immediately attacked the Rh+-ve blood, thus, caused Erythroblastosis fetalis.

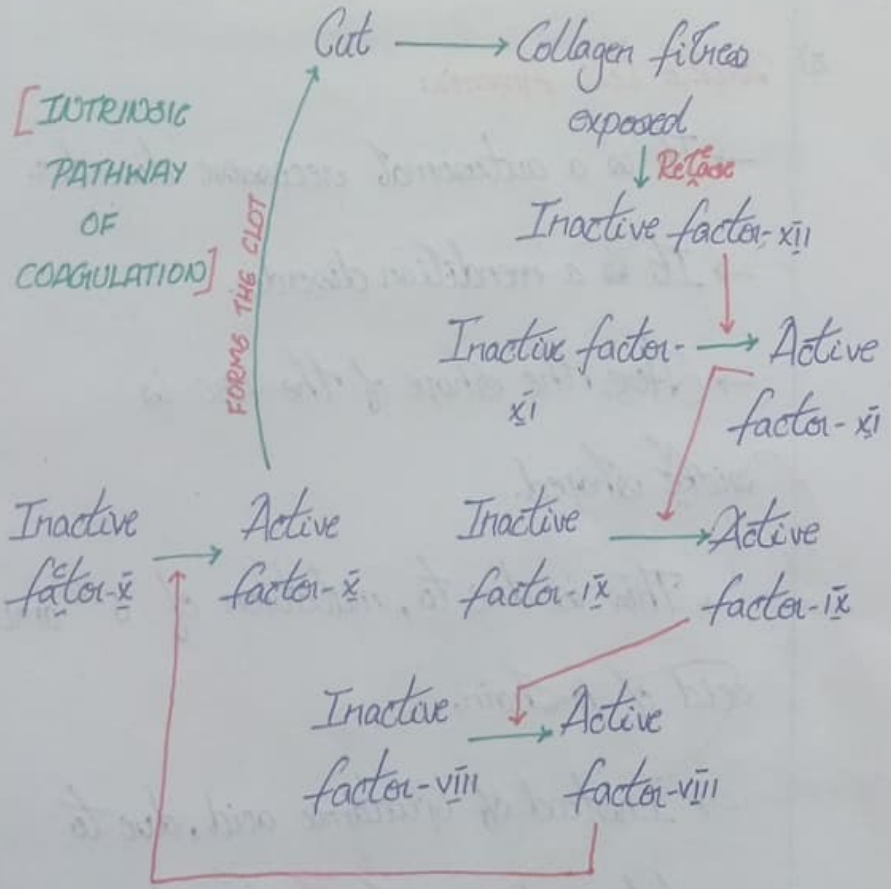


2) Intrinsic Pathway of Coagulation:

→ When endothelial cells are exposed in a cut,

→ The collagen also exposed in the cut-off.

⇒ So, the coagulation process takes place.

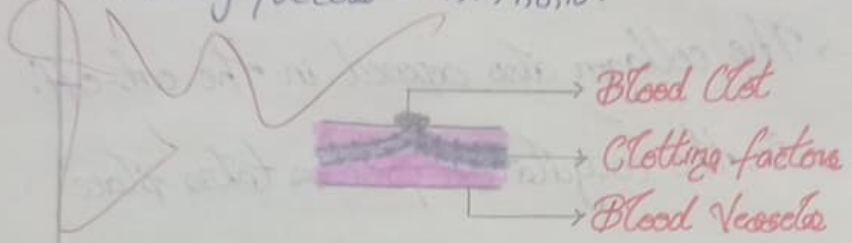


→ Intrinsic Pathway of Coagulation is the type of "Definite Haemostatic Plug".

* This pathway does not include temporary haemostatic plug.

* Here, in intrinsic pathway only the coagulation factors are involved.

* The coagulation factors involved are Clotting factors → 12, 11, 9, 8, 10.



3) Sickle Cell Anaemia:

→ It is a autosomal recessive disorder.

→ It is a mendilian disorder.

→ Here, the shape of the RBC is sickle shaped.

→ This is due to, mutation of 6th amino acid of β-chain.

→ Instead of Glutamic acid, due to mutation, it is replaced by Valine.

→ Due to sickle shape, the surface area of RBC is reduced.

→ So, the oxygen binding capacity of the RBC reduced.

→ It causes anaemia.

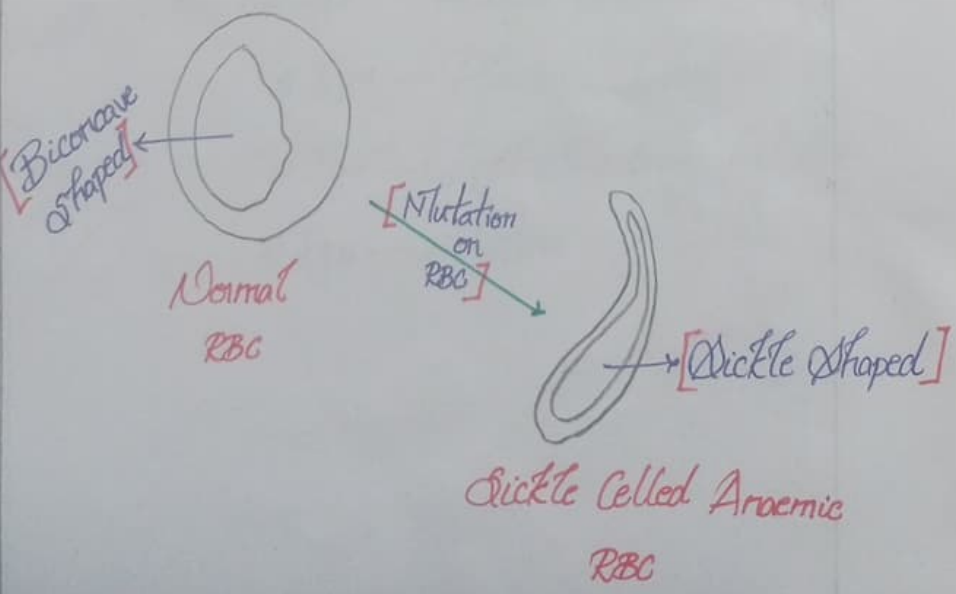
→ And also while travelling through cappillaries, RBC will be ruptured.

→ So, there will be decrease in RBC causes Anemia.

Importance:

* The patient with sickle celled anaemia will not be affected by "Malaria"

* Because, malarial parasite attacks the RBC. But, in case of sickle celled anaemia, there is no space for malarial parasite.



4) Anticoagulants:

→ Main Anticoagulants are,

- Anti Thrombin-III
- Heparin

⇒ Fibrinolysis → by Fibrinolysin / Plasmin

↑

Produced by

Fibrin by Plasma tissue

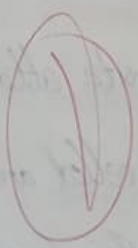
→ Fibrinolysin affect Fibrin

→ Thus, blood clot disintegrates.

→ Thrombin is affected.

If anticoagulants are not present,

Blood clot in blood vessels.



5) ESR:

Erythrocyte

Sedimentation

Rate:

6) Immunoglobins:

These are the antibodies found in different sites help in destruction of invading micro-organisms.

They are,

One of the site:

1) IgA → Colostrum
2) IgE → Allergic Reaction
3) IgM → Placental Blood
4) IgG → Erythroblastosis foetalis
5) IgD → Retina

7) Phagocytosis:

Phagocytosis is the process of destruction (or) digestion of cells.

Phagocytosis of RBC takes place in the spleen.

Phagocytosis of other cells also takes place by various mechanism.

9) Haemophilia:

→ Sex-linked recessive disorder.

→ Mendalian disorder.

* Males → 1%

* Females → 0.01%

→ Here, the one of the clotting factor is absent.

→ The clotting factor is Clotting factor - VIII.

