

1. Right Atrial Pressure minimum(0-2).....Max 6 Left Atrium Min 0-2 Max 6
2. Right Ventricle Pressure Minimum(2-3) Max 25 LV ...Min 5.....Max 120
3. Pulmonary Artery Pressure Min 7-8 .. Max 25 Aorta Min 80...120...

Pulmonary Valve will open at **8mm** of Hg. Aortic will open at **80**.

Pressure in aortic and pulmonary compartment are lowest in Isovolumetric contraction. And Max in Reduced Ejection Phase.

Lowest Resting Membrane potential is of SA node.

- SA node is present in Myocardium.
- AV node + Purkinji system in sub-endocardium.
- Purkinji fibers have more **gap junctions** and **less myofibrils**.
- Maximum conductivity of AV node is **230** impulses/min.
- Changes in level of potassium has profound effect on the heart.
- Absolute refractory period = 0.27 sec=270mS
- Relative refractory period = 0.26 sec =260mS
- Total 0.27+0.26 = 0.53 sec=530mS.
- Electrical Potential in ECG changes due to = **Partial depolarized state**.
- PR Interval = AV nodal delay
- PR interval short = louder S1 due to sympathetic stimulation.
- PR interval on venous curve = A-C interval.
- PR segment = Atrial systole.
- PR segment = atrial systole = a wave in JVP.
- Prolonged PR= raise in ventricular filling but it'll lead to decrease rapid ejection.
- QRS=Ventricular Depolarization
- QT interval = Complete Ventricular depolarization + Repolarization.

OR

We can say QT shows two ends = end of atrial depolarization + end of ventricular repolarization.

OR

Time taken by a impulse to travel from endocardium to epicardium is shown by QT.

- ST segment = Ventricular systole occurs here as ventricular depolarization has occurred already. During ST segment Calcium ions move in and cause ventricular contraction or systole.
- ST segment= interval between ventricular depolarization and repolarization.
- Clinical signs of Hypokalemia :- Palpitations ,Constipation, weakness, sinking heart.
- ECG signs ; - U-wave (**Most definite**), Inverted T waves, Prolong PR Interval.
- U wave shows = Papillary repolarization.
- WPW= Short PR + Wide QRS (Delta Wave)
- Bifasicular block = RBBB + LBBB = rsR' + Left axis deviation.
- Trifasicular Block = RBBB + LBBB + 1st degree heart block = rsR'(V1,V2) + Left Axis Deviation + PR Prolong.
- Complete Heart Block = Separate atrial and ventricular rate marching = Broad QRS @rate of 20-40/min.
- Commonest cause of sudden death = Vfibrillation (Ventricular Fibrillation disrupts action potential when it's about to **end**)
- 3rd Degree Heart block = Patient faints usually due to low CO. 3rd degree blocks usually show Cannon A waves in JVP. **Atrial Repolarization** becomes evident in 3rd degree heart block. Treatment is placement of pacemaker in Right Ventricle.
- Afib (Variable 1st heart sound . Absent P waves. Irregular rhythm. Absent a wave in JVP)
- Extra Systole means extra beat. Ventricular extra systole causes arrhythmia. During extra systolic beat diastolic time is reduced. Reduced EDV. Reduce SV. Reduce PP & CO.

- Normal Ventricular Contraction after extra systole will cause increase Pulse Pressure due to increase in SV.
- Saw Tooth is definite pattern of = Atrial Fibrillation
- ECG showing No P wave.QRS present.Pacemaker is in AV node.
- Atrial Pressure is controlled by = ANP
- Most immediate event following bleeding = constriction of arterioles
- Orthostatic hypotension occurs due to low blood volume,a1 blockers causing pooling of blood in periphery or defective baroreceptors.
- Baroreceptors are present in **adventitia** of large arteries
- When bleeding occurs and blood is lost.Below 60mm of Hg the most active and potent response is = CNS ischemic response.(Sympathetic stimulation=BP towards normal)
- At 60>mm of Hg Baro-receptors.
- Increase sympathetic response via baroreceptors occur when they are firing less(they are not stretched due to low BP) this will also lead to **increase renin** release via Sympathetic Stimulation.
- When Baroreceptors afferent or efferent are cut = then MAP would be variable with no proper control
- Stimulus for release of Renin are Hypo factors(Hyponatremia,Hypokalemia)
- Hyperkalemia actually inhibits release of Renin.
- Angiotensin II 4 effects :- Most immediate and transient is Vasoconstriction (It constricts efferent arterioles.
- Other functions are increase thirst,Na/H pump,increase aldosterone.
- Among the various stimulus for Renin release **the most powerful one is sympathetic stimulation.**
- Max feedback gain in controlling BP = RAS system
- Increase in vascular resistance before surgery = increase in catecholamines
- Blood flow remains constant but resistance is changed in= Autoregulation
- Brain Bridge Reflex = atrial reflex = cause an increase in HR inrespond to increase volume in Atria (Afferent and efferent by Vagus X nerve)
- WheatStone Bridge Principle = used to measure Cardiac Output.
- Dye used to measure CO is = Cardio green.
- CO measured by thermodilution technique by = Indicator dilution technique
- $CO = SV * HR$ and so SV or mean $SV = CO/HR$.
- $MAP = DBP + 1/3 PP(SBP-DBP)$ (DBP depends upon TPR AND SBP on CO...so MAP depends upon TPR + CO)
- Adenosine = has negative inotropic effect
- RV output is what percentage of LV output = 100% (both are equal)
- Work done by LV is greater than RV work because of more After Load
- Sympathetic stimulation will decrease the venous compliance as it leads to increase in venous return via constriction of veins as in exercise.
- DBP=An index of TPR.
- Before tranfusion of blood = it's warmed to about 37 degree = to prevent hypothermic reaction.
- Coronary blood flow is maintained by= Local metabolities (Mycocardial Oxygen demand and consumption)
- Coronary blood flow increase with increase in HR as with increase HR O2 demand increases amd blood flow occurs during diastole.
- Laminar flow is indirectly related to pressure .
- Turbulent flow is directly related to pressure.
- After hemoorrhage plasma proteins are replaced in = 2-3 days
- Role of lymphatics = removal of extra vascular fluid

