ANATOMY

INFERIOR EXTREMITY

1. Highest point of illiac crest lies at L3/L4 disc level.
2. During development, lower limb buds rotate 90° medially whereas upper limb buds rotate 90° laterally.
3. Obturator foramen is large, oval in males and small, triangular in females.
4. Greater sciatic notch is wider in females than males (female → 75°, male →50°).
5. Subpubic angle is females is 80° - 85° (less in males).
6. Neck – shaft angle of femur : 125°. Angle of femoral torsion or angle of anteversion : 15°.
7. Muscular attachment to greater trochanter : Piriformis, gluteus minimus and medius, obturator internus and externus.
8. Muscular attachment to lesser trochanter : Psoas major, illiacus, adductor magnus.
9. Femur ossifies from one primary centre (For shaft) and 4 secondary centres. Primary centre appears at 7th week of intrauterine life.
10. Ossification at lower end of femur occurs after the fetus attains viability. Lower end of the femur is the growing end.
11. Patella, the largest sesamoid bone develops in the tendon of quadriceps femoris.
12. Tibia has one primary and two secondary centres for ossification. Primary centre (shaft) appears at 7 th week of intrauterine life. (like femur)
13. Secondary centre for upper end of tibia appears just before birth.
14. Upper end of tibia and lower end femur are common sites of osteomyelitis but joint is not affected (extracapsular).
15. Law of ossification : ossification centre appearing first will fuse last. Fibula is an exception to this rule.
16. Fibula : upper and lower ends are subcutaneous. Common femoral nerve is in relation to its neck. This is an ideal spare bone for grafting.
17. Talus : It has one centre of ossification. No muscular attachment .Neck body angle is 150° in adults and 130° - 140° in infants.
18. Sesamoid bones : patella (largest) in tendon of quadriceps femoris, other :- in tendons of tibialis anterior and posterior, lateral head of gastroc nemius, gluteus maximus, flexor hallucis brevis.

19. Root value : ilio – inguinal nerve → L_1 genitofemoral nerve → L_1, L_2. Lateralcutaneous nerve of thigh →L_2, L_3. Iliohypogastric → L_1.
20. Lumbar plexus (L_1 – L_5).
21. a) Housemaid's knee : Enlarged prepatellar bursa.
b) Miner's beat knee : Infected prepatellar bursa.
c) Clergyman's knee : Enlarged infrapatellar bursa.
22. Illiotibial tract : Thickened lateral part of fascia 5 cm wide. Gluteus maximus and tensor fascia lata are inserted in the upper part.
23. Saphenous opening is in fascia lata. 4 cm below and 4 cm cateral to the pubic tubercle. It is 2.5 cm X2 cm. Closed by cribriform fascia.
24. Femoral triangle : Bounded laterally by Sartorius, medially by adductor longus, base by inguinal ligament. It is continuous below with the adductor canal. Femoral vein is medial and femoral nerve is lateral to femoral artery (vein – artery – nerve) contents : Femoral artery with branches, femoral vein with tributaries, femoral nerve, femoral branch of genitofemoral nerve, lateral cutaneous nerve of thigh, nerve to pectineus, deep inguinal lymph nodes.
25. Anterior wall of femoral sheath is formed by fascia transversalis and posterior wall by fascia iliaca.
26. Femoral canal is the medial compartment of femoral sheath (1.5 X 1.5 cm). Upper part/ base is called femoral ring. Femoral canal is wider in females.
27. Obturator artery is a branch of internal iliac artery. But, abnormally, it may arise from inferior epigastric artery.
28. Muscles in the anterior compartment of thigh are supplied by femoral nerve (L_2, L_3, L_4).
29. Both illiacus and psoas major have common insertion in the lesser trochanter. Both are supplied by spinal segments of L_2, L_3.
30. Adductor canal (= Hunter's/ subsartorial canal) : An intermuscular space on the medial side of thigh. Bounded anteriorly by vastus medialis, posteriorly by adductor longus (above) and magnus (below). Roof is overlapped by Sartorius. Contents : femoral artery and vein, saphenous nerve, nerve to vastus medialis, two divisions of obturator nerve.
31. Last branch of femoral artery : descending branch of genicular artery.
32. Quadriceps is an extensor to the knee joint.

33. Adductor magnus is supplied by two different motor nerves – obturator and sciatic nerve. Pectineus also has dual nerve supply – femoral and obturator. Pictineus has two origins also.

34. Principal nerve supply of adductor compartment : obturator nerve. It is a branch of lumbar plexus. Root value : L_2, L_3, L_4.

35. Accessory obturator nerve is present in 30% cases. Branch of lumbar plexus. Root value : L_3 , L_4.

36. Gluteus maximus is supplied by inferior gluteal nerve whereas gluteus medius and minimus are supplied by superior gluteal nerve.

37. Gamellus superior is supplied by nerve to obturator internus (L_5, S_1, S_2) and gamellus inferior is supplied by nerve to Quadratus femoris (L_4, L_5, S_1).

38. Tensor fascia lata is supplied by superior gluteal nerve (L_4, L_5, S_1).

39. Root value of a) Sciatic nerve - L_4, L_5, S_1 – S_3. B) Superior gluteal nerve - L_4, L_5, S_1. C) Inferior gluteal nerve – L_5, S_1, S_2. D) Pudendal nerve – S_2, S_3, S_4.

40. Popliteal artery : anterior to popliteal vein in knee. Very prone to aneurysm. B.P. in lower limb is recorded from popliteal artery. Common site of atherosclerosis.

41. Root value of a) Tibial nerve - L_4, L_5, S_1 – S_3. (like sciatic nv) b) Common peroneal - L_4, L_5, S_1, S_2.

42. Sciatic nerve : Largest branch of sacral plexus. Thickest nerve in the body (2 cm). Root value : L_4, L_5, S_1 – S_3. Divides into tibial and common peroneal nerves. Tibial part supplies → semitendinosus, semimembranosus and long head of biceps femoris. Common peroneal part supplies → short head of biceps femoris.

43. 'Sleeping foot' – is due to the compression of sciatic nerve.

44. Principal nerve of the lateral compartment : Superficial peroneal nerve.

45. Guy ropes : Three muscles – Sartorius, gracillis and semitendinosus are unitedly called guy ropes.

46. Nerve of illium, ischium and pubis :

nerve of ilium → femoral nerve → supplies sartorius nerve of ischium → sciatic nerve →supplies semitendinosus nerve of pubis → obturator nerve → supplies gracillis. Sartorius in anterior compartment, gracillis in medial compartment and semitendinosus in posterior compartment.

47. Anserine bursa : separates tendons of gracilis, Sartorius and semitendinosus. The bursa has several diverticula.

48. Peripheral hearts : Soleus muscles in the calf.
49. Sural nerve : Branch of tibial nerve. Root value. L_5, S_1, S_2. It descends between two heads of gastrocnemius.
50. Root value of a) lateral cutaneous nerve of thigh → L_4, L_5, S_1. B) medial cutaneous nerve of thigh →L_2, L_3. c) posterior cutaneous nerve of thigh → S_1, S_2, S_3. D) saphenous nerve → L_3, L_4.
51. Muscles of posterior compartment of leg are supplied by tibial nerve.
52. Gastrocnemius and soleus are plantar flexors of foot.
53. The sesamoid bone fabella is in tendon of lateral head of gastrocnemius.
54. Brodie's bursa lies deep to : medial head of gastrocnemius and semimembranosus. May communicate with knee joint.
55. Tendocalcaneus= Achilles tendon : Thickest and strongest tendon of the body- yet vulnerable to frequent rupture. 15 cm long. Formed by tendons of gastrocnemius and soleus.
56. There are 3 plantar and 4 dorsal interossei.
57. Lateral and medial plantar nerve are branches of tibial nerve.
58. There are about 5 perforators along the great saphenous vein and one along the short saphenous vein.
59. Perforators of leg : a) thigh → in lower part adductor canal, connecting femoral vein and saphenous vein b) below knee : connecting great saphenous vein and posterior tibial vein c) lateral perforator- at the junction of middle and lower thirds of leg d) medial –upper, middle and lower.
60.Trendelenberg test : Varicose veins- superficial veins and perforators are tested but not deep veins.
61. Perthe's test : is used to test the deep veins. Varicose veins become distended if the perforators are blocked.
62. Superficial inguinal lymph nodes drain the skin and fascia of lower limb, perineum, trunk below the umbilicus.
63. Gland of cloquet / Rossenmutller –lies in femoral canal.
64. Deep inguinal lymph nodes receive afferents from a) superficial inguinal nodes b) popliteal nodes c) glans penis /clitoris d) deep lymphatics of lower limb.
65. Sympathetic innervations of lower limb : T_{10}-L2. Fibers arise from lateral horn cells.
66. Muscles and nerve supply :

a) Hamstrings –sciatic nerve
b) Quadriceps-femoral
c) Adductors – obturator.
d) Triceps – radial.

67. Tibia & radius are pre-axial bones and fibula and ulna are post axial bones.

68. Illiofemoral ligament = ligament of Bigelow (Y shaped) is the strongest ligament of the body.

69. Hip joint : Ball and socket variety of synovial joint. Chief flexor → Psoas and illiacus. Chief extensor → gluteus maximus and hamstrings. Chief abductors-gluteus medius and minimus.

70. Coxa vara :neck shaft angle>150° in child and > 127° in adult.

71. Perthe's disease : destruction and flattening of femoral head due to ischaemia. Hyperdense/sclerotic.

72. Important lines : a) Shenton's line : between upper border of obturator foramen and lower border of neck of femour.

b) Nelaton's line : between anterior superior iliac spine and ischial tuberosity. Passes through the highest part of greater trochanter.

c) Schoemaker's line : anterior superior iliac spine and tip of greater trochanter.

73. Relative disruption of lines of Bryant's triangle is seen in displacement of greater trochanter.

74. Diseases and age distribution (hip joint).

a) <5 years-congenital dislocation of hip, T-B.
b) 5-10 years – perthe's ds.
c) 10-20 years – coxa vara.

75. Knee joint is a compound saddle joint.

76. Ligamentum patellae : Central portion of common tendon of insertion of quadriceps femoris. 7.5 cm long, 2.5 cm wide. Attached to : apex of patella and tibial tuberosity.

77. a) oblique popliteal ligament is an expansion from tendon of semimembranosus.

b) Arcuate popliteal ligament is posterior expansion from short lateral ligament.

c) Tibial (medial) collateral ligament is degenerated tendon of adductor magnus.

d) Fibular (lateral) collateral ligament is degenerated tendon of peroneus longus.

e) Cruciate ligaments are collateral ligaments of femorotibial joints.

78. Principal flexors of knee : biceps femoris, semitendinosus, semimembranosus. Principal extensor →quadriceps femoris.

79.Posterior horn of medial meniscus is more vulnerable to injury due to fixity to the tibial collateral ligament. Lateral meniscus is protected by poplitius.

80. Anterior cruciate ligament starts in the intercondylar region of tibia and attached to medial surface of lateral condyle of femur. More commonly injured-particularly in hyper extension injury and anterior dislocation of tibia.

81. Posterior cruciate ligament: begins in the intercondylar area of tibia, attached to lateral surface of medial condyle of femur. Less commonly injured.

82. Menisci, cruciate ligaments, tendons, cartilage- all are hypointense (black) on MRI.

83. Medial meniscus is semicircular. Posterior margin is continuous with transverse ligament and peripheral margin is attached to tibial (medial) collateral ligament.

84. Lateral meniscus is circular. Attached to femur via meniscofemoral ligaments.

85. Sinovial membrane of knee lines all aspects except posteriorly where it is reflected by the cruciate ligaments forming a common covering for ACL and PCL.

86. Bursae around knee : Total 13. 4 anterior, 4 cateral, 5 medial, no posterior.

87. Ankle joint is a synovial joint (hinge type).

88. Deltoid (medial) ligament : Triangular. Both superficial and deep parts have common attachment to medial malleolus. Crossed by tendons of a) Tibialis posterior b) Flexor digitorum longus.

89. a) Principal dorsiflexors of foot : Tibialis anterior (plus excessory : Extensors and peroneus tertius).

b) Principal plantar flexors of foot : Gastrocnemius, soleus (plus accessory : Tibialis posterior and flexors).

c) Principal everters of foot : peroneus longus, brevis.

d) Principal inverters of foot : Tibialis anterior and posterior.