→ That is Christmas factor (or) anti-haemophilic factor.

→ It may be * Haemophilia-A

* Haemophilia-B

* Haemophilia-C

→ In this disease,
the patient will loose the mechanism of clotting when there is a cut.

→ So, the bleeding will not stop in the patient, if it is a small cut.

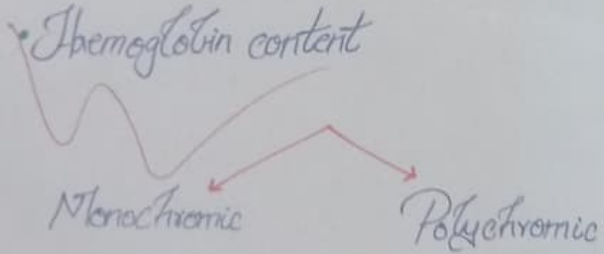
→ If there is a deep cut, in severe cases causes death.

→ In small cut, after long time the blood will stop.

→ Here, there will be no accumulation blood clot in the cut area.

10) Wintrobes Morphological Classification of Anaemia.

→ This classification of Anemia is based on • size of RBC and
• Haemoglobin content



VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

Velammal Village, Madurai - Tuticorin Ring Road, Anuppanadi, Madurai – 625009.

NAME OF THE EXAMINATION : 1st IA ○ / 2nd IA ○ / 3rd IA ○ / 4th IA ✓ / 5th IA ○ / MODEL EXAM ○

SUBJECT OF THE EXAMINATION : PHYSIOLOGY

DATE OF THE EXAMINATION : 10.6. / YEAR : 2022

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ROLL NUMBER : [ ][ ][ ] V M C H & R I [2][0][2][2]

SUBJECT CODE : [ ][ ][ ][ ][ ][ ]

Signature of the Candidate

Signature of the Chief Superintendent / Invigilator

Answered page Number to be filled by the candidate

Q.No.	1	2	3	4	5	6	7	8	9	10
I										
II	1	6								
III	16	11	-	12	-	14	-	19	18	17
IV										
V										

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1.
2.
3.
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8. 9 (MCQ)

QUESTION NUMBERS / MARKS

VALUATION

	1	2	3	4	5	6	7	8	9	10	TOTAL
I											
II	8½	10									18½
III	2	3	NA	3	NA	4	NA	1/4	1	NA	14½
IV											
V											
GRAND TOTAL											33 + 9

Total — 42

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Section-II - ESSAYS:

1. Salivary Gland:

→ Functional & Structural unit of Saliva is "Salivary".

→ Salivary Glands secretes saliva. → P^H - 7 (Normal)
P^H - 8 (Active conditions)

Types of Salivary Glands:

There are 3 types,

1) Parotid Gland
2) Submandibular Gland
3) Sublingual Gland

Parotid Gland:

* Present infront of the ear.
* Produce 70% of saliva.
* Controlled by IX cranial nerve.

Submandibular Gland:

* Present near the mandible.
* Produce 20% of saliva.
* Controlled by VII - cranial nerve

Sublingual Gland:

* Largest salivary gland.
* Secretes 10% of saliva.
* Present near lingual region.
* Controlled by VII- cranial nerve.

Composition:

Salivary Gland
↓
Saliva
↙ ↘
99.5% Water
0.5% Organic & Inorganic substance

Inorganic substance:

* Enzymes: Ptyalin / Salivary amylase
  Lysozymes
  Kallikrein
  Lipases
* Mucous
* IgA
* Cation → Na^+, Ca^+, K^+
* Anion → Cl^-, HCO_3^-, HPO_4^{-2}

Organic Substances:

* Urea
* Uric acid
* Creatinine

Functions:

Ptyalin / Salivary Amylase:

* Acts in fabrication of food
  mastication
* Mix with the food to form bolus.

Mucous:

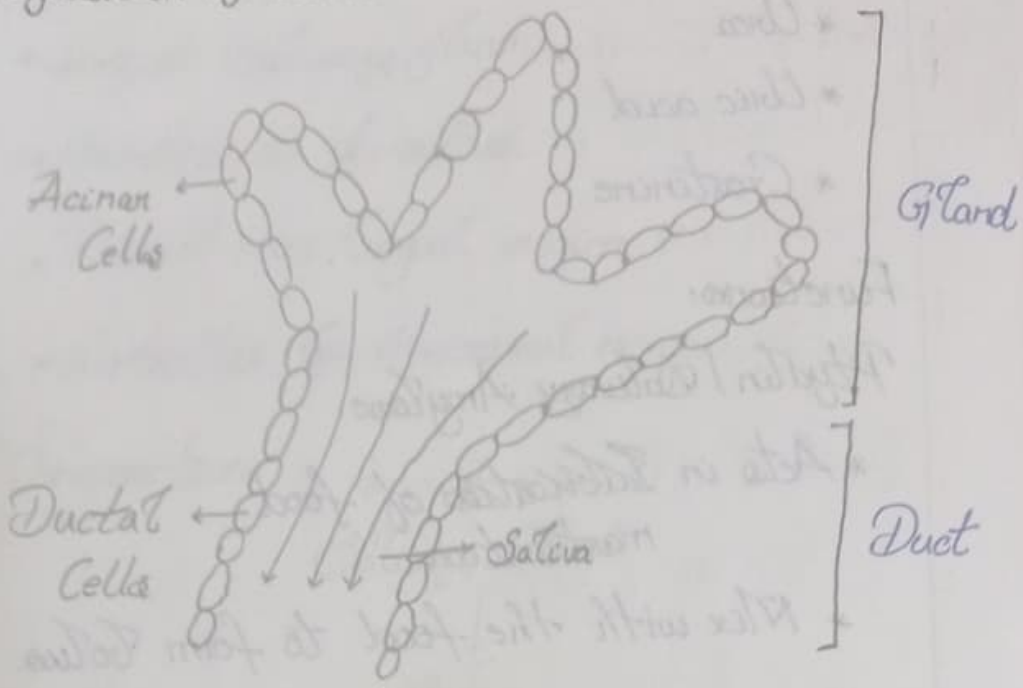
* Lubrication of food
* Mastication and Swallowing of food.
* Helps the tooth enamel from corrosion.
* Helps in Speech.
* Overcome dryness of oral cavity.

Lysozymes:

→ Kills the bacteria in the food in mouth.

Saliva → Act as a "buffer"
  ||
  Maintains oral pH

Regulation of Saliva:



→ Salivan

Acinar Cells Secretes inorganic substance inside Lumen.

↓

After mixing they flow through the ductal Cells.

↓

Some of the inorganic substance absorbed by ductal cells.

↓

Remaing fluid in the Duct is called Saliva.

→ Saliva Regulation !!!

Achalasia Cardia:

→ The lack of relaxation of lower oesophageal sphincter is called Achalasia cardia.

→ So, the food cannot enter into the stomach from oesophagus.

→ So, food digestion will also not takes place.

→ Because, lower oesophageal sphincter relaxation is controlled by Nitric oxid (NO_2).

→ It is absent in the Achalasia Cardia.

Nerve Supply of Salivary Gland.

- Sympathetic → T_1, T_2 nerve
- ParaSym. Nerves → $\underline{IX}$, $\underline{VII}$

* Saliva Secretion more in → When food is in Mouth.

* Saliva Secretion less in → Sleep.

2) Skeletal Muscle:

Electron Microscopic Structure of Skeletal muscle:

We can see, * Thick filament

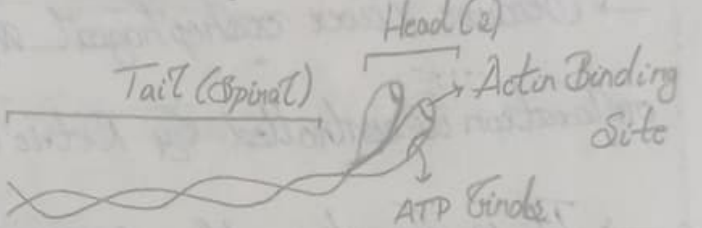
* Thin filament

Thick filament:

→ It will be in dark colour

→ Thick filaments Contains "Myosin".