- Lymph flow decreases with increase in venous pressure and also in shock.
- Pregnant lady should sleep in left lateral position . If she sleeps supine or Right lateral position it'll compress IVC and she may faint.
- During exercise,blood supply to GIT and Kidney is decreased. But GIT > Kidney. (via A1 receptors)
- Hyperventilation....decrease CO₂...Vasoconstriction in brain vessels...decrease blood flow there.
- Mixed Venous blood in which artery = Pulmonary Artery
- Brain Perfusion Pressure range = 50-150 mm of Hg
- Cerebral blood flow at rest is 50ml/100g/min

Lower Limb

- Highest Transverse plane = At the level of iliac crest = Intercristal line = at level of L4 = B/w L4-L5 vertebrae = act as an guide while doing LP. (Iliac Tubercle is also at the same level can be given in options)
- Normal angle of shaft of femur with it's neck is = 125 degree (If >125 its Genu Valgum, If <124 it's Genu Varus)Valgum occurs due to injury of MCL and Varum occurs due to injury of LCL in acquired cases.
- Linea aspera = a line on femur on which deep fascia attaches to divide the thigh in to anterior,medial and posterior compartments.It continues **upward** and **medially** as Intertrochanteric line and as pectineal line towards base of lesser tronchanter.
- Angle of femoral torsion is = 15 degree
- Commonest fractured bone is lower limb is tibia . (In old age it's Femur Neck)
- Medial Longitudinal arch is supported by = **Plantar** Calcaneonavicular ligament.
- Tibial Collateral Ligament = MCL = Injured when an force is applied on knee from lateral side otherwords lateral trauma of knee joint will damage MCL.
- Muscle which plays role in stability of knee joint = Quadriceps femoris (any part of it can be given in options)
- Triple Arthrodesis = Fusion of Calcaneocuboid,Calcaneotalus,Talonavicular bone together.
- Tendon of which muscle is Intracapsular = Popliteus
- Hip anterior dislocation thigh will be = Extended,Lateral Rotation,Abducted
- Hip Posterior dislocation = Flexion,Medial rotation,Adducted.
- Shin Split = injured muscle is Tibialis anterior.
- Acchiles tendon = injury may occur during tennis = by hyperextension and dorsiflexion of leg,foot = may be given as ecchymosis around calcaneum (cause can be asked which is rupture of tendon).Most commonly medial head of Gastrocnemius involved along with plantaris.
- Relation of nerves to piriformis. Sciatic nerve is deep to it. Superior gluteal nerve superficial to it which supplies Gluteus medius and Minimus (abductors and medial rotators of thigh)
- Trendelenburg sign occurs due to superior gluteal nerve damage. In a scenario you can be asked regarding side on which it's damaged after giving scenario of a patient standing on one leg and tilting of pelvis downwards on a side. Superior gluteal nerve of that side is damaged on which leg patient is standing or the site on which pelvis is tilting downwards nerve damaged will be opposite to that side.(Both are the same thing)
- Waddling gait or gluteal gait occurs due to gluteal nerve damage.
- Among hip flexors main(chief) one is = Iliacus
- Short head of biceps femoris isn't included in hamstring muscles.
- Sartorius is flexors of both thigh and leg.
- Femoral ring boundaries (Anteriorly=Inguinal ligament,Posterior= Pubic ramus aka Pectineal ligament,Medial=Lacunar Ligament,Laterally=Femoral Vein)
- Femoral hernia descends posterior to = Inguinal Ligament as anterior;y is Inguinal ligament as mentioned above.
- Function of femoral canal = To provide space during straining to femoral vein.Femoral vein is a potential space that becomes absent during straining/exercise.
- Femoral canal is widened to prevent = strangulation of hernia.
- Bleeding at the site of incision in femoral hernia repair = Inferior Epigastric artery.
- Femoral nerve not a component of femoral sheath and adductor canal.
- Flexor Digiti minimi = 3rd layer of sole.
- In popliteal fossa upper part =medial to lateral = Artery,Vein,Nerve (A,V,N) = In remaining parts it's in reverse order N,V,A = so in lower part artery is lateral to vein.
- Best Vessel to take sample = Femoral vein

- Structures through Saphenous opening = Superficial epigastric artery, Superficial External Pudendal artery, Greater Saphenous vein, Femoral branch of Genitofemoral Nerve.
- Greater saphenous vein = 10-12 valves acc to KLM and 15-20 acc to B.D (Choose as per given options)
- Small saphenous vein = accompanied by Sural Nerve as Saphenous nerve accompanies Greater Saphenous vein.
- Anterior Division L2-L4 = Obturator Nerve
- Posterior Division L2-L4 = Femoral Nerve.
- Posterior division of sacral plexus = Common Peroneal Nerve + Perforating cutaneous nerve of thigh + SGN & IGN.
- Anterior division of Sacral Plexus = Tibial Nerve
- Saphenous nerve = branch of Femoral nerve = supplies medial leg, foot, upto 1st toe and small part on dorsum of foot.
- Root of Saphenous nerve = Dermatome of 1st toe = Dermatome of medial foot = L4
- Root of Sural Nerve = Dermatome of little toe and lateral foot = S1
- S1, S2 = root of ankle reflex.
- L3, L4 = root of patellar reflex.
- Sciatic nerve = root = L4-S3 = During Sciatica pain can be radiated to **back of thigh (L4 root)** or **lateral side of leg (S1)**.
- Injection below and lateral to pubic tubercle = nerve damage is Obturator nerve.
- Ovarian injury = nerve = Obturator Nerve
- Gluteal injection are given outer quadrant to save = sciatic nerve
- Meralgia parasthetica = Lateral cutaneous nerve of thigh.
- If tibial nerve is damaged = can't stand on toes as it supplies flexors = tibial nerve is damaged due to prolonged dorsiflexion.
- Tarsal Tunnel syndrome = affects tibial nerve = tarsal tunnel is space b/w flexor retinaculum and Calcaneum (If asked specifically then it's Posterior Tibial Nerve)
- Common Peroneal Nerve = lateral to fibula head = so we don't take biopsy from lateral side as this nerve can be damaged there and during anaesthesia lithotomy position common peroneal nerve can get compressed against head of fibula and can be damaged)