90. Subtalar joint is talocalcaneal joint. Sinovial joint. Separated from talocalcaneo navicular joint by sinus tarsi.

91. Spring ligament = plantar calcaneonavicular ligament.

92. Abnormalities of arch of foot :

a) Pes planus – absence/ collapse of arch.

b) Pes cavus – Exaggerated longitudinal arch (due to spina bifida, polio etc).

c) Talips equinus – walks on toes.

d) Talipes calcaneus – walks on heel.

e) Talipes varus – walks on outer border of foot (foot is inverted and adducted).

f) Talipes valgus – walks on inner border of foot (everted and abducted).

g) Talipes equinovarus (club foot) : Foot is inverted, adducted + planter flexed (± associated with spina bifida).

93. Femoral nerve : Root value → L_2, L_3, L_4. Branches in thigh →sartorius, medial cutaneous nerve of thigh are superficial and branches to vasti (3), rectus femoris, saphenous as well as hip and knee joints are deep branches.

Test : patellar jerk.

94. Obturator nerve : A branch of lumbar plexus. Root value : L_2, L_3, L_4 (ventral rami).

Branches : adductors, pectineus, gracillis, obturator externus.

95. Femoral artery, hip, knee joints – are supplied by both femoral and obturator nerves.

96. Accessory obturator nerve : present in 30% cases. Root value L_3, L_4 (ventral). Supplies – pectineus (deep part), hip joint.

97. Tibial nerve : Larger terminal branch of sciatic nerve. Root value : L_4, L_5, S_1, S_3 (ventral).

Supplies : gastro – soleus, popiteus, plantaris, tibialis posterior (3P) flexors of back of leg oyher branches – sural, medial and middle jeniculars, ankle joint. Terminal branches are medial and lateral plantars.

98. Common peroneal nerve : smaller terminal branch of sciatic nerve. Root value : L_4, L_5, S_1, S_2. Branches : short head of biceps femoris, lateral cutaneous nerve of calf, lateral geniculars, superficial and deep peroneals. The nerve can be rolled against tibular neck. Injury results in foot drop.

99. Muscles having dual nerve supply : Pectineus, adductor magnus, biceps femoris.

100. Muscles acting on both hip and knee joints : Rectus femoris, Sartorius, long head of biceps femoris.

101. Unlocking of knee is done by : Popliteus.

102. Inferior tibio fibular joint is a syndesmosis. Calcaneo cuboid joint is a saddle joint.

103. Tarsals : a) Talus – no muscular attachment

b) Cuboid – groove for peroneus longus tendon.

104. Movement of hip joint : extension – gluteus maximus, abduction by gluteus medius, flexion by illiacus, lateral rotation by obturator internus.

105. Medial aspect of leg (skin) is supplied by saphenous nerve. Lateral aspect by sural nerve.

ANATOMY MCQS

INFERIOR EXTREMITY

1. Exception to the law of ossification occurs in

a) tibia b) talus c) fibula d) ulna.

2. The sesamoid bone fabella lies in the tendon of

a) flexor hallucis brevis b) lateral head of gastroc nemius c) soleus d) tibialis anterior.

3. Nerve palpable at neck of fibula is

a) common peroneal b) sural c) lateral cutaneous d) all.

4. All of the following muscles are attached to lesser trochanter except

a) psoas major b) illiacus c) adductor magnus d) piriformis.

5. Greater sciatic notch in females is a) 60° b) 60° – 65° c) 75° d) ≥ 90° .

6. Root value of ilio – inguinal nerve a) L_1 b) L_1, L_2 c) $L_1 – L_3$ d) L_2, L_3.

7. Clergyman's knee is enlarged

a) prepatellar bursa b) suprapatellar bursa c) infrapateller bursa d) none.

8. Housemaid's knee is enlarged

a) prepatellar bursa b) infrapatellar bursa c) suprapateller bursa d) Baker's cyst.

9. Which of the following is not component of femoral triangle?

a) femoral nerve b) genitor femoral nerve c) nerve to pectineus d) illio – inguinal nerve.

10. Which of the following is not true of femoral triangle?

a) continuous below with adductor canal b) bounded laterally by Sartorius c) femoral vein is lateral to femoral artery d) lateral cutaneous nerve of thigh is a component of it.

11. Obturator artery is a branch of

a) internal iliac b) common femoral c) profunda femoris d) external iliac artery.

12. Which of the following is not a component of Adductor canal?

a) saphenous nerve b) nerve to vastus medialis c) divisions of obturator nerve d) genitor femoral nerve.

13. Pectineus is supplied by

a) femoral nerve b) obturator nerve c) both d) illio – inguinal nerve

14. All of the following are attached to greater trochanter except –

a) piriformis b) obturator internus c) obturator externus d) gluteus maximus.

15. Accessory obturator nerve is seen in

a) 30% b) 40% c) 10% d) 20%.

16. Aneurysm is commonest in

a) femoral artery b) popliteal artery c) anterior tibial artery d) posterior tibial artery.

17. Adductor magnus is supplied by which nerve?

a) obturator b) sciatic c) femoral d) a + b.

18. Common perneal nerve supplies

a) short head of biceps femoris b) long head of biceps femoris c) semitendinosus d) semimembranosus.

19. Which of the following is not a member of 'Guy ropes'

a) Sartorius b) gracillis c) semitendinosus d) long head of biceps.

20. Gamellus superior is supplied by

a) nerve to quadrates femoris b) nerve to obturator internus c) both d) accessory obturator nerve.

21. Inferior gluteal nerve supplies

a) gluteus maximus b) gluteus medius c) gluteus minimus d) all.

22. Gluteus medius and minimus are supplied by

a) inferior gluteal nerve b) superior gluteal nerve c) obturator nerve d) accessory obturator nerve

23. Thickest nerve in body is

a) sciatic b) femoral c) nerve in cartid shrath d) illio – inguinal

24. Tibial nerve supplies all except

a) short head of biceps b) long head of biceps c) semitendinosus d) semimembranosus.

25. Sural nerve is

a) lateral to lateral head of gastrocnemius b) medial to medial head of gastrocnemius c) between the two heads of gastrocnemius d) posterior to soleus.

26. Peripheral hearts are located in

a) soleus b) medial head of gastrocnemius c) medial head of gastrocnemius d) all.

27. Bursa deep to medial head of gastrocnemius

a) anserine bursa b) Brodie's bursa c) infrapatellar bursa d) none.

28. Muscles of posterior compartment of leg are supplied by

a) femoral nerve b) obturator nerve c) common peroneal nerve d) tibial nerve.

29. Number of dorsal interrossei in leg

a) 2 b) 3 c) 4 d) 5.

30. Medial plantar nerve is a branch of

a) superficial peroneal b) common peroneal c) deep peroneal d) tibial.

31. Adductor group of muscles are supplied by – nerve

a) sciatic b) femoral c) obturator d) accessory obturator.

32. Strongest ligament in the body is

a) Illio lumbar b) anterior cruciate c) posterior cruciate d) sacro – tuberous.

33. Imaginary line joining anterior superior iliac spine and tip of greater trochanter is

a) Nelaton's line b) Schoemaker's line c) shenton's line d) none.

34. Perthe's disease is commonest in the age group

a) < 5 years b) 5 – 10 years c) 10 – 20 years d) > 20 years.

35. line passing between upper border of obturator foramen and lower border of femoral neck is

a) Shenton's line b) Schoemaker's line c) Nelaton's line d) M.C. Gregor's line.

36. Oblique popliteal ligament is an expansion of

a) tendon of semimembranosu b) short lateral ligament c) tendon of adductor magnus d) tendon of peroneus longus.

37. In the knee joint, sinovium lines all aspects except

a) anteriorly b) posteriorly c) medially d) laterally.

38. What is not true about meniscus?

a) Lateral meniscus is nearly circular b) medial meniscus is semicircular c) lateral meniscus is attached to femur via meniscofemoral ligament d) medial meniscus is resistant to injury.

39. What is not true about deltoid ligament
a) triangular in shape b) attached to lateral meniscus c) crossed by tendons of tibialis posterior and flexor digitorum longus d) none.
40. Which of the following is not an everter of foot?
a) peroneus longus b) peronus brevis c) tibialis anterior d) all.
41. Patients with talipes equinus walks on
a) toes b) heel c) lateral border d) medial border.
42. All of the following are components of talipes equinovarus except
a) inversion b) adduction c) plantar flexion d) walks on inner border of foot.
43. Unlocking of knee is due to
a) popliteus b) hamstrings c) quadriceps d) gastrocnemius.
44. All of the following muscles have dual nerve supply except
a) pectineus b) adductor magnus c) adductor longus d) biceps femoris.
45. All of the following muscles act on both hip and knee joints except :
a) rectus femoris b) sartorius c) short head of biceps d) long head of biceps.
46. Cuboid bone has groove for tendon of
a) peroneus longus b) peroneus brevis c) flexor hallucis longus d) flexor hallucis brevis.
47. Abduction of hip joint is accomplished by
a) gluteus medius b) gluteus maximus c) gluteus minimus d) illiacus.
48. Cutaneous supply of lateral aspect of leg is by
a) saphenous nerve b) superficial peroneal c) common peroneal d) sural nerve.
49. Bone having no muscle attachment
a) talus b) navicular c) cuboid d) medial cuneiform.
50. Which of the following is a wrong match?
a) knee joint – saddle joint b) hip joint – sinoval joint c) ankle joint – syndesmosis d) calcaneo – cuboid joint – saddle joint.

Ans :- 1) c, 2) b, 3) a, 4) d, 5) c, 6) a, 7) c, 8) a, 9) d, 10) c, 11) a, 12) d, 13) c, 14) d, 15) a, 16) b, 17) d, 18) a, 19) d, 20) b, 21) a, 22) b, 23) a, 24) a, 25) c, 26) a, 27) b, 28) d, 29) c, 30) d, 31) c, 32) a, 33) b, 34) b, 35) a. 36) a, 37) b, 38) d, 39) b, 40) c, 41) a, 42) d, 43) a, 44) c, 45) c, 46) a, 47) b, 47) a, 48) d, 49) a, 50) c.

ANATOMY

SUPERIOR EXTREMITY

1. Important points about clavicle : a) subcutaneous b) first bone to ossify c) only long bone showing membranous ossification d) only long bone with 2 primary centres of ossification e) may be pierced by middle supraclavicular nerve f) In females, lateral end lies at lower level than medial end. g) does not have well defined medullary cavity.
2. Conoid tubercle and trapezoid ridge are parts of clavicle.
3. Both scapula and humerus ossify from one primary centre and 7 secondary centres. Primary centre appearsat 8^{th} week of intrauterine life.
4. Winging of scapula : paralysis of serratus anterior- due to palsy of long thoracic nerve of Bell. Medial border of scapula becomes prominent. Arm can not be abduced beyond 90°.
5. Scaphoid scapula : concave medial border of scapula.
6. Nerves liable to injury : median nerve in supracondylar fracture humerus, axillary nerve at surgical neck of humerus, radial nerve at radial groove, ulnar nerve behind medial epicondyle.
7. Congenitally absent radius : thrombocytopenia with absent radius (TAR), Holt-oram syndrome.
8. Fracture of scaphoid commonly occurs at waist. When both nutrient arteries are affected-avascular necrosis results.
9. Dislocation of lunate may cause carpal tunnel syndrome.
10. Metacarpal / phallangeal tuberculosis or syphilis affects the mid diaphysis rather than metaphysis.
11. Serratus anterior muscle : arises from 8 digitations from upper 8 ribs. Supplied by nerve to serratus anterior (C5, C6, C7) (= nerve of bell) = long thoracic nerve which is a branch of brachial plexus root. Paralysis causes winging of scapula.
12. Brachial plexus : Formed by anterior rami of C5 to T1. Spinal nerve with contribution from C4 is more and in a post fixed plexus, contribution from T_1 is more, T_2 present and C_4 absent. Roots join to form trunks, trunks divide to form divisions and divisions again join to form cords.
13. Trunks of brachial plexus : C_5, C_6 roots join to form upper trunk, C_7 → middle trunk and C_7, T_1 join to form lower trunk.

14. Cords of brachial plexus : lateral cord → union of ventral divisions of upper and middle trunks. Medial cord → ventral division of lower trunk. Posterior cord → union of dorsal divisions of all 3 trunks.