Myosin Structure:



* Myosin contain 2 Heavy chains and 6 Light chains.

* Heavy & Light chains together form the head and 2 heavy chain twist each other to form the tail of myosin.

* One myosin is surrounded by 6 actins.

* Myosin head has actin binding sites where the actin will bind during contraction.

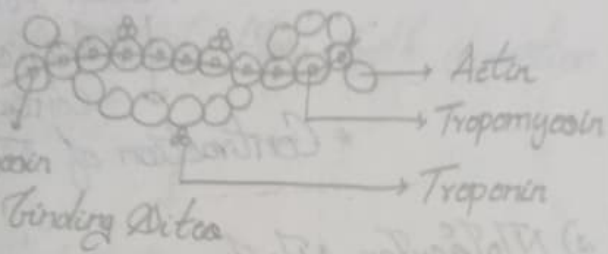
* And also has ATP binding site where ATP binds at contraction.

Thin filaments:

→ It is light in colour.

→ Thin filament contains "Actin" and also "tropomyosin, troponin" surrounding it.

Actin:



* Actin has two types, F-actin, G-actin.
* They form a spiral with each other.

Tropomyosin:

* Thin, long protein present in the spiral of actin covering the myosin binding sites.

Troponin:

* Small, circular protein present on the surface of Actin.
* There are 3 types of troponin.

*They are, . Troponin-T

. Troponin-I

. Troponin-c → Ca^{2+} binds here.

Mechanism of Skeletal muscle contraction:

1) Electrical-contractional Coupling:

* Nerve Action Potential

↓ Neuromuscular Junction

* Muscle Action Potention

↓ Electrical-Contractional Coupling

* Contraction of Muscle.

2) Molecular Mechanism:

Nerve impulse in Pre-Synaptic

↓

Synaptic Vesicles comes near Pre-Synaptic membrane

↓

Ca will come inside Pre-Synaptic and rupture of Pre-Synaptic membrane

↓

Release of Acetylcholine into the Synaptic Cleft

↓

Acetyl-choline binds with Nicotinic-ac.choline receptors & Na^+ influx takes place

↓

Depolarization of Post-Synapsis.

↓

When, it reaches threshold potential (30-40mv) muscle gives / forms action (spike) potential.

↓

Action potential flow both direction in the muscle.

↓

Sarcotubular system start its action, and results in the release of Ca^{+2} ions. By Longitudinal sarcoplasmic reticulum / terminal Cisternae.

↓

Ca binds with the muscle proteins and the contraction of muscle begins

↓

Then, if Ca is stopped, then, Relaxation of muscle happens.

Mechanism of Contraction:

Uptake of Ca^{+2} ions from terminal cisternae by troponin-c

⇒ Sliding Filament Theory !!!

Troponin-c will unbind the tropomyosin from myosin binding sites.

Actin & Myosin Comes close near their respective binding sites.

When ATP is binded to ATP binding side of Myosin the head of myosin attaches with actin at myosin binding site

If another one ATP comes, head will tilt due to active reflex contractin happens.

Again, one ATP binds the binding will be unbinded

III) Short Answers:

2. Movement of Small intestine:

i) Mixing movement:

* Segmentation
* Pendular

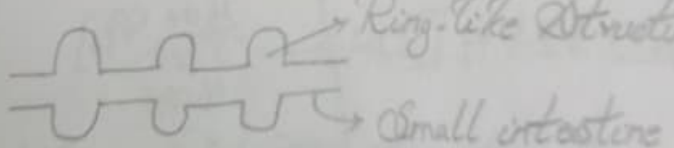
ii) Propulsive movement:

* Peristaltic
* Peristaltic Rush
* Intermediate Peristaltic

iii) Movement of Villi

Segmentation movement:

↳ The ring like formation at regular intervals forms the segmentation of small intestine for the movement.



Pendular movement:

↳ Side by side movement of small intestine.

→ It causes to & fro movement.

6. Drugs acting on Neuromuscular junction:

For inhibiting acetyl-choline:

* Botulinum toxin (Botax)

⇓

→ Blocks neuromuscular junction, so, no contraction of muscles.

Drugs Antagonist to Acetyl-Choline:

i) Competitive inhibitors:

* Tubocurarine

* Gallamine

⇓

• Curare ~~They~~ compete with acetyl choline & binds with nicotinic acetyl-choline receptors.

⇒ Anti-acetyl choline esterase destroys the acetyl-choline esterase.

ii) Persistent Depolarization:

* Suxamethonine (Succinyl Choline)

* Decamethonine

→ These are the drugs acting on Neuro-muscular Junction.

Myasthenia Gravis:

→ Myasthenia Gravis is the rare Auto-immune Disorder.

* It is caused by circulating antibodies on the of nicotinic acetyl-choline receptors.

* It destroys some of the nicotinic-ac.ch. receptors and joint the corresponding receptors with each other.

* So, the surface area of the receptors will decrease.

50.

Causes:

→ Fatigue of muscle.

→ In severe form, the patient may get bed ridden.

→ May even die due to paralysis of Respiratory Muscles.

Common Area of Disease:

* Extra-ocular muscle
* Facial muscle
* Mastigation muscle
* "Ptosis of Eye." (Eye lids falling)

1. Pathophysiology of Gastric Ulcer:

→ Gastric Ulcer is caused in the stomach. By the secretion of HCl.

When there is no food in stomach, but HCl secretion takes place.

↓

So, if food is not there, then, HCl digest the wall of Stomach.

↓

First, digest the mucous wall of the Stomach.

↓

If it continues, then, mucous wall ruptures and start digesting inner walls of Stomach

↓

It is called "Gastric Ulcer."

Causes:

* Stomach Burn
* Pain in the stomach

Treatment:

* Use of Antacid
* Surgery method
* Regular intake of food at regular time

10. Properties of Smooth muscles: 17

* Non-Striated Muscles
* Involuntary Muscles

→ Found mostly in the hollow organs of the body.

Example: Ureter, Fallopian tube etc.,

→ They are mainly present in the visceral regions.

Types:

Single → Functionally Syncitium

Multi → Functionally Non-Syncitium

Function:

* They provide easy passage for movement.
* Smooth muscle are soft muscle acts like a cushion.
* They are involuntary, under the control of Brain.
* They can contract & relax by the action of Brain.

9) Digestion & Absorption of Protein:

* Digestion of Protein:

→ By Peptidase

↓

formed by Chief / Peptic cells

→ Digestion of Protein takes place in the stomach completely.

→ Protein takes time to digest.

[Protein $\xrightarrow{\text{Peptidase}}$ Peptide]

→ Absorption of Protein → in the duodenum.

→ Proteins are important contents of our body.

→ Digestion of Protein not takes place or start in mouth.

→ They takes place only in stomach.

8) Dietary fibres:

→ Dietary fibres are the fibres which are required in our food daily.

→ If it is absent, loss of energy in the body takes place.

→ They should be present in our day to day food.

→ They gives strength to the muscles in our body.

→ They are available in the day to day food only.

→ Not available in our body itself.

	1	2	3	4	5	6	7	8	9	10	TOTAL
II	1	9									
III	14	15	16	18	20	21	24	25	26	25	

TOTAL ⇒

MCQ = 9

49/80

59/100

INTERNAL ASSESSMENT-VI

I. ESSAY:

1. MENSTRUAL CYCLE:

Functional differentiation between males & females.

Periodic release of gamete by the females

↓

Menstrual Cycle.

Ovary is formed in the mid of this cycle.

It starts after the puberty in females.

Duration:

Normally → 28 days.