Metabolism Key Points

- Transducer = One form of energy into another form.
- Protein in serum = Nitrogen in urine (Protein breakdown gives Nitrogen)
- B/W meals liver maintains glucose level by = glycogenolysis (Activation of glycogen phosphorylase)
- Lactoferrin is absent in mother's milk (Normal content are Lactose, Lactalbumin, Caesin)
- Daily Protein Requirement = 1g/kg
- 100g Cereal = 330-350 calories of energy.
- Healthy individual, metabolic requirement may exceed O₂ supply = in skeletal muscles
- Rigor Mortis occurs due to = less ATP
- Imp in Hepatic Encephalopathy = Ammonia Levels
- Hyperemesis gravidarum will lead to = Hypokalemia
- Heat loss depends on = Activity + Core Body Temp + Temp of the surroundings.
- Immediate response to heat = Cutaneous Vasodilation
- Decrease in activation energy = Enzyme.
- Most common complication of TPN = Hyperglycemia
- TPN is contraindicated in **Liver Failure**.
- Antioxidant substances Glutathione > Vit E > Vit C > Vit A.
- During exercise Skeletal Muscle blood supply is increased due to = Production of local Metabolites
- After thyroid surgery, numbness of muscle = Tetany (low calcium due to hypoparathyroidism)
- Counter part of sodium is = Cl⁻
- Renal Failure = Hyperkalemia
- **Lipoprotein lipase** = metabolizes free fatty acid in blood
- Ketosis results in = Increase in fat mobilization (as fats are their substrate)
- Long term adaptation to cold temperature = Brown Fat formation
- Brown Fat has a protein Thermogenin. It allows the uncoupling of protons moving down their concentration gradient from the synthesis of ATP, thus allowing the energy to be dissipated as heat = Fatty acids uncouple oxidative Phosphorylates.
- Aerobic vertigo in diver is due to = Baro Trauma
- Highest energy reserve = Adipose tissue (150 times as much energy stored in the form of fat as stored in the form of carbohydrate. 1g of fat energy is 2 to 2.5 times the energy stored in 1g of glycogen)
- Reabsorption of uric acid is inhibited by = Probenecid.
- At the end of marathon race = more Glycogenolysis
- Iron absorption = in duodenum + proximal jejunum
- Iron absorption = as Fe⁺² (Ferrous form) or Heme
- Weight is maintained = by Work Output
- Alzheimer disease = decrease utilization of glucose (Decrease glucose uptake = Insulin Resistance, Gluconeogenesis + Protein Catabolism + Lipolysis + Decrease Fibroblast activity = Striae, Decrease inflammatory and immune response)
- 1st pass metabolism occurs in = PO route
- High fiber diet = decrease cholesterol
- Muscle Fatigue = due to lactic acid
- Human and cow milk difference = Cow lacks antibodies (Human milk has clostrum)
- Formula milk lack lactose.
- Co-enzyme A = synthesized from Panthotetic acid
- During sweating = Na⁺ is lost.
- Organ which can use ketones in starvation = Brain
- Heart derives 60% of their energy from = Fat
- Juice which inhibit drug metabolizing enzymes in liver = Grape Fruit
- Food component not needing digestion = Glucose
- Iron Requirement in Pregnancy = Minimum 1g & ideal is 1.2g.
- Na content in body is due to High body water content.
- Heat cramps = loss of Na⁺
- Burning hot sensation occurs when temp >45 C
- Thermoregulation in cold = decrease in temp lead to activation of hunger center in lateral hypothalamus.

Metabolism Key Points

- ATP converted to ADP = Energy yield is 7.3 kcal/mole. (ATP is the main energy source of the body. It has 3 ester bonds. One bond = 7.3 kcal/mol of energy)
- Intracellular buffer = Bicarbonate
- Wilson disease, confirmatory test = Liver Biopsy
- Indicator of muscle loss = Urea
- Higher amount of _____ in tears = Na⁺
- Glycolysis in presence of O₂ end product = 2 molecules of pyruvate.
- Person in a room with optimum condition = heat loss occurs by radiation and conduction.
- Sucrose = disaccharide.
- Basal Metabolic rate = Depends upon amount of Lean body mass > Body Surface Area.
- Decrease Basal Metabolic Rate = in Obesity.
- Free fatty acids released from adipose tissue are transported in blood by **Albumin**.
- Fatty acids from GIT is transported via chylomicrons to lymphatic system.
- When Outside Temp is cooler than body temperature, then there's something from inside that triggers sweating as in Mental Stress.

Cellular Adaptations

- Metaplasia of surface epithelium = mostly due to **chronic irritation**.
- Cervical mucus is normally **Columnar**, mucus secreting endocervical cells. Due to chronic irritation such as due to IUD it's changed to **Stratified Squamous Epithelium**.
- Chronic Cholecystitis leads to **Metaplasia** of epithelium lining Gall bladder leading or increasing the risk of carcinoma of gall bladder.
- Hypertrophy there's increase in = **DNA** content of cell.
- In Leiomyoma, if less glands more stroma it's Atrophy (Glands to Stroma ratio is 1:2)
- In Leiomyoma, more glands less stroma is hyperplasia (Glands to stroma ratio 2:1)
- Vocal nodules due to overuse as in singers or teachers = Hyperplasia
- In a breast feeding mother there's a change = Lobular Hyperplasia of breast tissue.
- Lipofuscin Pigment = yellow colored = old aged patient = wear and tear pigment = shows atrophy

Hypoxic Cell Injury

- Reversible injury (1st change cell swelling followed by Fatty change, Plasma membrane blebs, Mitochondrial swelling, ER dilation)
- Nucleus changes in order = Karyolysis >> Pyknosis >> Karyorrhexis
- Karyolysis = loss of **basophilia**
- Irreversible cell injury Mitochondrial change = **Flocculent** densities in Mitochondria
- MI = **Contraction band necrosis** when reperfusion occurs.