15. Important branches of brachial plexus : A) nerve to serratus anterior and rhomboideus arise from roots. B) suprascapular nerve and nerve to subclavius arise from upper trunk. C) medial pectoral arises from medial cord and lateral pectoral from lateral cord. D) medial root of median nerve (C_8, T_1) arises from medial cord and lateral root of median nerve (C_5 –C_7) from lateral cord. E) ulnar (C_7-T_1) and medial cutaneous nerve of arm (C_8-T_1) arise from medial cord. F) axillary, radial nerves arise from posterior cord. [To summarise, 3 most important nerves-radial from posterior cord, median from both medial and lateral cord and ulnar from medial cord].

16. Injury to upper trunk (C_5 –C_6) causes Erb's paralysis.

Muscles paralysed : biceps, brachialis, brachioradialis and deltoid. Police man's tip or porter's tip hand.

17. Injury to lower trunk (C_8-T_1 –mainly T_1) causes Klumpke's paralysis → paralysis of intrinsic muscles of hand and ulnar flexors of wrist and fingers. Claw hand and Horner's syndrome.

18. Dislocation of humerus causes injury to lateral cord and subcoracoid dislocation causes injury to medial cord.

19. Injury to either ulnar nerve or median nerve (both arise from medial cord) →claw hand.

20. Axillary artery : continuation of subclavian artery and continues as brachial artery. Extends from outer border of 1st rib to lower border of teres major. Branches : superior thoracic, thoracoacromial, lateral thoracic, subscapular, anterior and posterior circumflex humeral arteries ± alar thoracic.

21. Axillary vein → continuation of basilic vein.

22. Axillary sheath comes from : Prevertebral layer of deep cervical fascia.

23. Commonest artery affected by lacerated injury : Popliteal artery in lower limb. Axillary artery in upper limb. Over all, popliteal is the commonest in the body.

24. Trapezeus is supplied by spinal accessory (spinal part), C_3, C_4. Latissimus dorsi by thoracodorsal nerve, levator scapulae by dorsal scapular, rhomboideus major and minor by dorsal scapular nerve (C_5).

25. Cutaneous supply of lateral $2/3^{rd}$ of palm : median nerve, medial $1/3^{rd}$: ulnar nerve.

26. Dorsum of hand-medial half + proximal phalanges of medial 2 ½ digits : supplied by ulnar nerve. Corresponding lateral half hand and digits → radial nerve.

27. Digits-palmar aspect + dorsal aspect of middle and distal phalanges : lateral 3 ½ : supplied by median nerve medial 1 ½ : supplied by ulnar nerve.

28. Cutaneous of innervations of upper limb : $C_5 - T_1$.

29. Vertebral spinal level is always lower than corresponding spinal segment.

30. Cephalic vein is pre-axial. Basilic vein is post axial. These are joined by median cubital vein in 70% of cases. In 20% cases, cephalic vein drains into basilic vein. Caphalic vein is longer than basilic vein.

31. Superficial veins in upper limb are absent in : palm, ulnar border of forearm, back of arm, trapezeus region.

32. Cephalic vein begins in the lateral end of dorsal venous arch and basilar vein begins in medial end.

33. In the elbow, BP is recorded from brachial artery and blood is drained/I.V. injection is given in medial cubital vein.

34. Cephalic vein frequently communicates with external jugular vein.

35. Supraspinatus, infraspinatus are supplied by suprascapular nerve, subscapularis, teres major by subscapular nerve and teres minor by axillary nerve.

36. Rotator cuff : Supraspinatus, infraspinatus, subscapularis, teres minor.

37. Largest bursa in the body : subacromial bursa. It protects the supraspinatus tendon from friction by acromion. It is situated below coracoacromial arch and deltoid muscle. Tendon of supraspinatus lies below the bursa.

38. Main abductor of arm : deltoid supplied by axillary nerve.

39. In injury of axillary nerve, deltoid is paralysed with loss of abduction upto 90°, sensory loss of lower half of deltoid. Rounded contour of shoulder is lost.

40. Ulnar nerve can be palpated behind medial epicondyle of humerus. Brachial artery is palpable in front of elbow.

41. Transverse septum of arm separates biceps from brachialis and encloses the musculocutaneous nerve.

42. Coracobrachialis and biceps brachii are supplied by musculocutaneous nerve. Brachialis is supplied by both musculocutaneous (motor) and radial nerve
(proprioception) . Root value of musculocutaneous nerve : C_5 –C_7.
43. Many important anatomic transitions occur at the level of coracobrachialis. It is pierced and supplied by musculocutaneous nerve.
44. Radial nerve : Root value C_5-T_1. Thickest nerve of brachial plexus. Arises from posterior cord. Branches to triceps, brachioradialis, extensor carpi radialis longus, posterior cutaneous nerve of arm and forearm, posterior interossoues. Paralysis causes wrist drop.
45. Median nerve : Labourer's nerve (coarse movements). Main nerve of front of forearm, lies medial to brachial artery. Root value C_5-T_1. Branches to : pronator teres (above elbow), opponens policis and other thener muscles. 1st and 2nd lumbricals others : flexor carpi radialis, flexor digitorum superficialis, Palmaris longus, anterior interosseous, flexor digitorum profundus, flexor policis longus and brevis, pronator quadrates. Most commonly injured at wrist.
46. Ulnar nerve : Musician's nerve (fine movement). Root value C_8, T_1. Most commonly injured at wrist. Branches to : hypothener muscles, medial two lumbricals, all interossei.Others : Palmaris brevis, medial half of flexor digitorum profundus and flexor carpi ulnaris, adductor policis cutaneous branch to medial one third of palm, digital branches to medial 1 ½ fingers, nailbed, dorsal distal phalanges.
47. Important nerve supply to muscles : a) biceps-musculocutaneous b) triceps-radial c) deltoid-axillary d) anconeus –radial e) supinator-posterior interosseous f) teres minor-axillary g) serratus anterior-long thoracic nerve of bell.
48. Anterior interosseous nerve is a branch of median nerve . Anterior and posterior interosseous artery are branches of ulnar artery.
49. Ape thumb deformity due to paralysis of thener muscles (injury to median nerve).
50. Injury to median nerve at the wrist : ape thumb deformity, loss of opposition of thumb, paralysis of 1st and 2nd lumbricals.
51. Carpal tunnel syndrome : compression of median nerve in the carpal tunnel. Loss of opposition of thumb, ape thumb deformity, loss of sensation of

lateral 3 ½ digits including nail beds and distal phalanges on dorsal aspect. Absence of sweating. Worm skin due to vasodilatation.

52. Dupytren's contracture : Inflammation, thickening and contraction of ulnar side of palmar aponeurosis. Ring finger is most commonly affected. Terminal phalanx remains normal.

53. Thener eminence : 3 muscles – abductor policis brevis, flexor policis brevis, opponens policis. Supplied by median nerve.

54. Hypothener eminence : abductor, flexor and opponens digitiminimi. In addition, another hypothenar muscle is Palmaris brevis. Supplied by ulnar nerve.

55. Adductor of thumb : adductor policis-supplied by ulnar nerve.

56. There are 4 lumbricals, 4 palmar interossei and 4 dorsal interossei. All interrossei are supplied by ulnar nerve, (deep branch) 1st and 2nd lumbricals by median nerve and 3rd, 4th lumbricals by ulnar nerve (deep branch).

57. Functions of lumbricals and interossei .

a) Lumbricals : flex the MCP joints and extend the I.P. joints of digits.

b) Palmar interossei : adduct the digits towards the middle finger.

c) Dorsal interossei : abduct the digit away from middle finger.

58. a) Opponens policis is tested by : trying to touch the finger-tips with the tip of thumb.

b) Dorsal interossei are tested by : trying to spread out the fingers against resistance.

c) Palmar interossei and adductor policis are tested by : trying to hold firmly a piece of paper between fingers.

59. Ulnar nerve is tested by : Froment's sign or book test which test the adductor policis muscle.

60. Claw hand- True or complete : due to paralysis of both median and ulnar nerve. Partial due to median / ulnar nerve plasy causes hyperextension at MCP joint and flexion at I.P. joint May be produced by : lesion / injury to medial cord of brachial plexus, Klumpke's paralysis, individual lesion of ulnar or median nerve.

61. Pen test is done for abductor policis brevis.

62. Space of parona is located in the lower forearm above the wrist. It lies in front of pronator quadrates deep to the long flexor tendons. Infection from ulnar bursa can spread to this.

63. Ulnar bursa is common flexor synovial sheath. Flexor digitorum superficialis and profundus tendons are enclosed. Generally, infection spreads from little finger.

64. Radial bursa : synovial sheath of the tendon of flexor policis longus. Infection generally spreads from thumb.

65. Posterior interosseous nerve supplies : extensor carpi radialis brevis, extensor carpi ulnaris, supinator, abductor policis longus, extensor policis longus and brevis, extensor indicis.

66. Shoulder joint is a synovial joint of ball and socket variety. Elbow joint is a synovial joint of hinge variety.

67. Normal carrying angle : 163°.

68. Tennis elbow : lateral epicondylitis.

69. Miner's / students elbow : effusion in bursa over post-erior surface of olecranon process.

70. Golfer's elbow : medial epicondylitis.

71. Supination is due to action of supinator (slow) and biceps brachii (rapid). Supination is more powerful than pronation. Pronation is due to action of pronator quadratus. Supination and pronation take place at : Superior and inferior radio-ulnar joints.

72. Sympathetic nerves for skin of upper limb are : Vasomotor, sudomotor and pilomotor.

73. Carpal tunnel contains : median nerve, tendon of flexor policis longus and flexor digitorum superficialis.

74. Structures in cubital fossa (medial to lateral) : median nerve, brachial artery, tendon of biceps brachii, radial nerve (superficial branch).

75. Injury to median nerve in arm causes : Impaired-pronation of forearm, flexion of thumb and wrist.

76. Effect of Erb's Palsy : a) Loss of biceps and supinator jerks b) Loss of abduction and lateral rotation of arm.

77. Segmental innervations of tendon reflexes : a) biceps-C_5, C_6. B) triceps – C_6, C_7, C_8.

ANATOMY MCQS

SUPERIOR EXTREMITY

1. Scaphoid scapula is

a) Scaphoid –like scapula b) Concave medial border of scapula c) Scapula undergoing avascular necrosis d) Scapula without its spine.

2. Nerve most likely to be injured at the surgical neck of humerus

a) median b) axillary c) ulnar d) radial.

3. Winging of scapula is due to paralysis of

a) median nerve b) axillary nerve c) long thoracic nerve d) ulnar nerve.

4. What is not true of clavicle

a) first bone to ossify b) shows membranous ossification c) one primary centre of ossification d) no well defined medullary cavity.

5. Conoid tubercle is a part of

a) clavicle b) scapula c) humerus d) ulna.

6. Carpal tunnel syndrome may result due to dislocation of

a) scaphoid b) lunate c) trapezoid d) trapezium.

7. Not true of serratus anterior muscle

a) arises from upper 8 ribs b) supplied by nerve of Bell c) paralysis result in winging of scapula d) none.

8. All of the following are true of brachial plexus except

a) formed by ventral rami of C_5 to T_1 b) C_4 is absent in prefixed plexus c) middle trunk is formed by C_7 d) medial cord is formed by ventral division of lower trunk.

9. Medial cord of brachial plexus gives rise to all except

a) median nerve b) ulnar nerve c) medial pectoral nerve d) axillary nerve.

10. Radial nerve arises from _____ of brachial plexus

a) posterior cord b) medial cord c) lateral cord d) upper trunk.

11. Nerve arising from roots of brachial plexus

a) serratus anterior b) rhomboids c) both d) suprascapular.

12. Policeman's tip deformity occurs due to

a) Erb's palsy b) klumpke's palsy c) median nerve palsy d) ulnar nerve palsy.

13. Which of the following is not a correct match?

a) ulnar nerve – claw hand b) median nerve – claw hand c) median nerve ape thumb d) klumpke's paralysis – porter's tip deformity.