But, it can be altered

↙

due to environmental factors

Disease of Reproductive system.

Altered upto → 21-35 days.

It starts from menstrual bleeding

↓

Menarche.

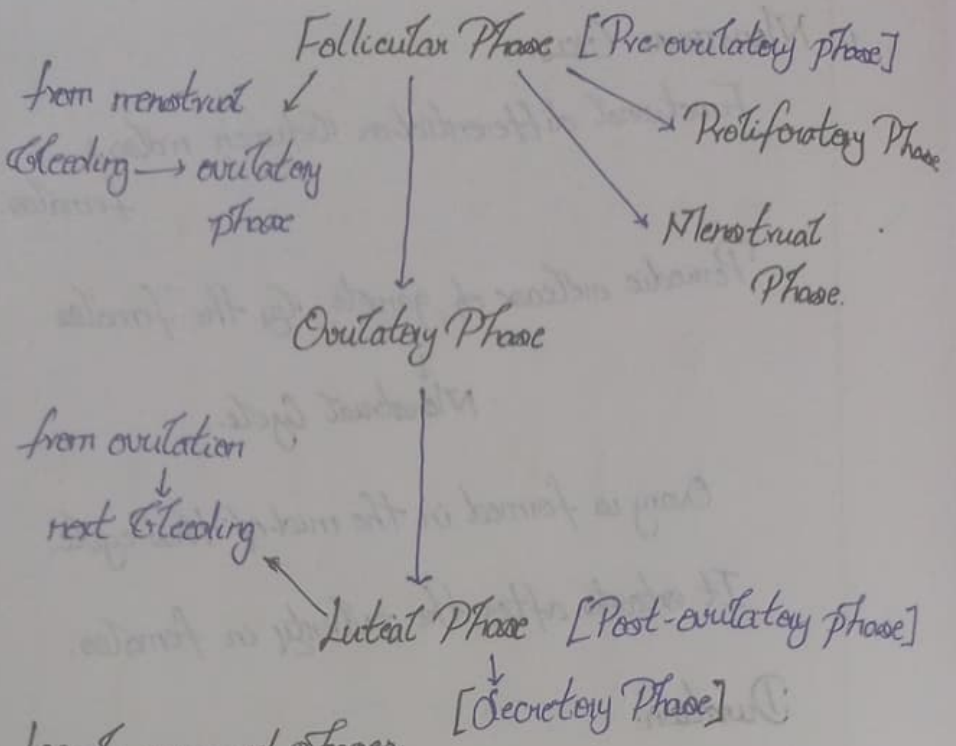
It ceases in Menopause.

Physiologically ceases in,

Pregnancy

Lactation

Phases of Menstrual Cycle:



Loosely arranged phases:

- Menstrual phase
- Follicular phase
- Ovulatory phase
- Leuteal Phase

Period of time →

Follicular phase → 1-14 days

Leuteal phase → 15-28 days.

Only follicular phase
↓
will be altered.

Menstruation happens
↓
Correctly after 14 days of Ovulation.

Changes in Menstrual phase:

→ Changes in Follicular phase:

Ovarian Changes:

After puberty → menarche

↓

4th day → one primary follicle formed

↓

it matures to form Matured follicle

↓

By proliferation of

* Granulosa cells. → Releases Estrogen
* Inner theca cells.

↓

Antrum → ↑ in size

Uterine fluid → ↑ in volume

Uterine Changes:

After 4 days, Endometrium starts developing after bleeding

↓

Glands → increase in length

Spiral arteries increases

Veins also increases

↓

Myometrial Flexibility → increases

Called Proliferative phase.

Uterine Cervix Changes:

Carbohydrate-rich mucous secreted.

increased cervical mucous

mucous become → alkaline

more viscous.

Vaginal changes.

Becomes soft.

↓

easy for sperm movement.

Ovulation Phase

At, 14th day of menstrual cycle.

Ovum comes from Graffian follicle

↓

Due to LH surge.

Progesterone level increases.

Estrogen also upto certain level.

→ Changes in Luteal phase:

Ovarian Changes:

As, Graffian follicle Ruptures

↓

Remaining part Corpus Luteum → increase in progesterone

↓

Corpus Luteum to (26-28th day)

if pregnant → Corpus albicans

if not pregnant → Corpus Luteum Persists.

Uterine Changes:

Endometrium thickens starts to degrade

↓

Spiral arteries → coiled & tortious

Veins → degenerate

Glands → secretes hormones → Called Secretory Phase.

↓

At last. Bleeding starts (if no fertilization)

↓

Endometrium sloughed out.

Cervical Changes.

Cervix becomes thick

Decreased cervical mucous.

Menstrual Bleeding:

Initiated by decrease in steroids

↓

Destabilization of lysozomal membrane

↓

Release of Proteolytic enzyme & Production of Prostaglandin [$PGF_{2\alpha}$]

↓

Lysis of Endometrium, $PGF_{2\alpha}$ → endometrial ischemia

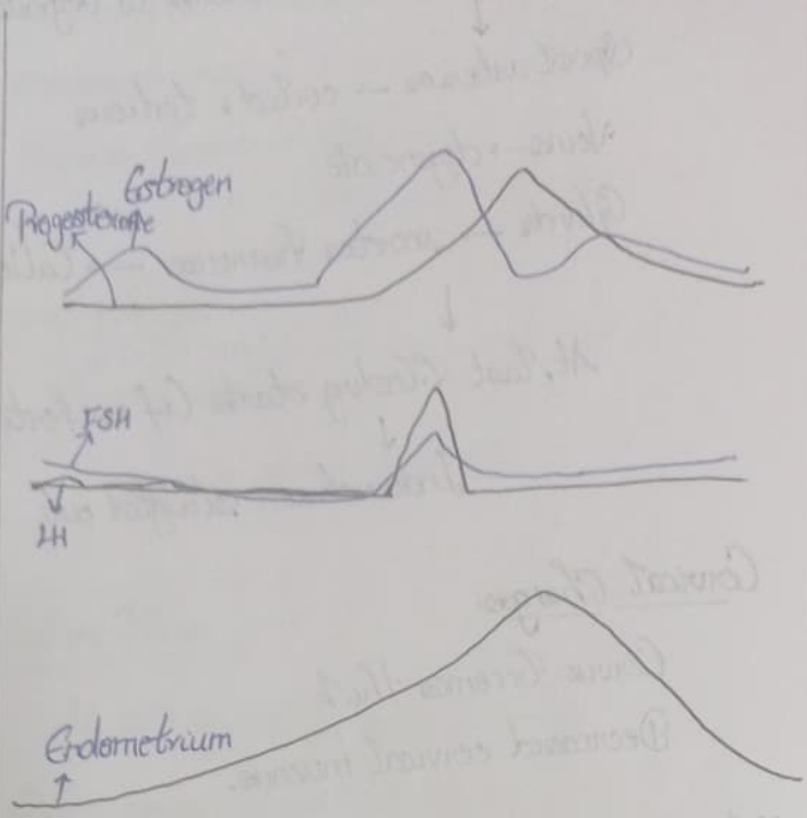
↓

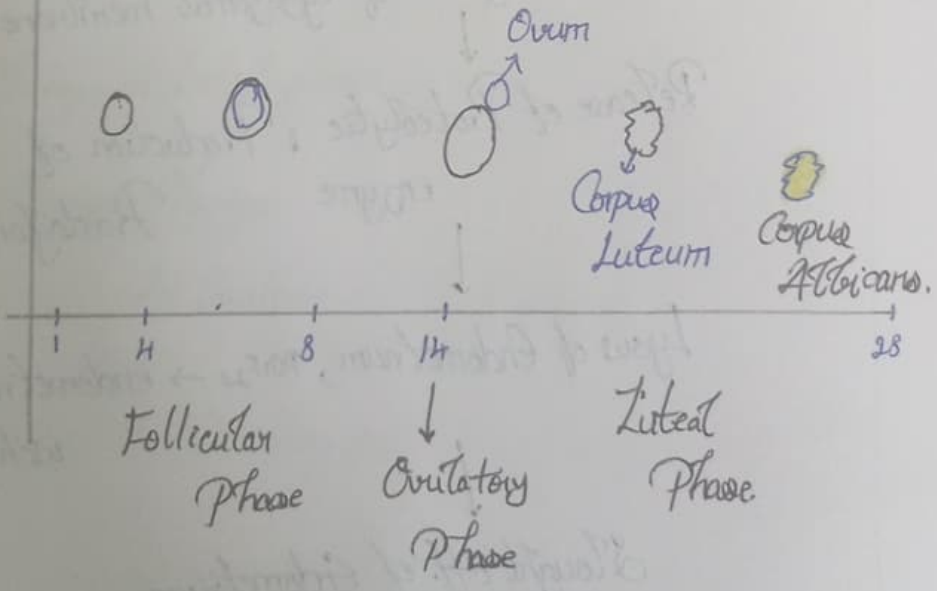
Slought off. of Endometrium

↓

New menstrual Cycle.