Necrosis

- Fat necrosis = a type of omental necrosis
- Fat Necrosis occurs = (Breast=due to trauma, Acute Pancreatitis=Enzymatic fat necrosis)
- Foul smelling crepitus = due to **Clostridium Perfringens** = produces toxins = may lead to **Toxemia**

Apoptosis

- Cellular Valt is regulated by = Apoptosis
- Atrophy of glands like parotid or pancreas secondary to duct obstruction is due to = Apoptosis
- Normal size heart on death after IHD = Apoptosis
- Histology of Apoptosis = Cell shrink (Compact Chromatin, Eosinophilic cytoplasm, Basophilic round bodies which are basically broken down organelles, Councilman bodies)

Cellular Accumulations

- Metastatic Calcifications occurs in normal tissues. Most common normal tissue involved is Kidneys leading to Nephrogenic diabetes insipidus.
- Character of Serous cells = nuclei pushed to base.
- Amyloid deposition leads to = Hyaline change.
- Hereditary Hemochromatosis = accumulation of Hemosiderin = Chronic hemolysis is one of the cause.

Tissue & Wound Repair

- Least important factor regarding wound healing = age of patient
- Steroid delays wound healing.
- Wound healing isn't effected by suture.
- Main difference b/w healing by primary and secondary intention = Wound Contraction (In secondary granulation tissue forms which fill the wound and contracts via myofibroblast)
- Most Important cells for secondary healing is = Myofibroblast.
- After Tissue injury clotting occurs due to = activation of extrinsic pathway (Tissue factor = Tissue Thromboplastin binds factor 7, this complex activates factor X to Xa)
- MMP'S=Matrix metalloproteases also known as collagenase are Zn dependent enzymes involved in remodelling of wound tissue and vascular extension (involved in both angiogenesis and wound healing)
- **Fibroblasts cells are least sensitive to Hypoxia.**
- Vitamin C is required for hydroxylation of proline and lysine. Lysyl oxidase later cross link them. Patient taking less fruits are deficient in Vitamin C leading to **Defective synthesis of Collagen.** (Not Decreased)
- Keloid Formation is common in Black population.

- Clot **retraction** occurs due to **Platelets** = within **60mins**.(Platelets have a protein named Thrombosthenin,it's involved in clot retraction)
- Growth factor at cell bring about it's effects by working on = **Cell Membrane**.
- Glial Cells = Cells involved in scar formation of neuron after injury.
- Wound healing in hernioplasty is better assisted by = **Ca+2**
- A **multiparrous** women has difficulty in wound healing due to = **Malnutrition**
- Wound closed by suture=reaches 80% of tensile strength as compared to normal by 12 weeks=3months , but usually don't improves beyond this point.
- Epithelioid cells = present in granuloma = absent in granulation tissue (So,no Langerhan giant cells = epithelioid cells are involved in healing of tissues and bones)
- Undermined Ulcer Edges = TB Ulcer.
- UV light = promotes wound healing.
- Liver tissue regrows by = Hyperplasia = regenerates considerable in 15-25 days)
- Burns occur= leading to loss of dermis = complication most commonly occur is = Contracture formation.
- Collagen is the most abundant protein in body.
- Follwing,radiotherapy scarring and ulceartion occurs due to = **Desquamation**.

Pelvis & Perineum

- Spinous processes of sacral vertebrae join to form = Median Sacral Crest.
- Fracture of sacrum can enter pelvic cavity and damage rectum. (Sigmoid colon becomes the rectum at level of S3 Vertebrae)
- Muscle which can increase the abdominal pressure = Pelvic Diaphragm.
- Transection of rectus sheath in which incision = Pfannenstiel incision.
- Superficial external Pudendal artery = pierces femoral sheath
- Lateral wall of ischiorectal fossa has pudendal canal = Pudendal artery can be encountered here.
- 2 branches of inferior epigastric artery = (Cremasteric artery, accessory obturator artery)
- Superficial Dorsal vein = drains into great saphenous vein
- Deep dorsal veins = drains into Santorini Plexus (Prostatic plexus) = Dorsal Venous Plexus.
- During Radical Prostatectomy bleeding from = Above mentioned plexus.
- Pudendal nerve leaves pelvis via UPPER part of = greater sciatic foramen (NOT LOWER)
- During pelvic injury nerve which can be damaged along the lateral pelvic wall = Obturator nerve
- Obturator nerve can be blocked = by giving local 2cm lateral and below to pubic tubercle.
- Lateral cutaneous nerve = supplies anterolateral surface of thigh.
- Supply of Anterior scrotum = Ilioinguinal nerve + Genitofemoral nerve
- Ilioinguinal length > Genitofemoral nerve, so it supplies distal scrotum.
- Most common cause of Obstructive uropathy in new born males = Posterior urethral valves.
- As long as Buck's fascia is maintained = Injury like hematoma is maintained to penis.
- Prostate size = 20gm.
- Testes start descending in = last trimester
- Vertebral plexus = spread prostate tumour to skull.
- Tunica Vaginalis (outer most layer), Tunica Albuginea (middle fibrous layer), Tunica Vasculosa (inner most layer)
- Glands involved in ulcer of Labia Majora = Greater Vestibular glands.
- Urethra is situated above = urogenital diaphragm.
- Tunica Vaginalis = derived from processus vaginalis.
- Processus vaginalis = derived from parietal peritoneum.
- Internal Urethral sphincter = absent in females
- Greater vestibular glands = present in females in superficial perineal pouch.
- B/w the two openings of ureter = interureteric ridge on base of bladder = also known as Bar of Mercier.
- Denoviller Fascia also known as retroprostatic fascia = present posterior to bladder = its injury leads to = vesicorectal fistula.
- Ureter can't be felt on rectal examination.
- Ischiorectal fossa = roof by Levator Ani.
- Hypogastric sheath = condensation of pelvic fascia for blood supply to lateral pelvic organs.
- Obstructed labor = most commonly occurs in Android pelvis.
- 38 weeks pregnancy = PROM = gush of fluid from vagina = next step = wait for 24 hrs.
- Fundal height greater gestational age = Esophageal Atresia.