14. Commonest artery affected by lacerated injury
a) axillary b) popliteal c) brachial d) femoral.
15. Rotator cuff includes all except a) teres major b) supraspinatus b) infraspinatus c) subscapularis.
16. Largest bursa in the body
a) subcoracoid b) subacromial c) prepatellar d) suprapatellar.
17. Which of the following is not a correct match?
a) supinator – posterior interosseous nerve b) biceps- musculocutaneous
c) triceps – radial d) teres major – axillary.
18. Principal abductor of arm is
a) trepezeus b) deltoid c) biceps d) triceps.
19. Anconeus is supplied by
a) radial nerve b) ulnar nerve c) median nerve d) axillary.
20. Transverse septum of arm encloses _____ nerve
a) radial b) median c) musculo cutaneus d) ulnar.
21. Wrist drop is due to paralysis of _____ nerve
a) radial b) ulnar c) median d) musculocutaneus.
22. Labourer's nerve is
a) ulnar nerve b) median nerve c) radial nerve d) axillary nerve.
23. Opponens policis is supplied by _____ nerve
a) median b) radial c) ulnar d) a+c.
24. Interossei muscles are supplied by
a) median b) ulnar c) dorsal interossei by median and palmer interossei by ulnar d) medial interossei by median and lateral interossei by ulnar.
25. Lateral two lumbricals are supplied by
a) radial nerve b) ulnar nerve c) median nerve d) musculo cutaneous nerve.
26. Ulnar nerve is called _____ nerve
a) labourer's b) musician's c) artist's d) parkinson's.
27. Compression of median nerve causes
a) carpal tunnel syndrome b) ape-thumb deformity c) loss of opposition of thumb d) all.
28. Which of the following is not a component of thener eminence
a) Palmaris brevis b) abductor policis brevis c) flexor policis brevis d) opponens policis.

29. Muscles of hypothener eminence is supplied by
a) radial nerve b) ulnar nerve c) median nerve d) b + c.
30. Function of lumbricals is
a) adduction of digits b) abduction of digits c) flex the MCP joint and extend the I.P. joint of digit d) extend the MCP joint and flex the I.P. joint of digit.
31. Froment sign is to test
a) median nerve b) ulnar nerve c) radial nerve d) musculo cutaneus nerve.
32. Space of parona is in
a) forearm b) wrist c) palm d) dorsum of hand.
33. Radial bursa is synovial sheath of the tendon of
a) flexor policis longus b) flexor digitorum superficialis c) Flexor digitorum profundus d) b+c.
34. Lateral epicondylitis is called –
a) Miner's elbow b) student's elbow c) Tennis elbow d) golfer's elbow.
35. Contents of carpal tunnel are all except
a) median nerve b) tendon of flexor policis longus c) tendon of flexor digitorum brevis d) tendon of flexor digitorum superficialis.

Ans :- 1) b, 2) b, 3) c, 4) c, 5) a, 6) b, 7) d, 8) b, 9) d, 10) a, 11) c, 12) a, 13) d, 14) b, 15) a, 16) b, 17) d, 18) b, 19) a, 20) c, 21) a, 22) b, 23) a, 24) b, 25) c, 26) b, 27) d, 28) a, 29) b, 30) c, 31) b, 32) a, 33) a, 34) c, 35) c.

ANATOMY

THORAX

1. Incidence of cervical rib: 0.5%
2. Cervical rib causes pressure over lower trunk of brachial plexus and wasting of small muscles of hand.
3. Rib notching in coarctation of aorta is due enlargement of posterior intercostal arteries.
4. Diaphragm at the thoracic inlet = Sibson's fascia = suprapleural membrane. It is the flattened tendon of scalenus minimius muscle.
5. Important structures passing through thoracic inlet : Trachea, oesophagus, apics of lungs, branches of aorta, internal thoracic, superior intercostals arteries of both sides, phrenic, vagus, 1st thoracic nerves of both sides,

sympathetic trunks, sterno hyoid, sterno thyroid, longus colli muscles, veins (inferior thyroid, 1st posterior intercostals).

6. Thoracic inlet syndrome : compression of subclavian artery and 1st thoracic nerve by cervical rib, scalenus anterior etc. With neuro - vascular symptoms.

7. Major openings of diaphragm : a) Aortic – D_{12} level. Transmits : aorta, thoracic duct and azygos vein b) oesophageal – D_{10} level. Transmits : oesophagus, gastric (branch of vagus) nerve and left gastric arterial branches c) vena caval : D_8 level. Transmits : IVC, branches of Rt phrenic nerve.

8. Sternal angle (angle of Louis) : Location of manubrosternal joint. 5 cm below suprasternal notch. Lies at the level of 2nd costal cartilage anteriorly and D_4/D_5 disc posteriorly. Importance: Ribs are counted from this level. Line of demarcation between superior and inferior mediastinum. Ascending aorta ends, aorch of aorta begins and ends, descending aorta begins at this level. Thrachea and pulmonary trunk divide. Thoracic duct crosses from right to left. Upper limit of base of heart.

9. a) True ribs : 1st to 7th b) false ribs – 8th to 12th. C) floating ribs : 11,12th d) typical ribs – 3rd to 9th. e) atypical ribs : 1st, 2nd, 10th – 12th.

10. Maximum obliquity of ribs – 9th. Maximum length of ribs – 7th.

11. Costal groove contains: Intercostal nerve, posterior intercostals vessels. Intercostal nerve passes below the neck of same numbered rib and enters the groove.

12. Typical ribs have: one primary and 3 secondary centres of ossification.

13. 1st rib: shortest, broadest, most curved but not twisted.

14. Important feature of 2nd rib: tubercle at the shaft.

15. Costal cartilege is made of hyaline cartilege. Medial end of 1st to 7th costal cartileges attach directly to sternum.

16. Rectus abdominis muscle attaches to 5th – 7the costal cartileges. Internal oblique attaches to : 7th – 9th. Transversus abdominis attaches to 7th to 10th. Hence, 7th costal cartilage gets attachment from all the 3 muscles.

17. Sternohyoid muscle takes origin from 1st costal cartilage.

18. % of total length of vertebral column shared by discs : 20%.

19. Intervertebral foramina transmit : dorsal and ventral rami of spinal nerves.

20. I.V. discs have central nucleus pulposus and peripheral annulus fibrosus. Peripheral collagenous fibres blend with longitudinal ligaments (anterior and posterior).

21. Posterior longitudinal ligament is continuous with membrana tectoria.
22. Supra spinous ligaments connect tips of vertebral spines from c_7 to sacrum. Ligamentum flavum connect laminae of adjacent vertebrae.
23. Diaphragm assumes lowest position in sitting position. Hence dyspnoic patients feel better in sitting position due to be tter ventilation.
24. Typical intercostal nerves : 3^{rd} to 6^{th}.
25. Subcostal nerve : anterior primary ramus of 12^{th} thoraci nerve. Supplies : abdominal wall, skin of buttocks.
26. Intercostobrachial nerve : lateral cutaneous branch of 2^{nd} intercostal nerve. Supplies axillary skin, upper medial arm.
27. Posterior intercostals arteries: 1^{st} and 2^{nd} arise from superior intercostal artery of costocervical trunk and 3^{rd} to 11^{th} from descending thoracic aorta.
28. Internal thoracic (mammary) artery : Takes origin from first part of sub clavian artery opposite thyrocervical trunk 2 cm above clavicle. Branches – pericardio phrenic, musculophrenic, mediastinal, anterior intercostals, superior epigastric.
29. Azygos vein : Formed by the union of lumbar azygos, right subcostal and right ascending lumbar vein. Passes through aortic opening of diaphragm. Main conduit of venous flow from upper half during SVC obstruction.
30. Splanchnic nerves : a) greater → formed by 5 roots from 5^{th} to 9^{th} ganglia b) lesser → formed by 2 roots from 10^{th} and 11^{th} ganglia c) least / lowest (= renal nerve) from 12^{th} ganglia. All these are medial branches and are preganglionic.
31. Intrapleural pressure is negative. It becomes more negative during inspiration.
32. Pleural lining is mesothelium (specialized epithelium).
33. Pulmonary pleura/visceral pleura does not cover the hilum and along the attachment of pulmonary ligament.
34. Pulmonary ligament is a fold of pulmonary pleura surrounding the root.
35. Parietal pleura develops from somato pleuric layer of lateral plate of mesoderm and supplied by somatic nerve (intercostal and phrenic) while visceral pleura develops from splanchnopleuric layer of lateral plate of mesoderm and supplied by autonomic nerve. Visceral pleura is not sensitive to pain.

36. Visceral pleura is supplied by bronchial arteries while parietal pleura is supplied by internal thoracic, intercostals and musculophrenic arteries.

37. Oblique fissure of lung cut across hilum. It meets the horizontal fissure in the midaxillary line. Horizontal fissure runs at the level of the 4^{th} costal cartilegs.

38. There is no medial basal segment of left left lower lobe.

39. Lungs and bronchial tissues are supplied by bronchial arteries. There is one bronchial artery on right side and two bronchial arteries on left side. On the right side it arises from 3^{rd} posterior intercostal artery or left upper bronchial artery. On the left side, the bronchial arteries arise from descending thoracic aorta.

40. There is anastomosis between bronchial and pulmonary arteries at pre-capillary level.

41. Bronchial veins drain into azygos and hemiazygos veins.

42. Trachea starts at c_6 (cricoid level) and divide at T_4 level (lower border).

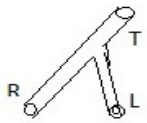
43. Each lobe of lung is supplied by secondary lobar bronchi and each segment is supplied by tertiary or segmental bronchi.

44. Respiratory bronchiole is considered as pulmonary unit. It consists of alveolar duct, atria, air saccule and pulmonary alveoli.

45.In the right lung, middle lobe has lateral and medial segments while, in the left lung, lingula (middle lobe equivalent) of upper lobe has superior and inferior segments.

46. Bronchopulmonary segments do not have their own vein.

47. Abscess/aspiration pneumonia are common in posterior segment of right upper lobe and apical segment of right lower lobe. Right principal bronchus is shorter, wider (2.5cm.) and is in line with trachea. Hence right lung is affected more commonly.



48. Trachea and extrapulmonary bronchi are lined by pseudostradtified columner cpithelium which are endodermal in origin.

49. Superior and inferior mediastinum are demarcated by an imaginary line joining Louis angle (sterna angle) in front and lower border of T_4 behind.

50. Important contents of a) anterior mediastinum : thymus, branches of internal thoracic artery. B) middle mediastinum : ascending aorta, pulmonary trunk c^- branches, SVC, azygos vein, phrenic nerve, deep cardiac plexus c)

posterior mediastinum : oesophaguns, descending aorta, azygos and hemiazygos veins, vagus and splanchnic nerves. Lymph nodes are present in all the 3 compartments.

51. Veins are on right side and arteries on left side of mediastinum. 'Dead space' is more on right side, hence tumours / infections project more on left side.

52. Serous pericardium is lined by mesothelium. Serous and parietal pericardium are continuous at the root of great vessels.

53. Transverse sinus is a horizontal gap between arterial and venous ends of heart tube.

54. Arterial supply of pericardium : Internal thoraccic, musculophrenic and descending thoracic aorta.

55. Atria and ventricles of heart are separated by coronary sulcus (A.V. groove). Cardiac apex is formed by left ventricle. It is in left 5^{th} intercostal space 9 cm. lateral to midsternal line.

56. Atrial fibres are arranged in two layers – superficial and deep. Ventricular fibres are arranged in three layers – super ficial, middle and deep. Of these, middle layer is the thickest.

57. Sulcus terminalis is a groove along the right border of right atrium. S.A. node is is situated at the upper part of sulcus. Sulcus terminalis is formed by crista terminalis. A.V. node is at the lower part of the septum. (muscular ridge)

58. Veins draining into right atrium : SVC, IVC, Coronary sinus, anterior cardiac veins, thebasian veins (venae cordis minimi).

59. Fossa ovalis, limbus fossa ovalis (or annulus ovalis) are in interatrial septum.

60. Sinus venorum is smooth posterior part and pectinate part is rough anterior part of right atrium. Musculi Pectinati are located in the anterior part.

61. Trabeculae carneae are muscular ridges present in right ventricle $\pm$ left ventricle. Right ventricle has 3 papillary muscles : anterior, posterior and septal. Of these, antenior is the thickest. Lt ventricle has 2 papillary muscles – anterior and posterior. Overall, left ventricular muscles are thicker than right ventricle – (3 : 1).