Normal Blood Discharge → 30-130ml





→ Menstrual Cycle Changes

Hormones Regulation Menstrual Cycle:

Estrogen:

↳ Has a peak, small increase at follicular phase.

→ Before 48 hrs of ovulation (Major)

→ After 2-4 days of ovulation,
attains peak in post-mid-luteal phase

Progesterone:

Attains peak after 4-8 days of ovulation.

Increased due to corpus luteum.

When, it regresses. Then progesterone level is starts to decrease.

LH:

Increases 8-10 hrs before ovulation
↓ ——→ LH Surge
Decreases 24-48 hrs after ovulation

FSH:

Starts slight increase in 1st phase
↳ due to follicles
↓
It increases along with LH at the time of ovulation.

Inhibin:

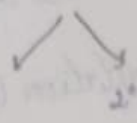
Inhibin-A coincide with action of Progesterone.

Inhibin-B coincide with action of FSH.

Applied:

1) Amenorrhea:

Stop / Absence of Menstrual Cycle



Primary Amenorrhea:	Secondary A.
There is no menstrual cycle happened before.	Sudden stop of normal menstual Cycle.
Physiological Cause →	Before Puberty / Pregnancy, Lactation
Pathological Cause →	Congenital Disorder / Hypothalamus Disorder

2) Dysmenorrhea:

Painfull Bleeding

↓

Due to accumulation of Prostaglandins

3) Menorrhagia:

Over Bleeding / more Bleeding.

2. Thyroid Hormone:

Synthesized by Thyroid Gland.

↳ Largest endocrine gland.

Hormones are,

Tetra-iodothyronine (T_4) → Thyroxine.

Tri-iodothyronine (T_3)

Calcitonin.

Synthesis of Thyroid Hormone:

1) Thyroglobulin formation

↓

Rough Endoplasmic Reticulum & Golgi complex degrades to form Thyroglobulin. → inside follicles-cells

2) Intake of iodide

↓

Body absorbs as iodide form

It is taken by the food diet → By Na-iodide pump

3) Oxidation of Iodide:

↓

Iodide oxidates to form Iodine.

With the help of Peroxidase.

4) Transport of iodine into Follicles

Iodine enters → Follicles

↓

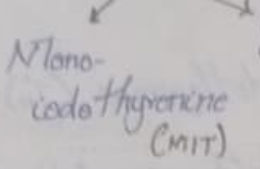
Actively by Iodine pump [Pendrin]

6) Iodination of Tyrosine:

↓

Iodine react with tyrosine ← present in follicles

↓



6) Copulation Rxn

↓

Addition of the products

→ MIT + DIT → Tri-iodothyronine (CT_3)

→ DIT + DIT → Tetra-iodothyronine. (CT_4)

Regulation of Thyroid hormone:

Regulated by

Thyroid hormone receptors.

Thyroxine is the major thyroid hormone.

↓

90% of total.

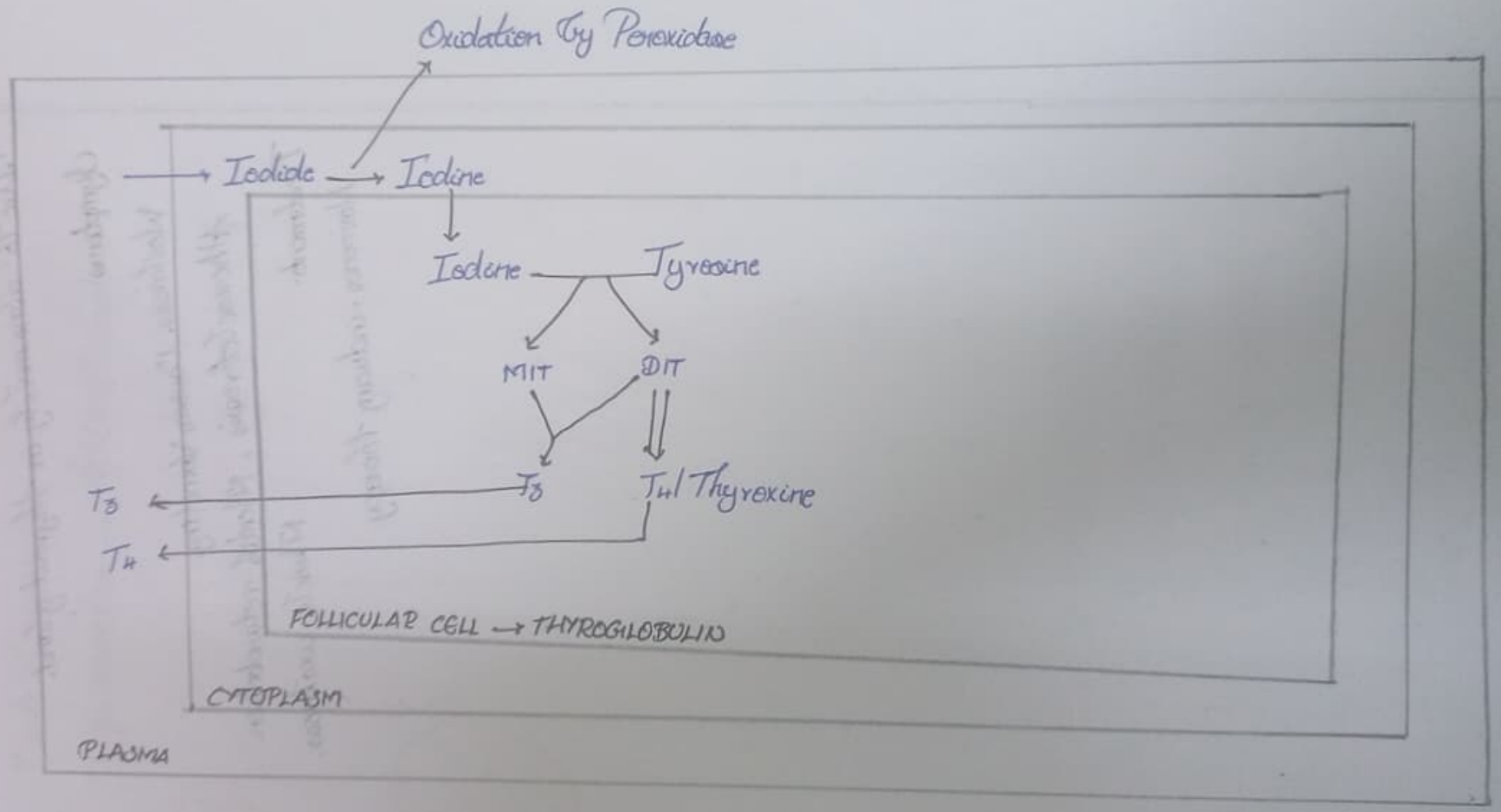
Secreted by thyroid gland

Increased in,

If more protein stored.