Platelets disorders+Infarcts

- Coronary occlusion most commonly occurs due to = Thrombus (via atheroma formation)
- Mural Thrombi are formed in = heart or aorta
- Heparin induces it's effect by acting on = Anti-thrombin III
- Naturally occurring anti-coagulant in body is = Heparin like sulfates secreted by endothelium.
- Atheroma is most common cause of infarction in viscera.
- Phlebothrombosis = occurs in veins
- Clotting occurs due to interaction with = Collagen
- Prostacyclin antagonist is = Prostaglandin.(Prostacyclin maintains endothelium)
- Thromboxane A2 = enhances platelet aggregation and is synthesized by Platelets not Endothelium.
- Most common source of arterial thrombi is = Left Ventricle.
- Vasoconstriction occurs in damaged vessel occurs due to = damage interfere with production of NO.
- Increase risk of atheroma = Systolic Hypertension (other factors are DM,Lipid,Smoking)
- Recurrent abortion = LUPUS anticoagulant should be tested.
- Antiphospholipid antibody syndrome = Most common acquired cause of thrombosis.
- Pale Infarct = Heart,Spleen,Kidney
- Red Infarct = venous occlusion or an organ with dual blood supply (Lungs,Liver,Intestines,Testes) Brain or heart after reperfusion.
- White or pale infarct = most commonly due to Atherosclerosis.
- Fat embolism is the most fatal type of embolism.
- Renal Infarct most common cause is = Embolus arising from mural thrombus.
- In lungs = DVT leads to wedge shaped(Triangular) infarct due to Thromboembolism.
- Gallium scan is done for PE.
- Not related to embolus = Thrombus (until it get's detached)
- Arterial gas embolism occurs in deep sea divers.(Caisson disease is it's chronic form)
- Amount of air needed for air embolism is = 100ml.
- Amniotic fluid embolism is a complication of labour and it occurs during delivery or the immediate post partum period.
- Symptoms of fat embolism appears after = 12hrs
- Pulmonary Infarction = occurs when small artery are involved (Large or medium sized artery leads to pulmonary thromboembolism which is red infarct due to dual supply)
- Pulmonary Embolism is clinically silent.
- ECG and CXR can be normal in PE.
- Poor prognostic factor in sepsis /Burns is = DIC.
- Vit K dependent factors are = 2,7,9,10 (factor 2 is prothrombin , most important is this if asked in mcq and it's also the same factor for CLD)
- Citrate affects coagulation by = Calcium Chelation.
- Factor V leiden mutation(not Factor V deficiency) is most common cause of hypercoagulable.(After this it's Protein C).
- Post Splenectomy Scenario = leading to DIC due to infection by N.Meningitidis and E.Coli. (labs will be asked)
- Classic Hemophilia occurs due to = Factor 8 minor component (Factor 8 major leads to VVB disease)
- Fibrin is stabilized by factor 13.
- Test least likely to be done in DIC patient = Clotting time
- A scenario asked with condition having least chances for DIC= Cervical Carcinoma.
- Diseases in which PT and APTT are prolonged = DIC + CLD.
- Transudate has specific gravity <1.012 and protein less than 1.

- Exudate has specific gravity >1.012 and Protein >3 .
- Exudate contains inflammatory cells and is due to increase vascular permeability.
- In a patient with edema = test performed will be 24hr urinary protein.
- In nephritic syndrome, facial puffiness is not due to decrease proteins = it's due to increase fluid retention.
- Anion gap decreases in = Hypoalbuminemia.
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Renal Physiology

- MAP for renal autoregulation = 80-180 mm of hg (Brain 50-150)
- Urine output = 1000ml
- Urine blood flow = 1100ml/min (22% of CO)
- Renal Plasma Flow=600-650 ml/min
- $FF=GFR/RPF=20\%$ (Range 15-20%)
- Cortical Nephron = 94% , Medullary = 6%
- Angiotensin II prevents the GFR from decreasing.
- Cystatin C is a compound used in glomerular injury.
- Highest Clearance = PAH
- **Least clearance = Glucose**
- Glucose is reabsorbed by secondary active transport = co-transport.
- PH of DCT < PCT.
- Urea concentration in urine > than in plasma.
- **K lost more in vomiting + loop diuretics**
- Sweating increases sodium loss from body.
- **Burns causes = Hyperkalemia (cell injury)....Exercise also causes increase Potassium.**
- Under ADH hyperosmolar urine is produced = 1200-1400 mOsm/L
- Micturition Center = Present in PONS.(Midbrain)
- Fraction of excreted sodium = used to assess renal tubular function.
- Thirst is stimulated by ECF volume depletion.
- **Osmoreceptors = regulate Na levels.**
- Atonic bladder = (Injury at level of sacral segment) overflow incontinence
- Automatic = voluntary control is lost = recover after sometime = injury above sacral segment.
- 3rd spacing is treated by = Lactate solution (it's isotonic)
- GFR best method = Inulin clearance
- GFR clinically = Creatinine clearance
- During exercise, vasoconstriction of vessels occurs via alpha 1 to kidney, so there's decrease blood flow. So, Oxygen requirements of kidneys are not met during exercise.
- Urea is reabsorbed passively.
- The normal range for urine specific gravity is **1.005 to 1.030**
- Urine specific gravity tells us about = Concentration ability'
- **Minimum amount of urine required to remove waste products from body= 400-500 ml.**
- Medullary Nephrons = play role in concentrating urine.
- In Asthenuria = there's fixed specific gravity of urine.
- Countercurrent Multiplier = By which Juxta Medullary Nephrons add more and more solutes
- **In case of High Urine Osmolarity= defect lies in Absorption**
- Atonic bladder in Tabes is due to injury of Sacral nerves
- Imp buffer of Extra-cellular = Interstitial+Plasma = Bicarbonate
- Imp buffer of Intra-cellular=Phosphate + Protein (most imp is protein)
- Buffer action of kidney is least likely = by combination of H with Proteins.
- H⁺ secreted in urine as = Bound to Ammonia.
- Cells of kidney are able to = synthesize ammonia.
- In DKA = buffer most imp is Bicarbonate
- In CKD=there's Metabolic Acidosis.