62. Papillary muscles are attached to the cusps of the valves by chordate tendinae.

63. Interventricular septum (IVS) : Upper part is thin and membranous. Lower part is thick and muscular. Upper part speparates : Two ventricles as well as right atrium from left ventricle. Fossa lunata is in IVS.
64. Left atrium receives 4 pulmonary veins + few thebasian veins.
65. Active contraction of ventricular papillary muscles keep the A.V. valves competent.
66. Coronary arteries arise from : anterior and left posterior aortic sinuses.
67. Cariac valve with largest diameter : Tricuspid (4 cm.).
68. 1st heart sound (S_1) is due to closure of A.V. valves. 2nd heart sound (S_2) is due to closure of semilunar valves.
69. Atrial and ventricular musculature are connected by bundle of his.
70. Purkinje fibers : Form a subendocardial plexus. Highest rate of conduction (4m/sec.). Purkinje fibers have double nuclei.
71. Right coronary artery arises from anterior aortic sinus, left coronary artery arises from posterior aertic sinus. Right coronary artery supplies : Rt atrium, maximum of right ventricle, minimum of left ventricle, posterior part of IVS and maximum of conducting system. Left coronary artery supplies : Left atrium, maximum of left ventricle, minimum of right ventricle, anterior part of IVS.
72. Part of left ventride adjoining the posterior interventricular groove is supplied by right coronary artery (not left) and part of the right ventricle adjoining anterior interventricular groove is supplied by left coronary artery (not right).
73. S.A node is supplied by right coronary artery in 60% of cases and left coronary artery in 40% of cases.
74. Posterior interventricular artery arises from right coronary artery in 90% of cases (right dominance) and from left coronary artery in 10% case. (left dominance)
75. Largest cardiac vein : coronary sinus . Smallest cardiac veins : thebasian (venae cordis minimi).
76. Tributaries of coronary sinus : great, middle, small cardiac veins. Posterior vein of left ventricle, oblique vein of left atrium (vein of Marshallo), right marginal vein.
77. Diastolic pressure in ventricles : Zero.

78. Branches of arch of aorta : Regular : brachiocephalic trunk, left common carotid, left subclavian. Occaisional : vertebral artery, arteriathyroidea ima.

79. Important branches of descending thoracic aorta : 9 posterior intercostals (3^{rd} to 11^{th}), subcostal, two left bronchial arteries, superior phrenic.

80. Ductus arteriosus connects : Left pulmonary artery with arch of aorta. Left recurrent laryngeal nerve hooks around the ligamentum arteriosus (post natal remnant of ductus).

81. Trachea is 10 -15 cm long. [From c_6 (cricoids) to T_4] Internal diameter at one year of age : 3mm. internal diameter in adults : 12mm. External diameter : 20mm.

82. Trachea has 16 – 20 rings. 'C' shaped – deficient posteriorly. Where trachealis is attached. Trachea is supplied by inferior thyroid arteries.

83. Oesophagus starts at the level of cricoid cartilage. It is 25cm long.

84. Narrowest Part of alimentary canal : appendix. Next : Pharyngo – esophageal junction.

85. 4 constrictions of esophagus : at beginning, where it is crossed by aortic arch, where it is crossed by left bronchus, where it pierces the diaphragm (distance from incisor teeth – 6", 9", 11" and 15" respectively)

86. Arterial supply of oesophagus – cervical part : inferior thyroid, thoracic part : aorta, abdominal part : left gastric.

87. Cardiac chamber enlargement causing indentation on esophagus (barium swallow) : Left atrium.

88. Thoracic duct : Continuation of cisterna chyli passes through aortic opening of diaphragm, length – 45 cm. Receives lymph from both halves of body below the diaphragm and left half of body above diaphragm. Drains at the junction of left subclavian vein and left internal jugular vein.

ANATOMY MCQS

THORAX

1. Sibson's fascia is seen at

a) thoracic inlet b) thoracic outlet c) vena caval opeing of diaphragm

d) superficial inguinal ring.

2. Muscles crossing the thoracic inlet are all except

a) longus colli b) sterno thyroid c) sternohyoid d) myohyoid.

3. Incidence of cervical rib

a) 0.5% b) 1% c) 1.5% d) 2%.

4. Rib notching in co-arctation of aorta is due to dilated

a) Superior intercostal arteries b) Posterior intercostal arteries c) subcostal arteries d) all.

5. What is not true of thoracic inlet syndrome?

a) may be due to cervical rib b) compresses 1^{st} thoracic nerve c) compresses subclavian artery d) compresses internal thoracic artery.

6. Vena caval opening of diaphragm is at the level of

a) D_8 b) D_{10} c) D_{12} d) L_1.

7. Which of the following does not pass through aortic –opening of diaphragm?

a) thoracic duct b) aorta c) vagus nerve d) azygos vein.

8. Which of the following is not true of sternal angle?

a) level of demarcation of superior and inferior mediastinum b) ascending aorta ends, descending aorta begins c) at the level of 4^{th} costal cartilage d) trachea, pulmonary trunk both divide at this level.

9. which of the following is a typical rib

a)1^{st} b) 2^{nd} c) 6^{th} d) 10^{th}.

10. Maximum obliquity of ribs is at

a) 5^{th} b)7^{th} c)9^{th} d)11^{th}.

11. Rectus abdominis, transverses abdominis and internal oblique all are attached to costal cartilage

a) 7^{th} b) 8^{th} c) 9^{th} d) 10^{th} & 11^{th}.

12. I.V. discs occupy % of total vertebral column length

a) 12 – 15% b) 20% c) 25 – 30% d) 30 – 35%.

13. 3^{rd} posterior intercostals artery is a branch of

a) costocervical trunk b) descending aorta c) thyrocervical trunk d) internal mammary artery.

14. Azygos vein passes through which opeing of diaphrapm

a) aortic b) vena caval c) azygos d) oesophageal.

15. Greater splanchnic nerve is formed by roots of

a) 5 – 8^{th} ganglia b) 10^{th} & 11^{th} ganglia c) 5^{th} – 9^{th} ganglia d) 5^{th} to 10^{th} ganglia.

16. Visceral pleura is supplied by

a) Phrenic nerve b) intercostal nerve c) autonomic nerves d) all.

17. Parietal pleura is supplied by all arteries all except

a) bronchial b) internal thoracic c) intercostals d) musculophrenic.

18. Broncho pulmonary segment is supplied by

a) primary bronchi b) secondary bronchi c) tertiary bronchi d) quarternary bronchi.

19. What is not true of bronchial artery

a) one on right side and two on left side b) on left side, arise from descending aorta c) Embolisation is done to arrest hemoptysis d) Bronchi but not lungs are supplied by these.

20. Pulmonary unit means

a) respiratory bronchiole b) terminal bronchiole c) acinus d) alveoli.

21. Segments of lingula of left lung are

a) superior & inferior b) lateral and medial c) anterior and posterior d) major and minor.

22. Which of the following is not a content of posterior mediastinum?

a) oesophagus b) phrenic nerve c) azygos vein d) descending thoracic aorta.

23. Pericardium is supplied by

a) descending aorta b) internal thoracic artery c) musculophrenic artery d) all.

24. Atria and ventricles of heart are supplied by

a) Coronary sulcus b) Coronary sinus c) Sinus venosus d) Sulcus terminalis.

25. Thebasian veins brain into

a) Right atrium b) Left atrium c) Both d) SVC.

26. Coronary sinus drains into

a) IVC b) SVC c) Right atrium d) Left atrium.

27. Papillary muscles are attached to valve cusps via

a) chordate tendinae b) musculi pectinati c) trabeculae carnae d) none.

28. Ratio of thickness of left ventricular wall to right ventricular wall

a) 2 : 1 b) 3 : 1 c) 1 : d) 4 : 1.

29. All of the following are true of trachea except

a) 16 – 20 rings b) rings are deficient posteriorly c) supplied by superior thyroid artery d) divides at T_4.

30. Enlargement of which cardiac chamber causes indentation on esophagus

a) Right atrium b) Left atrium c) Right ventricle d) Left ventricle.

31. Oesophageal opening of diaphragm is at the level of

a) D_8 b) D_{10} c) D_{12} d) D_{11}.

32. Which of the following is not a correct level of oesophageal constrictions?

a) At crossing by aortic arch b) At crossing by left main boconchus c) Where it crosses azygos vein d) Where it pierces the the diaphragm.

Ans : 1) a, 2) d, 3) a, 4) b, 5) d, 6) a, 7) c, 8) c, 9) c, 10) c, 11) a, 12) b, 13) b, 14) a, 15) c, 16) c, 17) a, 18) c, 19) d, 20) a, 21) a, 22) b, 23) d, 24) a, 25) c, 26) c, 27) a, 28) b, 29) c, 30) b, 31) b, 32) c.

ANATOMY

ABDOMEN PART- 1

1. Lumbar vertebrae has 3 primary and 7 secondary centres of ossification.
2. Sacrum gives attachment to : Pyriformis, erector spinae and multifidus.
3. Average sacral index in males 105. In females it is 115.
4. Commonest type of pelvis : Gynaecoid (41.4%).
5. Subpubic angle : Females → 80 - 85°, males → 50 - 60°.
6. Greater sciatic notch : Females → 74°, males → 50°.
7. Puboischial index : Females → 100°,males → 83°.
8. Thichness of I.V. discs : Cervical and lumber → thicker in front. Dorsal : Uniform all around.
9. Water content of nucleus pulposus : Newborn → 90%, adult 70%.
10. Commonest site of disc prolapse : Lower lumbar(4/5) followed by lower cervical ($C_{5/6}$).
11. Vertebral level of xiphoid process : T_9, umbilicus : $L_{3/4}$ disc, transpyloric plane : L_1.
12. Renal angle : Angle between last rib and outer border of erector spinae.
13. Skin around the umbilicus is supplied by segment T_{10}.
14. Umbillicus is the meeting point of 4 folds of embryonic plate and 3 systems (digestive, vascular and excretory).
15. (a) Remnant of vitello – intestinal duct : Raspberry red tumour or cherry red tumour in umbilicus. (b) Patent vitello – intestinal duct : fecal fistula in umbilicus.

(c) Failure of physiological hernia to regress (normally physiological hernia regresses by 10^{th} week) : Exomphalos. (d) Failure of infraumbillical part of anterior abdominal wall to develop : Ectopia vesicae.

16. Infraumbillical anterior abdominal wall has 2 layers of the fascia : Outer/ superficial = camper's fascia composed of fat and inner/ deep = scarpa's fascia is membranous. Dartos muscle of scrotum replaces the superficial layer. M embranous layer is continuous in the perineum with colles fascia. Suspensory ligament of penis or clitoris are actually thickened membranous layer.
17. Cutaneous supply of anterior abdominal wall : $T_7 - L_1$ nerves.
18. Skin of external genitalia and medial side of thigh is supplied by : ilio – inguinal nerve.
19. External oblique muscle : Arises from lower eight ribs. Upper 4 slips inter digitate with serratus anterior and lower 4 with latissimus dorsi. Inguinal ligament is formed by a fold of the aponeurosis. Superficial inguinal ring is seen in the aponeurosis of this muscle. Supplied by lower 6 thoracic nerves.
20. Internal oblique : Arises from lateral $2/3^{rd}$ of inguinal ligament, illiac crest and thoracolumbar fascia. Cremastric muacle is formed of fibres of this muscle. Conjoint tendon is partly formed by this muscle (other contributor is transversus abdominis). Supplied by lower 6 thoracic plus L_1 nerve.
21. Transversus abdominis : Arises from lateral $1/3^{rd}$ of inguinal ligament, iliac crest and thoraco – lumbar fascia. Neurovascular plane of abdominal wall is lies between internal oblique and transverses abdominis. Supplied by : Lower 6 thoracic plus L_1 nerve.
22. Aponerosis of external obliqus, internal oblique and transverses abdominis participate in the formation of rectus sheath. They end in fibrous raphe in the midline – the linea alba.
23. Lacunar ligament is pectineal part of inguinal ligament and ligament of cooper = pectineal ligament is extension of lacunar ligament.
24. Conjoint tendon is formed by fusion of internal oblique and transversus abdominis aponeurosis.
25. Cremaster muscle is not well developed in females. Lies deep to external spermatic fascia. Supplied by genital branch of genitofemoral nerve (L_1). It suspends and elevates the testis. Cremasteric reflex is lost in UMN lesion above L_1.
26. Pyramidalis muscle is rudimentary in humans.
27. Deep arteries of anterior abdominal wall : Superior epigastric and musculophrenic arteries are branches of internal thoracic artery and inferior epigastric artery is a branch of external iliac artery.