Less Blood glucose level

If more lypolysis.


Oxidation by Peroxidase
Iodide
Iodine
Iodine
Tyrosine
MIT
DIT
T3
T4/ Thyroxine
T3
T4
FOLLICULAR CELL → THYROGLOBULIN
CYTOPLASM
PLASMA

Hypothyroidism:

↳ Decrease in secretion of Thyroxine.

Due to abnormality in Thyroid gland.

Symptoms:

Weakness, Nausea, Vomiting.

Atherosclerosis, Mental retardation.

Muscle weakness.

Treatments:

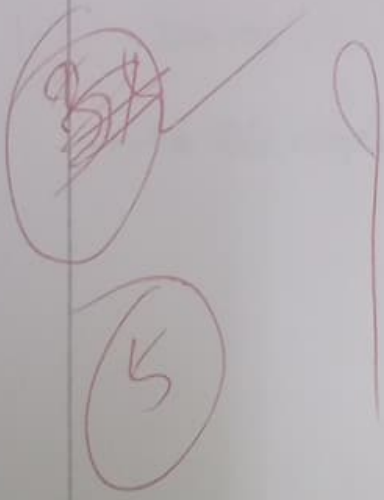
Hormones-inducing therapy.

Function of Thyroxine:

↑ Basal metabolic rate

↑ rate of respiration.

Hypo-secretion → Atherosclerosis.



I SHORT NOTES:

1. Action of Parathormone:

↑ Blood Ca level.

Sec. by Parathyroid Gland.

↓

↓ Bones.

Proteolysis

Glyconeogenesis

2. Second messenger:

↓

cAMP

cGMP

Tyrosine kinase

DAG-IP3

→ Acts like receptors.

3. Cushing's Syndrome:

→ Hypersection of Cortisol / Gluco-corticoids from adrenal cortex.

Caused by,

Tumour of Adrenal Cortex.

Tumour of Pituitary Gland.

Symptoms & Sign.

→ Lemon on Stick appearance

↓

Lypolysis → in limbs

Lypogenesis → in head, neck, abdomen.

→ Purple Striay

↓

Due to collagenase activity

Thin skin

→ Weakness of the muscle

→ Increased osteoclastic activity

↓

Bones damages

→ Decreased Eisenophilic count.

→ More proned for diseases.

→ Proteolysis takes place.

→ Action of Neutrophils → decreased.

→ Develops → 2°. Diabetic mellitus

→ Hypertension.

→ Euphoria condition, Mental retardness.

→ Bronchodilation, Vasoconstriction.

→ GFR-↑, ADH-↓.

Other Causes:

from external source,

↳ Wrongly used by doctors

↓

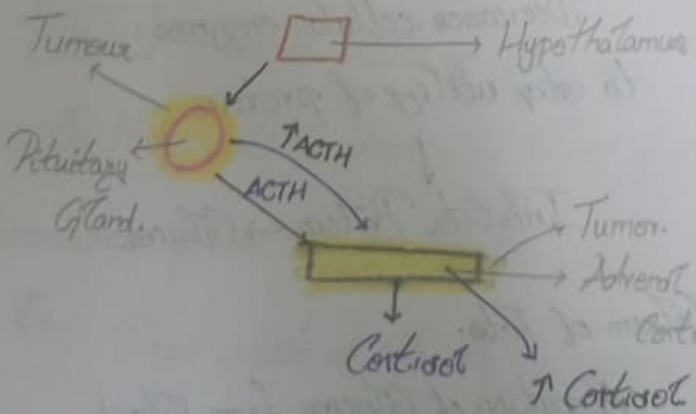
Over dosage

↳ Leads to Cushing's Syndrome

Treatment:

* Surgical removal of tumour.
* Reduce the dose day by day slowly.

Mechanism of Cushing's Syndrome:



→ Also, ↓ in Lymphocytes

↓

more easily

prone for diseases.

4. Action of Insulin:

↓

Only antidiabetic hormone secreted by our body

They help in Metabolism of Protein
Fats

Also, mainly maintain metabolism of Carbohydrate, and checks Blood Glucose level.

Metabolism of Protein:

Insulin → [synthesis & storage of Proteins.]

Transport excess amino acid in Blood to the cell.

↓

Accelerates translation,
Production of Protein

↓

Decreases cellular enzymes to stop utilize of protein.

↓

Inhibits, Protein → Glucose.

Metabolism of Fats:

Absorption of Glucose from Blood

↓

Cells (Liver)

↓

Converts Glucose

↓

Fatty acids & Triglycerides.

↓

Transport of fatty acid → muscles & adipose as fats. → Goes to Adipose tissue

↓

If excess fat, fatty acid converted into TGA.

⇒ Insulin helps in [Synthesis & storage of fats.]

Metabolism of Carbohydrates:

Insulin is present in ~~almost~~ β-cells of Pancreas

Glucose → absorbed by almost all cells

↓ Mainly → [Liver, muscle, Adipose]

Not abs. by

Brain

Renal tubule.

Glucose transported into cell via GLUT-4

↓

Has insulin receptor

Stereochemically, Na-Glucose Symport way.

GLUT-4 → Rapid intake of Glucose.

So, there will be Reduce in Blood glucose level.

Decrease in Blood Glucose Level:-

By. Rapid intake of Glucose by GLUT-4

Increased peripheral utilization of Glucose.

↑ → Glycogenesis

↓ → Glycogenolysis, Gluconeogenesis.

Applied:

Injury to Pancreas → ↓ in insulin

↓

Causes Diabetes mellitus

[Blood Glucose level ↑]

5. Acromegaly:

Increased Secretion of Growth Hormone.

After puberty/at adult.

After epiphyseal formation.

Acro-megaly → Peripheral Proliferation.

Caused by,

Tumour of Pituitary Gland.

Symptoms:

Prognathism

↓

[Protrusion of mandible]

Palpitation of Eyes.

Hepato
Splecno } Megaly
Organo

There will be no increase in height.

⇓

Because, GH ↑ after

Closure of epiphyseal plate.

Rupture of Peripheral tissues

↓

Edema.

Secondary Diabetic mellitus.

It's are having Glycosuria.

Decreased androgen level.

Swelling of Peripheral regions.

Diagnosis:

By serum GH analysing.

Treatment:

Surgical removal of tumour.

6. Pregnancy Tests:

To determine the pregnancy.

Using the analysis of hCG (human chorionic gonadotrophin)

↓

Secreted in urine of Pregnant female.

Types:

Biological

↓

Kupperman test.
Friedman test
Hogben test
Galli-mainin test

Immunological

↓

Commonly now Used tests.

↓

Gravindex Test

Gravindex Test.

Principle:

Detect the agglutination of the RBC of Sheep coated with hCG-with urine.

Requisite:

hCG-antiserum

urine of patient

RBC of Sheep coated with hCG

↳ Now, Latex particle used.

Procedure:

hCG-antiserum → hCG is injected into rabbit

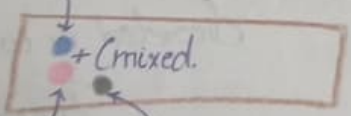
↓

hCG-against antibodies formed

↓

hCG-antiserum in plasma is removed

First, hCG-antiserum



urine Latex particle

Second,

Agglutination [Not pregnant]

Non-Agg. [Pregnant.]

No hCG-in urine.

⇓

Free hCG-antibodies

+

Latex particle

↳ Agg.

If pregnant,

hCG in urine

↓

hCG & hCG-antibodies react

↓

forms agglutination → not seen

(Colour less)

↓

Add latex particle,

now, no free antibody

↓↓

No-Agglutination

Disadvantage of Biological method:

Requires animals for the test.

Done only after 2-3 weeks of pregnancy (hCG well formed)

Delayed result (upto 2-days)

Killing of an animal for one test.