Reproduction

1

- Sperm regeneration cycle = 64 days
- Penetration of Corona Radiata by Sperm = Hyaluronidase enzyme
- Least chances of Maternal death = 20-30 years
- Definite Sign of Ovulation = Ferning of Cervix
- Antepartum Fetal checkup = via Scalp Electrode
- Penile Erection = Muscarinic Receptors (Parasympathetic system)
- Emission of sperm = alpha receptors on epididymis, vas and seminal vesicles
- Ejection = Pudendal Nerve (Has some sympathetic fibers)
- Ejaculation = Emission + Ejection = Sympathetic Nervous System
- Sperm are partially motile = in Epididymus
- After normal delivery = breast feeding asap (within 1st hr or after 30 mins of birth)
- Acrosome is made up of = Golgi Apparatus
- In New Born = vertebral column is C shaped
- When Pregnancy doesn't occur Corpus Luteum becomes = Bleeding Corpus Luteum (Corpus Hemorrhagicum)
- Sperm can remain alive in vagina for = 1-2 days (24-48 hrs)
- Implantation occurs on = 6th day of Fertilization.
- Doppler USG is effective at 24 weeks of Pregnancy.
- Oocyte at Ovulation = Secondary Oocyte (Present in Tertiary Follicle and released as secondary Oocyte which is arrested at metaphase of 2nd meiotic division)
- Last Change of Puberty = Menstruation (Menarche marks the end of puberty)
- Thelarche = 1st change of Puberty
- Doppler in Pregnancy = Detects pulsatility in uterine arteries + increase in growth restricted fetus)
- Leydig cell tumour = not a germ cell tumour. It's a sex cord stromal tumour common in young people.
- A female presenting with amenorrhea with absent B-HCG = it can't be Normal, Molar or Ectopic Pregnancy as B-HCG is produced in all of them. It's Anovulation.
- Oxytocin = Initiates Labour
- Absolute Contraindications of OCP = 1) Acute Liver Disease 2) Migraine 3) Cardiovascular problems 4) Estrogen Dependent Neoplasm.
- Failure rate of ICP = less than 1%
- USG = 20,000 Hz sound waves are used
- HB drops in Pregnancy = Normal Physiological Change (Expansion of volume)
- During Pregnancy blood volume and HB both increase but increase in blood volume is > than increase in HB so, HB drops on CBC but we can say in Pregnancy there's increase in RBC + Blood Volume.
- Necessary Supplements in pregnancy = Iron + Folic acid
- In each cycle number of follicles that are stimulated = 15-20 (Only 1 is selected the Dominant one)
- Capacitation = an ultimate step in sperm maturation occurring in female genital tract = Uterus
- Viscosity of Cervical Mucosa is at its peak = 2 days after ovulation (in secretory phase)

Reproduction

- Gap b/w 2 children = 2-3 years
- Fetal Movement are known as quickening = 5th month of Pregnancy
- Blood Sugar , Blood Albumin , Uric Acid all increase during Pregnancy (Uric acid decreases during 1st trimester due to uricosuric effect of estrogen)
- Urea level don't increase during pregnancy.
- Asthenospermia = sperms with decrease motility (occurs in old age)
- Asperima = absent of semen
- Azospermia = absent of sperms in semen.
- Fetal Heart Rate = 120-160/min
- Safe Motherhood = Component of reproductive Health.
- Placenta = Barrier between maternal and fetal blood.
- Lead Shield = Xray in Pregnancy
- HMB = Blood loss of >than 80ml.
- During Sexual act = Wetness of Vagina = Secretions from Parasympathetic
- Menopause occurs = when ovary run out of follicles = ovarain unresponsiveness
- During 2nd stage of labour = most imp point = contraction of abdominal muscles.

Thorax

- Flexors of trunk are supplied by = Ventral Rami of Spinal Nerves.(Same for intercostal muscles)
- Extensors of trunk(Muscles of back) are supplied by=Dorsal Rami of Spinal Nerves.
- Intercostal nerves are part of sympathetic chain and somatic nervous system of body.
- Phrenic nerve is accompanied by Pericardiophrenic artery(a branch of internal thoracic artery).If phrenic nerve is cut off pericardiophrenic vessel can be damaged.
- Left phrenic nerve lies anterior to Scalenus anterior muscle which is inserted onto upper and inner border of 1st rib.Phrenic is accompanied here by subclavian vein.
- Thyrocervical trunk branches (1st largest inferior thyroid artery,Superficial cervical artery,Suprascapular artery)
- Subclavian artery aneurysm is in Posterior triangle of neck.
- Behind Sternum **vertically seen structure** is = Internal Thoracic artery.
- Anterior to thoracic aorta is = Root of lung.
- Posterior to arch of aorta is = Recurrent Laryngeal Nerve.
- Aneurysm of aorta will **not** compress = Phrenic Nerve.
- In coarctation of aorta blood is fed into distal thoracic aorta via = Internal Thoracic Artery.