28. Rectus sheath : Formed by aponeurosis of 3 muscles – external, internal obliques, transverses abdominis. Posterior wall is deficient and incomplete and is free from rectus muscle. Contents : Rectus abdominis, pyramidalis, superior and inferior epigastric artery & vein, lower 6 thoracic nerves.

29. Supraumbillical median incision causes less bleeding but more chances of ventral hernia.

30. Fascia transversalis lines the inner surface of transverses abdominis. Deep inguinal ring is located within this fascia 1.2 cm above the midinguinal point. Internal spermatic fascia and anterior wall of femoral sheath are prolongations of this fascia.

31. Structures passing through inguinal canal : Spermatic cord in male or round ligament in female → enters through deep ring and exits through superficial ring. Ilioinguinal nerve exits through superficial ring.

32. Components of spermatic cord : Ductus deferens, pampiniform plexus, testicular and cremesteric arteries, genital branch of genito femoral nerve, sympathetic nerves, processus vaginalis remnamt..

33. (a) External spermatic fascia is derived from external oblique aponeurosis. It covers the spermatic cord below the superficial ring. (b) Internal spermatic fascia is derived from internal oblique aponeurosis. It covers the whole of spermatic cord.

34. Direct inguinal hernia passes medial to the inferior epigastric artery (posterior to deep ring) while, indirect inguinal hernia passes lateral to inferior epigastric artery (through the deep ring).

35. Transpyloric plane passes anteriorly through tips of 9^{th} costal cartileges and posteriorly through L_1 vertebra. Subcostal plane : Anteriorly 10^{th} costal cartilage. Posteriorly : L_3.

36. Visceral peritoneum develops from splanchopleuric layer of lateral plate mesoderm. Supplied by autonomic nerves. Not sensitive to painful stimuli but sensitive to ischaemia, stretch or distension → pain.

37. Parietal peritoneum develops from somatopleuric layer of lateral plate mesoderm. Supplied by somatic nerves. Pain sensitive.

38. Abdominal police guard : Greater omentum.

39. Mesothelial cells of peritoneum can transform into fibroblast and aid in healing responses.

40. (a) Structures developing from foregut : From esophagus to 2nd part of duodenum (upto the level of opening of CBD), liver, GB, pancreas. (b) Structures developing from midgut : From duodenum (starting of opening of CBD) to right 2/3rd of transverse colon. (c) Structures developing from hindgut : From left 1/3rd of transverse colon to proximal part of rectum.

41. Structures developing from ventral mesogastrium : Lesser omentum, triangular, coronary and falciform ligaments.

42. Structures developing from dorsal mesogastrium : Greater omentum, gastrosplenic, gastrophrenic and lienorenal ligaments.

43. Greater omentum develops from dorsal mesogastrium. It is made up of 4 layers of peritoneum and folded in such a way that 1st layer becomes the 4th layer and 2nd layer becomes the 3rd layer. It hangs from greater curvature of stomach. 4th layer is partly fused to transverse colon and transverse mesocolon. Right and left gastro epiploic vessels and fat are its contents. Collection of macrophages in greater omentum are called milky spots – visible to eyes.

44. Lesser omentum develops from ventral mesogastrium. It is a fold of peritoneum extending from lesser curvature of stomach to first 2 cm of duodenum. Behind its free right margin is epiploic foramen = foramen of winslaw at D_{12} level through which greater and lesser sacs communicate. Along the right free margin there are : Hepatic artery, bile duct, portal vein plus nerves and lymph nodes. Along the lesser curvature : Gastric vessels and nerves.

45. Mesentery suspends jejunal and ileal coils from posterior abdominal wall. It extends from duodeno – jejunal flexure to upper part of sacro – iliac joint. Contains jejunal and ileal branches of superior mesenteric artery, vein nerve and lymphatics.

46. Lesser sac or omental bursa is a large peritoneal recess behind stomach, lesser omentum and caudate lobe of liver.

47. Hepatorenal pouch of Morrison is right posterior space or subhepatic space of peritoneal cavity. When supine, it is the most dependent part of peritoneal cavity. It is the commonest site of subphrenic abscess.

48. Rectouterine pouch of Douglus is the most dependent part of the peritoneal cavity while upright / erect.

49. Abdominal part of oesophagus is 1.25 cm long. It enters the abdomen through esophageal opening of diaphragm at T_{10} level and ends at the cardiac end of stomach at T_{11} level 2.5 cm to the left of midline. Lower end of esophagus is a common site for porto – systemic anastomosis (varices in portal hypertension). Oesophageal carcinoma most commonly occurs at the lower end.

50. Epithelial lining of oesophagus : Stratified squamous nonkeratinising.

51. Capacity of newborn stomach : 30 ml.

52. Cardiac orifice of stomach : T_{11} level. Pyloric orifice : L_1 (lower border).

53. Prepyloric vein of Mayo lies infront of pyloric constriction.

54. Angular notch or incisura angularis is the most dependent part of lesser curvature of stomach.

55. Pyloric antrum is separated from pyloric canal by sulcus intermedius of greater curvature. Pyloric antrum is 7.5 cm long, pyloric canal is 2.5 cm.

56. Secretory cells of stomach : Mucus cells, chief cells or peptic cells (secrete digestive enzymes) and parietal / oxyntic cells (secrete HCL).

57. Blood supply of stomach : Left gastric from celiac trunk, right gastric from common hepatic, left gastroepiploic from splenic, right gastroepiploic from gastroduodenal and short gastric (5 to 7 in number) from splenic artery.

58. Sympathetic supply of stomach : $T_6 - T_{10}$. Parasympathetic supply : Vagus.

59. Common sites of peptic ulcer : D_1 segment of duodenum, lesser curvature of stomach. Lower end of esophagus and Meckel's diverticulum may also be affected.

60. Carcinoma of stomach commonly affects greater curvature. May metastasize to left supra clavicular lymph nodes (troisier's sign = signal nodes).

61. Small intestine : 6 meter long: from pylorus to ileo-caecal junction. Duodenum is fixed and rest is mobile. Circular folds of mucus membrane – plicae circularis or valves of kerkring are permanent – not obliterated by luminal distension. They start at second part of duodenum. Tubular intestinal glands or crypts of lieberkuhn are noted over the entire mucus membrane of jejunum and ileum. Intestinal villi are finger like projection – more in duodenum and jejunum and less in ileum. Brunner's glands are located in duodenal submucosa. Peyer's Patches are aggregated lymphatic follicles – are seen in maximum number and in large size in ileum and small, few in number

in distal jejunum. These are located along antimesenteric border and show ulcerations in typhoid (oval in shape – long axis along long axis of bowel).

62. Duodenum has dual source of development (fore gut and midgut) and dual arterial supply (celiac trunk and superior mesenteric artery (branches). Sympathetic nerve supply of small intestine → $T_9 – T_{11}$ and parasympathetic → vagus.

63. Shortest and widest part of small intestine is duodenum. Duodenum lies at $L_1 – L_3$ level. 25 cm long – 3rd part is longest (10 cm) and 4th part is shortest (2.5 cm) second part is descending, 3rd part is horizontal and 4th part is ascending. 3rd part courses between superior mesenteric artery and aorta and is compressed in superior mesenteric artery syndrome causing obstructive features. Duodenum is mostly retroperitoneal except at two ends.

64. (a) Major duodenal papilla : 8-10 cm distal to pylorus. Ampulla of vater opens at its summit. (Both common bile duct and main pancreatic duct open at ampulla at vater at second part of duodenum. (b) Minor duodenal papilla : 6-8 cm distal to pylorus. Accessory pancreatic duct opens here.

65. Ligament of Treitz or suspensory ligament of duodenum is a fibromuscular band suspending the demarcatin of upper and lower G.I. bleeding.

66. Comparative study of ileum and jejunum : Jejunum : Wall thicker and more vascular, Peyer's Patches are scanty or absent, mesentery shows windows and longer but fewer vasa recta. Arterial arcades 1 or 2.

Ileum : wall thinner and less vascular. Peyer's patches are present. Mesentery shows no windows. Shorter but numerous vasa recta. Arterial arcade 3 or 6.

67. Meckel's diverticulum : 2%, 2 inches, 2 feet from ileo – caecal valve. Calibre is nearly equal to ileum. May contain islands of gastric mucosa which may ulcerate.

68. Large bowel starts at ileo – caecal junction and ends at anal opening. 1.5 cm long (25% of small bowel) villi are not present. Except for appendix, transverse and sigmoid colon – large bowel is fixed. 3 taeniae coli are seen which coverage at the base of appendix. Appendices epiplicae are fat filled pouches of peritoneum seen in large intestinal surface except appendix, caecum, rectum.

69. Small intestine vs large intestine : small intestine → Peyer's Patches are present (ileum), villi are present while, appendices epiploicae, taeniae coli, sacculations are absent. The features are just the opposite for large intestine.

Transverse mucosal folds are permanent in small intestine but may be obliterated in large intestine.

70. Pain impulses upto descending colon are carried by sympathetic nerves and from sigmoid colon to rectum by pelvic splanchnic nerves.

71. Caecum is a blind-sac more wide than its length (7.5 cm vs 6 cm). Ampullary type is the commonest (78%). Inflammation of caecum is called typhilitis. Caecum and appendix develop from post arterial segment of midgut loop (caecal bud).

72. Vemiform appendix : Arises from posteromedial wall of caecum, 2 cm below the ileo – caecal orifice. Called dilated or distended when ≥ 7mm in diameter. Average length 9 cm (2-20 cm). Base is fixed. 12 o'clock or retrocaecal position is commonest (65%). Appendicular orifice is guarded by valve of Garlach. Appendicular artery is a branch of ileo – colic artery.

73. Longest part of large bowel : Transverse colon (50 cm).

74. Physiological hernia of midnight returns at 10^{th} week of gestation with 270^{o} anti-clockwise rotation.

75. Origin of (a) celiac trunk : D_{12}/ L_1 , disc level (b) Superior mesenteric artery : L_1 (1 cm below celiac trunk) (c) Inferior mesenteric artery : L_3 (behind third part of duodenum (d)Portal vein : L_2 (behind neck of pancreas).

76. Coeliac trunk is 1.25 cm long. Branches – left gastric, hepatic, splenic arteries.

77. Branches of common hepatic artery : gastroduodenal, right gastroepiploic, superior pancreatoico duodenal, right gastric artery. Cystic artery is more often a branch of right hepatic artery than common hepatic artery.

78. Largest branch of coeliac trunk : Splenic artery. Arteria pancreatica magna is a branch of splenic artery.

79. Jejunal and ileal branches of superior mesenteric artery are 12 – 15 in number arising from left side.

80. Branches of inferior mesenteric artery : superior left colic (first branch), inferior left colic (sigmoid), superior rectal (continuation of IMA).

81. Median sacral artery is the terminal continuation of primitive abdominal aorta.

82. Marginal artery is an arterial arcade / anastomosis formed by : ileocolic, right colic, middle colic, left colic, sigmoid arteries. Can supply the colon in absence of main feeding artery.

83. Portal vein is formed by union of superior mesenteric vein and splenic vein behind neck of pancreas (L_2 level). Rt branch receives cystic vein before entering right lobe and Lt branch receives ligamentum teres, ligamentum venosum and paraumbillical veins before entering Lt lobe. In addition to these tributaries, others include right and left gastric, and superior pancreatico – duodenal veins.

84. Portal venous pressure : 5-15 mm Hg (average 6-8 cm of water). Portal hypertension : >40 mm Hg. (clinically : splenomegaly, ascites, diameter of ≥ 13 mm).

85. Common sites of porto – systemic communications : umbilicus, lower end of esophagus, anal canal, bare area of liver, posterior abdominal wall.

86. Structures at the porta : Portal vein, hepatic artery,. Hepatic ducts.

87. Accessory hepatic duct : Present in 15% of population. Generally arises from right lobe of liver and end in gall bladder or common hepatic duct.

86. Hartmann's pouch is dilated neck of gall bladder posteromedially.

89. Cystic duct : Arises from neck of gall bladder and terminates at common hepatic duct at an acute angale to form bile duct. Spiral valves of Heister are mucous folds – not true valves (5-12 in number).

90. Bile duct : After the cystic duct joins the common hepatic duct, it becomes CBD. 7.5 to 8 cm long, 6 mm wide. Ends at ampulla of vater (along with main pancreatic duct) which opens at the summit of major duodenal papilla. CBD & MPD may open separately in the papilla also.