Advantages of Immunological method:

No animal req. → required only for anti-serum (hCG)

Fast result

Done suddenly after pregnancy.

Accurate.

Need only 10 IU/ml for finding.

Nowadays,

↳ Pregnancy tester used

↓

2-3 drops of urine in a tester

↓

Result in 5-10 minutes.

No need of Doctors.

7. Spermatogenesis:

⇓

Process of formation of Sperm from male germ cells.

Takes place in →

Seminiferous tubule of testes.

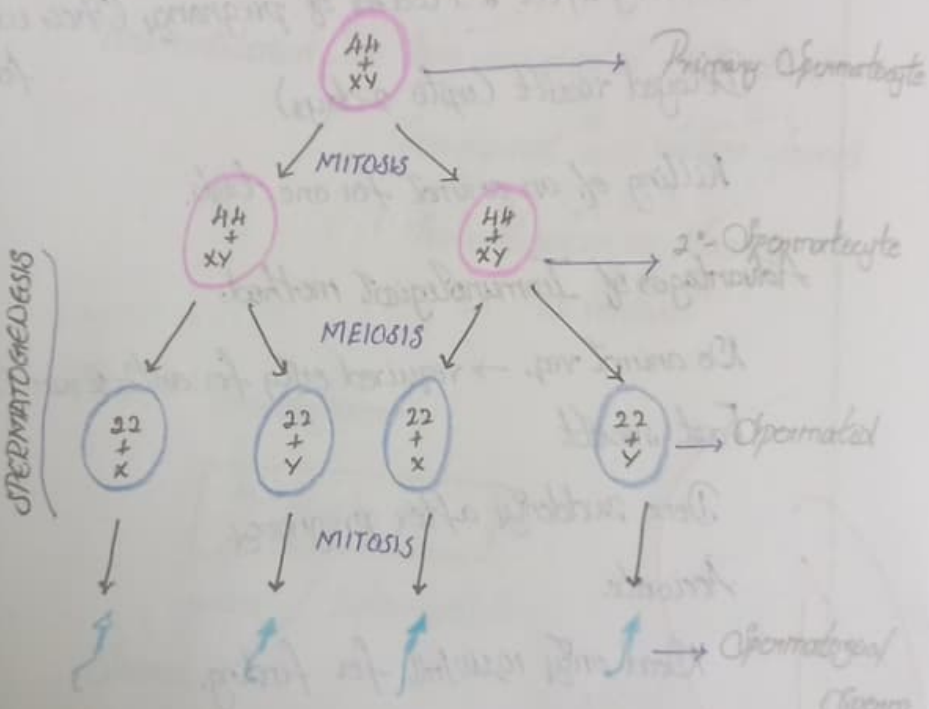
↓

Have Sertoli Cells → Nourishment

Male Germ Cells

↓

Sperms.



Occurs only after the Puberty

From one primary spermatocyte → 4 sperms produced.

After sperm formed, they are released out of Seminiferous tubule by process → Spermiation.

Each sperm are haploidic.

8. Conn's Syndrome:

→ Increased Secretion of Aldosterone (Mineralo-corticoid)

Also called as "Primary (1°) Hyperaldosteronism"

Caused by,

Tumour of Adrenal Cortex

Tumour of Pituitary Gland.

Symptoms:

Hypernatremia or

Hypokalemia

More GFR

Aldosterone Escape:

After more accumulation of Aldosterone

↓

After certain limit,

action of aldosterone ceases → but aldosterone is more.

Aldosterone ↓ Escape.

⇓

No edema in Conn's Syndrome.

2° diabetic mellitus

Causes Tetany.

Muscle & bone weakness.

Urine ⟶ ↓ Na^+

↓

↑ K^+, H^+

Detected by:

K^+ content in urine.

Treatment:

Surgical removal of tumour.

Anti-drug against aldosterone.

9. Contraceptive method.

Methods used to stop the fertilization of sperm & ovum after copulation.

Types:

Barrier method

Intra uterine devices

Surgical method

Contraceptive pills.

IUD:

- Non-steroidal
- Steroid

Ex: Copper-T

Lippes loop

Nowadays, these methods are used more common. IUD are more common.

Need doctor.

Barrier method:

Males → Condoms

[Gives privacy, safer, No side effects.]

Females → Diaphragm, Cervical Vaults

Surgical method:

Vasectomy → Cut & tie of vas deferens (Males)

Tubectomy

↓

Cut & tie of fallopian tube (Females)

[Irreversible

No side effects.]

Contraceptive pills:

Tablets taken before copulation.

Has side effect

Tablets → Progesterone stat.

Ex: Saheli

↳ Once in a week pill.

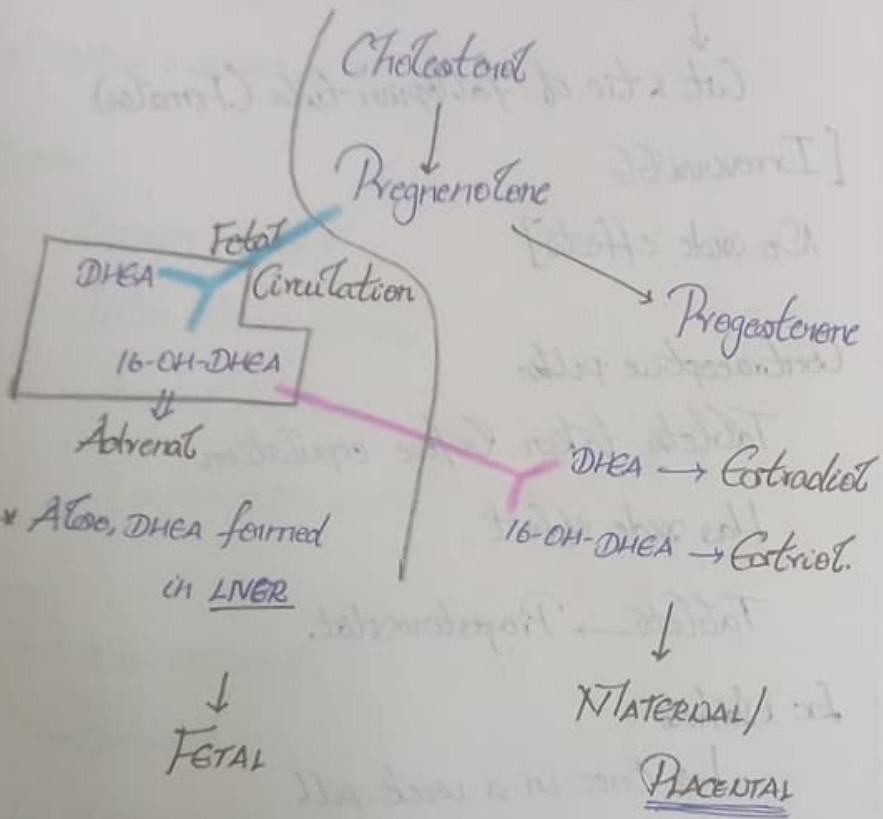
10. Feto placental Unit:

Relation between fetus and the placenta of maternal is called Feto placental Unit.

For Steroidogenesis,

↳ fetus connected with placenta.

DHEA → Dehydroepiandrosterone



* Also, DHEA formed in LIVER

Significance of Feto placental Unit:

Major product is Estriol, formed by 16-OH-DHEA.

→ If it is excreted in urine of mother, then, the baby is having normal growth.

(2)

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

Velammal Village, Madurai - Tuticorin Ring Road, Anuppanadi, Madurai – 625009.