Diaphragm

- **Morgagni hernia** is a rare form of congenital diaphragmatic hernia with a prevalence of 2–3%. It occurs due to a defect of the **right anterior part** of the diaphragm,at the level of 7th rib on either side of xyphoid which allows abdominal organs to penetrate into the thoracic cavity.
- Phrenic nerve damage will lead to **Respiratory depression**.
- After intercostal muscles structure damage in penetrating wound injury will be= Endothoracic fascia.
- A needle inserted in intercostal space just left to sternum = Internal intercostal muscles is damaged.
- Congenital diaphragmatic hernia = defect of **pleuro-peritoneal membrane**.
- Diaphragmatic hernia associated with Lung Aplasia.
- Diaphragm hernia not occurs in = Inferior vena caval opening. (Central tendinous part)
- Aortic opening of diaphragm is = most posterior opening of diaphragm.
- Structure entering through thoracic inlet = Recurrent Laryngeal nerve.
- Neck infection between pre-tracheal and pre-vertebral fascia spreads to **Superior Mediastinum**.
- Left Vagus nerve = Involved in cardiac plexus.
- Neurogenic tumour = least likely to occur in anterior mediastinum.
- Thymus extends from **inferior border of thyroid to 4th costal cartilage** in children.(Regresses after puberty and is a lobulated organ)
- Thymus supplied by inferior thyroid artery + internal thoracic artery.
- Esophagus junction with pharynx at level of 6th Cervical vertebrae (Cricoid Cartilage)
- Esophagus enters abdomen via Esophageal opening at T10 and connects with stomach at level of T11.
- Esophagus has 3 constrictions. 1st at junction with pharynx at C6 level (Cricopharyngeus muscle....Maximum constriction is at this level), 2nd is due to crossing by arch of aorta and left main bronchus at level of T5, 3rd where it pierces the diaphragm and enter stomach T10.
- From Anterior to Posterior we have Left atrium,esophagus and Aorta. So,LA dilation can compress esophagus and can lead to Dysphagia.
- GIT layers from Inside. Mucosa---Sub-Mucosa---Muscular layer---Adventitia--Serosa (For retroperitoneal organs like esophagus serosa is absent , so for them outermost layer is Adventitia).
- Muscle that's not pierced during Pleural Tapping = Transversus thoracis.
- Safe space for Paracentesis = lower part of 9th intercostal space in midaxillary line.(Done in expiration to avoid damage to inferior border of lungs).

- Endothoracic fascia = in upper parts thickens to forms supra-pleural fascia/membrane which is attached to internal border of 1st rib and transverse process of vertebrae.
- When suprpleural membrane gets damaged , cervical part of pleura can herniate into neck on straining,sneezing.
- Trachea in Superior Mediastinum is related on its right to = Vagus Nerve.
- Structure lateral to trachea is = Recurrent Laryngeal nerve branch of Vagus.
- On right side,Vagus is separated from Trachea in thorax by Brachiocephalic trunk while in neck it's separated from trachea by Common Carotid Arteries.
- Tracheostomy site = T3-T4.
- Most common cause of bleeding in tracheostomy is = inferior thyroid vein.
- Increased(Heavy) bleeding is due to = Anterior Jugular vein (In Tracheostomy)
- During Child tracheostomy = structure encountered is Brachiocephalic vein.
- Trachea length in neonates is = 4cm (while in adults it's 12cm)
- Right main bronchus length = 2.5cm (left = 5cm)
- Blood supply to proximal trachea = Inferior thyroid artery (Distal by = Bronchial artery)
- Terminal bronchioles and respiratory bronchioles lacks Cartilage which differentiates them from conducting airways.
- Bronchopulmonary Segments = Right 10 ,Left 10.
- Right 3+2+5 (3 in Superior lobe Apical,Posterior,Anterior)(2 in middle Medial and Lateral)(5in inferior Superior,Medial Basal,Anterior basal,Lateral basal,Posterior basal)
- Bronchopulmonary segments = Anatomical,Functional and surgical (not structural).
- Resection of root of lung,structure saved will be = Vagus as it's posterior to root.
- Right Atrium is in direct contact with Right lung.
- Right lung can be differentiated from left by **Impression of ventricles**.
- **Sympathetic supply of lungs = T2-T4.**
- Elongated airways with alveoli around them = Alveolar ducts.
- Basement membrane separates alveolar epithelium from capillary endothelium.
- Eparterial bronchus.
- Right side 1 bronchial artery from 3rd posterior intercostal artery , Left side 2 bronchial arteries from descending thoracic aorta at level of T4.
- Resonance can be auscultated upto which level. Midclavicular 6th rib,Mid-axillary 8th ,Back 10th .

Heart

- Pericardiocentesis most commonly done in emergency by which technique = Sub-Xyphoid (Needle inserted between xyphoid process and costal margin)
- Percardiocentesis :- other technique Left 5th or 6th intercostal space.
- Afferent pain fibers carried in angina by = Thoracic Splanchnic nerves
- Nerves that sense pain associated with coronary artery ischemia (angina) follow the sympathetic pathways back into spinal cord segments **T1–T5**.
- The lymphatic drainage from the lower lobe of the left lung also drains across the midline into the right bronchomediastinal lymphatic trunk and nodes, then continues along the right pathway to the right lymphatic duct. This is important to consider with metastasis of lung cancer.
- The anterior interventricular artery descends in the anterior interventricular sulcus and provides branches to the (1) anterior left ventricle wall, (2) anterior two-thirds of the interventricular septum, (3) **bundle of His**. (Posterior 1/3rd of IV septum is supplied by PDA which in most cases in RCA)
- Apex of heart is supplied by = Marginal artery (a branch of RCA)
- If RCA occlusion occurs distal to origin of marginal artery = affected will be AV node.
- Dominance of heart is defined by PDA when it's Left side dominant PDA comes from Left circumflex artery.
- Right border of heart is formed by = Right Atrium
- Right border of heart on xray is formed by = Right atrium + SVC.
- Sternal surface (anterior) surface is formed by = Right ventricle.
- Sternal Border on Xray is formed by Right Ventricle.
- **SA node lies close to Pericardium.**
- Apex of heart = 5th intercostal space Left. About 8-9cm lateral to sternal border =.
- Tricuspid auscultation = Left lower sternal border (4th Intercostal Space)
- Limbus Fossa Ovalis isn't a boundary of Koch's triangle.