91. Sphincter choledochus is located at the lower end of CBD before termination. Always present and is essential for filling the gall bladder. Sphincter pancreaticus is seen at the MPD before it opens in ampulla of vater. Not always present. Sphicter surrounding the ampulla of vater sphincter of oddi.

92. Principal arterial supply of biliary apparatus : cystic artery. It commonly arises from right hepatic artery but may arise from common hepatic artery or gastroduodenal artery.

93. Maximum concentrating ability of gall bladder : 10 times.

94. Courvoisier's law : Overdistended GB in a jaundiced patient is possibly due to mass (lower end of CBD or carninoma head of pancreas) not due to calculus.

95. Murphy's sign : Catch in the breath when pressed at the tip of 9^{th} costal cartilage in case of acute cholecystitis.

96. Harris's rule of odd numbers applies to spleen 1,3,5,7,9,11. 1 inch thick, 3 inches wide, 5 inches long, 7 ounces in weight and lies on 9^{th} to 11^{th} ribs.
97. Long axis of spleen corresponds to long axis of 10^{th} rib.
98. Impressions on spleen : gastric, renal, pancreatic and colic. No suprarenal impression.
99. Phrenico-colic ligament supports the spleen but is not attached to spleen.
100. Splenic artery, the largest branch of coeliac trunk is the main arterial supply of spleen. Smaller branches' are end arteries.
101. Malpighian's corpuscle is in white pulp of spleen.
102. Intrasplenic pressure is an indirect measurement of portal pressure.
103. Most significant injury during splenectomy : Pancreatic tail.
104. Spleen is palpable when it is enlarged twice its size. Sonographically, when it is > 12 cm.

ANATOMY MCQS

1. Subpubic angle in males is
a) $70 – 80^0$ b) $80 – 85^0$ c) $50 – 60^0$ d) $60 – 70^0$
2. Transpyloric plane goes through
a) T_{11} b) T_{12} c) L_1 d) L_2
3. Sacrum gives attachment to all except
a) pyriformis b) erector spinae c) multifidus d) quadratus lumborum.
4. Skin around umbilicus is supplied by segment
a) T_{10} b) T_{11} c) D_1 d) D_2
5. Raspbery red tumour is due to
a) failure of physiological umbilical hernia to return. b) remnant of vitello – intestinal duct c) persistent vitello – intestinal duct d) failure of anterior abdominal wall of develop.
6. Which of the following is not continuous with membranous layer of anterior abdominal wall
a) Dartos muscle b) colles' fascia c) suspensory ligament of penis
d) suspensory ligament of clitoris.
7. Skin of external genitalia is supplied by
a) genital branch of genitor femoral nerve b) ilio inguinal nerve
c) iliohypogastric nerve d) interal pudendal nerve.
8. Inguinal ligament is formed by aponeurosis of

a) external oblique b) internal oblique c) transverses abdominis (d) rectus sheath.

9. Cremasteric muscle is a part of

a) external oblique b) internal oblique c) rectus abdominis d) transverses abdominis.

10. Conjoint tendon is formed by aponeurosis of

a) external oblique and internal oblique b) internal oblique and transversus abdominis c) transversus abdominis and rectus sheath d) all 4 muscles.

11. Which of the following statements is wrong?

a) cremaster is a part of internal oblique b) cremaster is ill – developed in females c) pyramidalis is rudimentary in human beings d) pyramidalis lies lateral to rectus sheath.

12. Which of the following is a branch of external iliac artery?

a) superior epigastric b) inferior epigastric c) musculophrenic d) all.

13. Deep inguinal ring located within

a) external oblique aponeurosis b) internal oblique aponeurosis c) fascia transversalis d) reetus sheath.

14. External spermatic fascia is a derived from

a) fascia transversalis b) internal oblique aponeurosis c) external oblique aponeurosis d) formed by blending of all three.

15. Which of the following is not a content of inguinal canal?

a) ilioinguinal nerve b) iliohypogastric nerve c) spermatic cord d) none.

16. Indirect inguinal hernia

a) passes lateral to inferior epigastric artery b) passes posterior to deep ring c) both are true d) passes medial to inferior epigastric artery.

17. Which of the following is not true of parietal peritoneum?

a) develops from somatopleuric layer of mesoderm b) extensive autonomic innervations c) exquisitely painful d) all.

18. Duodenum develops from

a) foregut b) midgut c) both d) hindgut.

19. Hepatic flexure develops from

a) foregut b) midgut c) hindgut d) b + c.

20. Lesser omentum develops from

a) dorsal mesogastrium b) ventral mesogastrium c) splanchnopleuric layer d) somato pleuric layer .

21. Milky spots are seen in

a) greater omentum b) lesser omentum c) the mesentry d) fascia of zukerkendl.

22. Most dependent part of peritoneal cavity while supine

a) puch of douglus b) puch of Morrison c) Rt paracolic gutter c) recto – vesical puch.

23. Which of the following does not develop from ventral mesogastrium?

a) greater omentum b) lesser omentum c) coronary ligament d) falciform ligament.

24. Regarding epiploic foramen not true is

a) greater and lesser sacs communicate through it b) it is located D_{12} level

c) seen anterior to right free margin of lesser omentum d) bile duct, portal vein, hepatic artery seen along right free margin.

25. Commonest site of carcinoma esophagus

a) upper $1/3^{rd}$ b) middle $1/3^{rd}$ c) lower $1/3^{rd}$ d) eqully distributed.

26. Length of pyloric canal is

a) 2.5 cm b) 3 – 3.5 cm c) 3.5 – 5 cm d) 7.5 cm.

27. Signal nodes refer to

a) left supraclavicular b) Troisier's node c) metastasis from carcinoma stomach d) all.

28. Ulceration in which of the following may indicate Zollinger – Ellision Syndrome?

a) lesser curvature b) D_1 segment of duodenum c) lower end of esophagus

d) jejunum.

29. Regarding small intestine which of the following is not true?

a) Brunner's glands are seen in duodenum. b) crypts of Liberkuhn are more numberous in duodenum c) Payer's patches are more numerous and large in ileum. d) intestinal villi are more in duodenum and less in ileum.

30. Most fixed part of small intestine

a) duodenum b) jejunum c) ileum d) no part is fixed.

31. Arterial supply of duodenum is form

a) coeliac ftrunk b) superior mesenteric artery c) both d) inferior mesenteric artery.

32. Longest part of duodenum

a) D_1 b) D_2 c) D_3 d) D_4

33. Which part of duodenum is horizontal?
a) D_1 b) D_2 c) D_3 d) D_4
34. Meckel's diverticulum – not true is
a) seen in 2% of population b) 2 cm long c) 60 cm from ileo – caecal gunction d) may contain gastric mucosa.
35. Which of the following parts of large gut is fixed?
a) appendix b) ascending colon c) transverse colon d) sigmoid colon.
36. Which of the following is not seen small intestine?
a) Payer's Patches b) crypt of Liberkuhn c) villi d) appendices epiploicae.
37. Commonest type of appendix
a) retrocaecal b) pre-ileal c) postileal d) precaecal.
38. Thphilitis is inflammation of
a) caecum b) ileum c) jejunum d) meckel's divereticulum.
39. Physiological hernia returns at
a) 8^{th} week b) 10^{th} week c) 12^{th} week d) 16^{th} week.
40. Coeliac trunk originates at the level of
a) D_{11} b) D_{12}/L_1 c) L_1 d) L_1/L_2
41. Regarding branches of aorta which is wrong?
a) cystic artery is a branch of rt hepatic artery b) right gastric artery is a branch of coeliac trunk c) splenic artery is the largest branch of coeliac trunk.
d) Superior mesenteric artery arises at L_1 level.
42. All of the following are true of portal vein except
a) originates at the level of L_2 b) originates behind neck of pancreas c) normal portal venous pressure is 15 – 18 mm Hg d) left and right gastric vein are tributaries.
43. Incidence of accessory hepatic duct
a) 15% b) 18 – 20% c) 10 – 12% d) 5 -8%.
44. Spiral valves of Heister are seen in
a) right hepatic duct b) left hepatic duct c) common hepatic duct d) cystic duct.
45. Which of the following is not true regarding extrahepatic biliary tree?
a) cystic duct joins the common hepatic duct at an angle of 90 - 100^0 to form CBD. b) CBD is approx 7.5 – 8 cm long c) CBD ends at amphulla of vater along with MPD d) sphincter choledochus is seen at lower end of CBD.
46. Principal arterial supply of biliary tree is

a) right hepatic artery b) left hepatic artery c) cystic artery d) hepato – duodenal artery.

47. Long axis of spleen is parallel to long axis of

a) D_{10} b) 10^{th} rib c) D_{11} d) 11^{th} rib.

48. Intrasplenic pressure is an indirect measurement of pressure of

a) portal vein b) IVC c) Rt atrial compliance d) hepatic veins.

49. Level of origin of superior mesenteric artery

a) D_{12} b) L_1 c) L_2 d) L_3

50. Which of the following is not a common site of porto-systemic communication?

a) umbillicus b) bare of liver c) lower end of esophagus d) recto-sigmoid junction.

Ans : 1) c, 2) c, 3) d, 4) a, 5) b, 6) a, 7) b, 8) a, 9) b, 10) b, 11) d, 12) b, 13) c, 14) c, 15) b, 16) a, 17) b, 18) c, 19) b, 20) b, 21) a, 22) b, 23) a, 24) c, 25) c, 26) a, 27) d, 28) d, 29) b, 30) a, 31) c, 32) c, 33) c, 34) b, 35) b, 36) d, 37) a, 38) a, 39) b, 40) b, 41) b, 42) c, 43) a, 44) d, 45) a, 46) c, 47) b, 48) a, 49)b, 50) d.

ANATOMY

ABDOMEN PART II

105. J shaped structures : stomach, pancreas.

106. Organ more wide than their length : caecum, pituitary, prostate, pons.

107. Pancreas lies posterior to stomach, being separated from it by lesser sac.

108. Pancreas has 3 borders. Superior (related to 1^{st} part of duodenum), right lateral (related to second part of duodenum) and inferior (related to 3^{rd} part of duodenum). No left lateral border.

109. Tail. Of pancreas lies on : Lieno-renal ligament.

110. Main pancreatic duct = Duct of wirsung runs close to the posterior surface of pancreas. ≤ 3 mm in diameter. Opens in 2^{nd} part of duodenum at ampulla of vater, which in turn, opens at the summit of major duodenal papilla.

111. Accessory pancreatic duct = duct of santorini crosses the main duct and opens in minor duodenal papilla.

112. Like duodenum, pancreas also has dual source of development and dual arterial supply – coeliac trunk and superior mesenteric artery. Supplied by : splenic artery, superior and inferior pancreatico duodenal.

113. Pauereatic β cells are basophilic and α cells are acidophilic. B cells constitute approx 80%. A_2 cells secrete glucagon and A_1 cells → gastrin, serotonin.

114. Ventral but gives rise to uncinate process and lower part of panereatic head. Rest of the pancreas develops from dorsal bud.

115. Accessory pancreatic tissue may be present in : duodenum, jejunum, ileum, Meckel's diverticulum.

116. Largest gland in the body : Liver.

117. Liver has 5 surfaces. No left surface.

118. Interlobar notch of liver contains ligamentum teres and cystic notch for fundus of gall bladder.

119. To the left of caudate lobe, there is fissure for ligamentum venosum.

120. omental tuberosity or tuber omentale in the left lobe of liver near the fissure for ligamentum venosum.

121. Porta hepatis : Length – 5 cm. Located in inferior surface of right lobe of liver. Contains : portal vein, hepatic artery and hepatic ducts. Provides attachment to lesser omentum.

122. Parts of liver with no peritoneal coverings : bare area on the posterior surface of right lobe, fossa for gall bladder, groove for IVC, coronary ligament, lesser omentum.

123. Contribution of hepatic supply by portal vein : hepatic artery → 4 : 1. Hepatic arterial blood mixes with portal venous blood in hepatic sinusoids. No anastomosis between adjacent hepatic arterial territories.