NAME OF THE EXAMINATION : 1st IA ○ / 2nd IA ○ / 3rd IA ○ / 4th IA ○ / 5th IA ○ / MODEL EXAM ○

SUBJECT OF THE EXAMINATION : Community medicine

DATE OF THE EXAMINATION : 17/1/22 / YEAR : 4th year

For College use only

ROLL NUMBER : ☐☐☐ V M C H & R I ☐☐☐☐

SUBJECT CODE : ☐☐☐☐☐☐

V. Prasanna Venkataraman

Signature of the Candidate

Signature of the Chief Superintendent / Invigilator

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

Answered page Number to be filled by the candidate

Q.No.	1	2	3	4	5	6	7	8	9	10
I	1	5								
II	6	6	7	N.A	7	7				
III	8	8	8	8	8					
IV										
V										

QUESTION NUMBERS / MARKS

VALUATION	1	2	3	4	5	6	7	8	9	10	TOTAL
I											
II											
III											
IV											
V											

GRAND TOTAL: 33.5

Signature of the Examiners

1.

2.

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4.

5.

6.

7.

8.

INSTRUCTIONS TO THE CANDIDATE

1) Kindly check whether your register number, subject code etc. printed correctly on the Answer Booklet. If not, please contact the Chief Superintendent.
2) You are prohibited from writing your name in any part of the answer book including the Bar Coded sheet.
3) Write your Register Number, Subject Code etc., in the Bar Coded Sheet in the Column specified Register Number should not be written anywhere else in the answer book

   Illustrations for Writing Numerals ☐☐☐ VMCH & RI ☐☐☐☐

4) Verify that given question paper of subject, Regulation, title etc., before answering
5) Use both sides of the paper for answering questions. In each page not less than 25 lines to be written.
6) Possessions of any incriminating written / printed / Xerox material, calculator, cell phone or any other electronic devices are totally prohibited.
7) Malpractice of any nature is punishable as per college Statutes.
8) Write the answers according to the order in the question paper.
9) Additional sheets are incorporated in the Answer Booklet. Additional booklet should not be used.
10) Write the page number of the written answer in the Tabulator column provided for the candidate.

I Essay:

1) Dengue Syndrome:

Dengue is a Viral disease caused by an Arbovirus, called dengue Virus. due to bite of Aedes mosquito

There are 4 serotypes of dengue Virus DENV 1-4

Agent:

DENV - 1 to 4

This is transmitted to humans by bite of ~~Aedes~~ Aedes aegypti mosquito

Host:

Humans are definitive host

Aedes mosquitos are intermediate host

Environment:

Aedes mosquitos breeds on fresh water. (domestic water) like ~~dog bites~~. water stored for Home hold purpose, rain water filled in open containers, etc.

Aedes are day biter, they won't able to fly more than one feet.

(1) fever
(2) Headache, body pain,
(3) Petechia all over body
(4) Cold extremities
(5) Severe stomach pain
(6) Hypotension
(7) Thrombocytopenia

Dengue has 3 clinical types:

(1) classical dengue fever
(2) Dengue Haemorrhagic fever
(3) Dengue Shock Syndrome

Each of these type has special clinical feature.

→ classical dengue :
patient presents with fever more than 101°F along with body pain

→ Dengue haemorrhagic fever
patient have clinical symptoms of dengue along with petechial rashes over parts of body (or) induced with tourniquet test

→ Dengue shock syndrome:
most severe stage
pt will ~~go~~ for hypotensive shock
platelet count drops drastically
pt will present with cold extremities, loss of consciousness, even more severe like patient will collapse to death

Screening and diagnosis:

→ Screening:
(1) tourniquet test:
BP cuff is applied to the patients arm for 5 min cuff is inflated, if 2 (or) more petechiae is seen, test is positive
(2) platelet count / complete blood count.

→ Diagnosis: includes screening test and
(1) CBC.
(2) DLC.
(3) HB.
(4) PT / PTT / CT.
(5) Serology ~~examinations~~ tests.
(6) USG abdomen for Hepatomegaly
(7) ~~Lipids~~ or urine analysis

...ment comprises of (4)

1. I V fluid infusion especially Ringer lactate
2. If patient presents with shock, acute management of shock along with fresh frozen plasma infusion

Crystalloids are more preferred than Colloids.

→ Prevention:

1. Currently there are no vaccines for Dengue
2. Avoid storing water in open containers unnecessarily
3. Drain the stagnated water in tanks, rubber tubes, etc

Above two steps will prevent the breeding

4. Try to sit above the ground level [atleast 1 feet] this prevent mosquito bites.

8

Complications:

Most of post dengue patients will have cancer stomach

(2) MCH care indicators:

1. Maternal mortality rate
2. Infant mortality rate
3. Under 5 child mortality rate

→ Maternal mortality rate:

$$\frac{\text{No of maternal death}}{\text{live births}} \times 1000$$

Janani Suraksha Yojana: It is a programme in India which gives guideline for maternal and child health care.

1. This scheme gives access to the poor mothers for institutional delivery.
2. They will get fund benefits for treatment.
3. This reduces maternal mortality and infant mortality rate significantly as home deliveries have major drawbacks of

4

1. Neonatal infection
2. Maternal death due to PPH
3. Malpresentation
4. Conditions which need emergency LSCS
5. Pregnancy induced HTN and gestational diabetes mellitus
6. Still births

Short notes:

(1) Bias in case control Studies:

Case - Control Study is a Retrospective Study.

Bias are errors in Studies

- Some bias are

(1) Observation bias
   - Recall bias
   - Interviewer bias

(2) Selection bias.

(2) COVID 19 Vaccine:

(1) Covishield
(2) Covaxin
(3) Sputnik V
(4) Pfizer
(5) Moderna

3) are vaccines currently available for COVID-19

Pfizer and Covaxin are MRNA vaccines.

Covishield and Sputnik V are antibodies / Immunoglobulins

Efficacy is higher in Pfizer and lowest in Covaxin.

3) Indicators for Housing:

(1) Lighting.
(2) ventilation.
(3) Cross ventilation
(4) Sanitation → Toilet, latrine, Drainage System, waste disposal
(5) Overcrowding. / No of family members in a room / per-Capita Space
(6) Water supply → Continuous (or) Intermittent / Source of water
(7) Distance from dump disposal area / drainage to house
(8) Environmental indicators like. Breeding places of vectors, Pollution; noise pollution, etc.
(9) Height of Kitchen Slab for stove from ground level
(10)

(5) Prevention and Control of Nightblindness:

Night blindness is one of the preventable blindness. So it Comes under Vision 2020 act (NPCB)

Vit A at 9-6 Months of age

⇒ Vitamin A Supplementation as per Universal Immunization Schedule

1,00,000 IU for child < 12 months
2,00,000 IU for child > 12 months
→ if missed

Dietary counselling about Vit A to mother.

(6) Principles of Health education:

(1) Credibility
(2) Interest
(3) participation
(4) Motivation
(5) Comprehension
(6) Reinforcement

III Short answers:

(1) **Stratified Random sampling:** Population is divided into 2 (or) more groups called Strata, according to some criterion such as geographic location, age, sex. Sub samples are randomly selected from each strata. Elements within each strata are homogeneous but are heterogeneous across strata.

(2) **Ergonomics:**

Ergonomics is a branch of ~~[illegible]~~ Science dealing with making the working environment of the worker better way to Reduce the Industrial Hazards and making them Comfortable for working.

(3) **Tracking of blood pressure:** Those individuals whose BP was initially High would follow the same track as Adult. This phenomenon of remaining of rank order of BP have been described as Tracking

(4) **GOBIFFF:** Growth monitoring, Oral Rehydration, breast feeding, immunization, female education, family, food

(5) **Triage in Disaster management:**

~~[illegible]~~ There are 4 Color Codes based on which priority for treatment is given

(1) Red:
1. most urgent
2. Survival possible if attended immediately

(2) Yellow:
1. ~~[illegible]~~ urgent can wait 45-60 mins
2. ~~[illegible]~~ after Stabilization.

(3) Green:
Can wait longer
Minor Care is given

(4) Black:
dead

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