- Ribs most commonly fractured at Angle.
- Tip or Inferior angle of scapula is at the level of T7.
- Axillary sheath is continuation of Pre-vertebral Fascia.
- In uncontrolled hypotension = cervical part of spinal cord should be examined.

Upper Limb

- Post-mastectomy most common complication is = Lymphedema
- Pudea Orange appearance = due to lymph block
- Suspensory ligament involvement = Puckering or folding of the skin.
- Subareolar tissue involved in cancer = retraction of nipple.
- Breast is an sweat gland.
- Breast has 15-20 lobes and same amount of ducts are present in each lobe.
- Deep relation of breast = Pect.Major,Pect Minor,Seratus Anterior,External Oblique.
- Internal thoracic = Internal Mammary = Parasternal = by these tumour spread to other breast
- Parallel lymph nodes = above mentioned.

Bones of Upper Limb

- Clavicle is most commonly fractured long bone.
- Common site of it's fracture = junction of medial 2/3rd and lateral 1/3rd.
- After fracture medial side is lifted upward due to = Sternocleidomastoid.
- Clavicle is 1st bone to ossify intrauterine life.
- 3rd part of axillary artery gives Anterior circumflex humeral artery which gives arcuate artery , this arcuate artery supplies the head of humerus.
- Most commonly fractured wrist bone = Scaphoid
- Most commonly displaced wrist bone = Lunate = displaced lunate damages median nerve in Carpel Tunnel.

Joints and Ligaments+Muscles

- Strongest ligament attaching clavicle to upper limb = Coracoclavicular ligament.
- Injury to Coracoclavicular ligament = leads to fall of upper limb due to it's own weight and clavicle sliding on upper part of acromian process.
- Common direction of displacement of shoulder = Inferior
- Different names for Supraspinatous tendinitis(Most Common) = Sub Acromian Bursitis = Pericapsulitis
- Rotator Cuff 4 muscles = Supraspinatous , Infraspinatous , Teres Minor , Subscapularis
- SIT attached to Greater tuberosity of Humerus.
- Subscapularis attached to lesser tuberosity.
- Deltoid is attached to Lateral 1/3rd of Clavicle and Posterior of Scapula.
- Deltoid fibers are Anterior fibers, other are posterior fibers. Anterior fiber responsible for FM(Flexion and Medial Rotation) while posterior one are responsible for Extension and lateral rotation.
- Bicipital groove has Latismus dorsi.
- Pect Minor related to Coracoid process of scapula.Inserted on coracoid process of scapula with origin on ribs.

Arteries+Veins+Lymph

- Posterior Circumflex humeral artery = present in quadrangular space.
- It also winds around surgical neck of humerus.
- Superficial Palmar Arch = Present below palmar aponeurosis.
- Infraclavicular lymph nodes also known as deltopectoral lymph nodes= 1st web space.
- Cephalic vein also present here accompany these lymph nodes (b/w Deltoid and Pect Major muscle)
- Clavipectoral fascia = deep fascia = covers Pect.Minor = pierced by Cephalic vein.

Brachial Plexus

- Roots,Trunks,Division,Cords.
- Lateral cord is anterior division of Superior and Middle Trunks.(Musculocutaneous nerve+Lateral Pectoral nerve)

- Medial Cord is anterior division of Inferior Trunk.(Ulnar nerve,Median Nerve is both lateral and medial cord)
- Posterior Cord arises from posterior division of Superior,middle and inferior trunks.
- Suprascapular nerve innervating Supraspinatous and Infraspinatous arrives from roots directly.(C5,C6,)
- Nerves of Posterior Cord (Axillary,Radial,Upper Subscapular,Lower Subscapular,Thoracodorsal)
- Long Thoraic Nerve = C5,6,7.
- All nerves of hand can be checked by examining Thumb.
- (Flexor Pollicis longus in forearm=Median Nerve , Flexor Pollicis brevis in hand= Median nerve,Opponus Pollicis = Median Nerve)
- Adduction of thumb = Adductor pollicis = Ulnar Nerve.
- Abductor Pollicis longus = Radial nerve , Abductor Pollicis brevis = Median Nerve)
- Extensor Pollicis Longus = Radial Nerve , Extensor Pollicis Brevis = Radial Nerve)
- Most disabling injury in hand = Median Nerve.
- When Ulnar nerve is damaged at elbow Flexor Digitorum Profundus,Flexor Carpi Ulnaris and small muscles of hand lose innervation = so apparently there will be only wasting of hypothenar muscles and no claw because of lost of Flexor digitorum profundus.
- On the other hand when Ulnar nerve injury is at wrist here claw is prominent because of intact Flexor Digitorum Profundus.
- Cubital Tunnel Syndrome = Ulnar Nerve damaged (b/w the two heads of Flexor Carpi Ulnaris).
- Radial Nerve is continuation of posterior cord so Radial > Axillary if both are given as option.

Dermatomes

- C6 is dermatome of thumb.
- C3,C4=Supraclavicular nerve=base of neck and upper part of arm.
- C5 = sensory over upper lateral part of arm and forearm,
- C6=Middle of forearm to forward on thumb
- C7=Middle and ring finger and corresponding area of palm
- C8=Little finger and medial side of arm.
- T1=medial forearm and inferior arm
- T2=Superior arm and Axilla.