124. Hepatic segments are divided by coinaud.

125. Capsule of liver : Glisson's capsule.

126. Rectum : appendices epiploicae, taeniae coli and sacculations (features of large bowel) are absent. Length : 12 cm – starts at S_3 level. There are 2 anteroposterior curves and 3 lateral curves. Longitudinal mucosal folds are obliterated by distension while transverse folds = Houseton's valves = plicae transversalis are not obliterated when distended. Rather, these become more prominent. The middle fold is largest and most constant.;

127. Superior rectal artery – the continuatioin of inferior mesenteric artery – is the chief arterial supply of rectum. Others are middle rectal and median sacral.

128. Anal Canal : 3.8 cm long – upper and middle parts are 15 mm each, lower part is 8 mm. Upper part is mucous part, middle part is the transitional zone and lower part is cutaneous. Middle and lower parts are separated by white line of Hilton. Skin covering with sebaceous and sweat glands are seen in lower part.

129. Internal anal canal is involuntary. It surrounds the upper 30 mm of anal canal (above Hilton's line). External and sphincter is voluntary and surrounds the lower 8 mm of anal canal (below Hilton's line). It is made of striated muscle.

130. Anorectal ring is responsible for rectal continence. It is formed by puborectalis, deep external and internal sphincters. Puborectalis is absent anteriorly.

131. Anal valves form a line at the middle of internal anal sphincter called pectinate line.

132. Anal canal is supplied by superior rectal artery (above pectinate line) and inferior rectal artery below pectinate line.

133. Primary internal piles are seen at 3,7,11 o'clock position, piles in other location → secondary.

134. External pile = false pile : occurs below the pectinate line. These are painful but do not bleed on straining.

135. Rectum and upper 15 mm of anal canal are endodermal in origin (above pectinate line). Lower 23 mm develops from ectoderm.

136. Principal muscle of respiration : diaphragm.

137. Diaphragm arises from : (a) sterna part from xiphoid process (b) costal part from lower 6 ribs and (c) lumbar part from lumbar vertebrae forming right and left crura.

138. Right crus of diaphragm is larger and stronger than left. Medial margin of two crura form a tendinous are anterior to aorta. This is called median arcuate ligament.

139. Central tendon of diaphragm lies at the level of 6^{th} costal cartilage.

140. Levels of major opening of diaphragm : (a) oesophageal : T_{10} (b) vena caval - T_8 (c) aortic – T_{12} .

141. Structures passing through the major openings of diaphragm (a) oesophageal : oesophagus, esophageal branches of left gastric artery , gastric

or vagus nerve. (b) vena caval : IVC, branches of right phrenic nerve (c) aortic : aorta, thoracic duct, azygos vein.

142. Foramen o9f morgagni = space of Larry : space between xiphoid process and 17^{th} costal cartilage origin of diaphragm. Transmits : superior epigastric vessels and lymphatics.

143. Normal respiratory excursion of diaphragm : 1.5 cm. maximum : 10 cm (in deep respiration).

144. Nerve supply of diaphragm : phrenic nerve is the one and only motor nerve supplying diaphragm ($C_3 - C_5$) sensory supply of central part is from phrenic nerve and peripheral part from lower 6 thoracic nerve.

145. Development of diaphragm : Central tendon from septum transversum, dorsal paired tendons from pleura peritoneal membranesf, dorsal unpained tendon from dorsal mesentery and circumference from lateral thoracic wall.

146. Congenital hiatal hernia results from persistence of embryonic peritoneal process in posterior mediastinum. The stomach can 'roll' upwards into posterior mediastinum (rolling hernia). Normal relationship of cardio-esophageal junction is not disturbed.

147. Acquired hiatal hernia results from weakness of phrenico – esophageal membrane obesity, surgery are the usual causes. Cardial end of stomach 'shide' up through the opening (sliding hernia). Normal relationship of cardio – esophageal junction is disturbed resulting in reflux esophagitis. Commonest internal hernia.

148. Diaphragmatic eventration : congenital weakness/defect of diaphragmatic musculature. Abdominal contents push the diaphragm up common on left side.

149. Bochdalek's hernia : Commonest congenital diaphragmatic hernia. Posterolateral, more common on left side. Free communication between pleural and peritoneal cavities.

150. Morgagnian hernia : through the foramen of mongagni more common on right side antero medially between pleura and pericardium. Generally asymptomatic.

151. In the renal hilum, the structures from anterior to posterior are renal vein, renal artery and pelvis.

152. Vertebral level of kidneys – D_{12} to L_3. Left kidney is slightly higher and medially. Upper poles are more medial than lower poles.

153. Renal fascia or fascia of Gerota has anterior layer called fascia of Toldt and posterior layer called fascia of Zuckerkandl. Superiorly, it encloses suprarenal gland, inferiorly encloses ureter and laterally, it fuses with fascia transversalis.
154. Accessory renal artery is seen in 30% cases.
155. Divisions/ generations of renal artery : segmental → lobar → interlobar → arcuate → interlobular. Interlobular arteries do not anastomose with each other – they are end arteries.
156. Arterial supply of medulla : efferent arterioles of the Juxtaglomerular glomeruli. These divide into vasa recta.
157. Free circulation is seen in cortex (glomerular) and restricted circulation is in medulla.
158. Constrictions of ureter : pelviureteric junction, brim of lesser pelvis where it crosses the terminal of common iliac artery, during passage through bladder wall.
159. Genito femoral nerve lies posterior to ureter.
160. Ductus deferens crosses the ureter and seminal vesicle lies behind the ureter in males.
161. In females, ureter lies in lower and medial part of broad ligament of uterus. It is crossed by uterine artery.
162. Kidney develops from : metanephros.
163. Congenital polycystic kidney results from failure of union of collecting and secretary parts of kidney.
164. Suprarenal glands are located at 11^{th} intercostal space and 12^{th} rib level.
165. Right suprarenal gland is triangular or pyramidal and left one is semilunar in shape.
166. Right suprarenal gland has apex, base, 2 surfaces and 3 borders whereas left gland has upper and lower ends, two borders and 2 surfaces. Apex of right gland is related to bare area of liver, upper end of left gland is related to posterior end of spleen.
167. Middle suprarenal artery is a direct branch of abdominal aorta. Superior suprarenal artery is a branch of inferior phrenic artery and inferior suprarenal artery is a branch of renal artery.
168. Location of accessory suprarenal gland : around the main gland, in spermatic cord, epididymis, broad ligament of uterus.
169. Suprarenal cortical cells have numerous vacuoles in the cytoplasm.

170. Suprarenal cortex is developed from mesoderm and medulla is developed from neuroectoderm.

171. Para – aortic bodies are located on each side of origin of inferior mesenteric artery connected with each other in a 'H' or horse – shoe pattern. Disappears by 14 years of age. Secrete nor – adrenaline.

172. Glomus coccygeum = coccygeal body is located in front of coccyx connected to median sacral artery and ganglion impar.

173. Abdominal aorta starts at aortic opening at D_{12} level and ends at the bifurcation at lower border of L_4. It is 2 cm in diameter.

174. Ventral branches of abdominal aorta : celiac trunk, superior and inferior mesenteric arteries.

175. Dorsal branches of abdominal aorta – 4 pairs of lumbar arteries and median sacral artery which continues downwards as the direct posterior continuation of aorta.

176. Lateral branches of abdominal aorta includes : inferior phrenic (first branch of abdominal aorta), renal, middle suprarenal, testicular / ovarian.

177. Middle suprarenal artery arises at level of superior mesenteric artery. Renal artery arises below it.

178. Ovarian artery enters broad ligament. A branch of it anastomoses with uterine artery and supplies uterine tube and pelvic ureter.

179. Median sacral artery anastomoses with illiolumbar and lateral sacreal arteries.

180. IVC starts at L_5 level by union of common iliac veins and ends at right atrium. It pierces the central tendon of diaphragm at T_8 level. It is 2.5 cm in diameter (wider than aorta).

181. Left renal vein receives – left testicular / ovarian vein and left suprarenal vein.

182. Azygos vein is formed by union of ascending lumbar vein and subcostal vein. It enters the thorax through aortic opening in diaphragm.

183. Cisterna chili lies at L_1 and L_2 level (5-7 cm long) on the right side of aorta. It continues above as thoracic duct.

184. External iliac nodes (8-10 in number) receive afferent from inguinal lymph nodes, infraumbillical abdominal wall, medial (adductor) aspect of thigh, glans penis/clitoris, urinary bladder (fundus), prostate, membranous urethra, cervix, upper part of vagina. Efferents go to common iliac nodes.

185. Muscles of posterior abdominal wall : Psoas major and minor, illiacus, quadratus lumborum. Superior part of Psoas major is in posterior mediastinum.

186. Nerve supply of Psoas major : L_2, L_3 ± L_4, illiacus : L_2, L_3. Psoas minor : L_1, quadrates lumborum : T_{12} – L_4 (ventral rami).

187. Lumbar plexus is formed by ventral rami of upper four lumbar nerves with contribution from subcostal nerve. (4^{th} lumbar number gives contribution to : lumbo sacral trunk). The plexus is situated within posterior part of Psoas major muscle.

188. Branches of lumbar plexus : illioinguinal and iliohypogastric nerve (L_1), genitofemoral nerve (L_1, L_2), lateral cutaneous nerve of thigh (L_2, L_3), femoral → (L_2, L_3, L_4 – dorsal), obturator ((L_2, L_3, L_4 – ventral) and lumbo sacral trunk L_4, L_5 – ventral).

189. There are 4 ganglia in the sympathetic chain. It runs deep to medial arcuate ligament and along the medial margin of Psoas major.

190. Coeliac ganglia is the largest ganglia in the body, situated on either side of celiac trunk. Its larger upper part receives greater splanchnic nerve and smaller lower part receives lesser splanchnic nerve.

191. Most fixed and lowest part of urinary bladder – neck. It is located behind the lower part of pubic symphysis.

192. Sphincter urethrae is located in deep perineal space.

193. Empty of bladder is tetrahedral, full blader is ovoid.

194. Apex of of bladder is connected to umbilicus via median umbilical ligament.

195. In males, superior surface of bladder is wholly covered by peritoneum. But in females, a small area near the posterior border, related to supravaginal cervix, is not covered by peritoneum. When the blader fills, the lower part of anterior surface in both sex becomes devoid of peritoneum – comes in direct contract with anterior abdominal wall.

196. Trigone of bladder : located in lower part of base of bladder. Ureters and internal urethral orifice open here. Mucosa is smooth (does not show folding). Base is formed by interureteric ridge or bar of marcier.

197. Distance between ureteric orifices : 2.5 cm when empty, 5cm when distended.

198. Blood supply of bladder : superior and inferior vesical arteries in male, superior vesical artery, uterine and vaginal arteries in females –. All are branches of internal iliac artery.

199. Somatic & parasymphathetic supply of bladder : S_2, S_3, S_4. Symphathetic – T_{11} to L_2.

200. Pain originating from bladder is conveyed via lateral spinothalamic tract but sense of distension is conveyed via posterior column. Hence anterolateral cordotomy does not abolish sense of distension.

201. Injury to cervico – thoracic cord causes 'automatic reflex bladder' while injury to sacral segments of cord causes 'autonomous bladder'.

202. Male urethra : 'S' shaped when flaccid and 'J' shaped when erect. 18-20 cm in length. Penile part is longest (15cm) membranous part is surrounded by sphincter urethrae. It is the part vulnerable to rupture in pelvic injury. Prostatic part is widest and most dilatable part. External urethral meatus is the narrowest part.

203. Structures opening in prostatic urethra : prostatic utricle (opens in colliculus seminalis), ejaculatory ducts, prostatic glands (open in prostatic sinuses).

204. Prostatic utricle is a 6mm blind sac in prostate analogous to uterus or vagina in females.

205. Structures opening in penile urethra : ducts of bulbourethral glands, urethral glands (of littre), lacuna of morgagni. Largest lacuna = lacuna magna is seen in roof of fossa navicularis.

206. Internal urethral sphincter is involuntary but external urethral sphincter is voluntary.

207. Length of female urethra : 4cm (diameter 6mm). Paraurethral glands of skene are seen around it. Skene's glands are homologous to male prostate.

208. Ectopia vesicae : structures absent are : umbilicus, infraumbillical abdominal wall, anterior wall of bladder, pubic bones. Epispadius is common associated finding.

209. Pelvic diaphragm – which forms the pelvic floor – consists of levator ani and coccygeus.

210. Pelivic inlet is heart shaped in male and oval shaped in female. It forms

50-60° angle with the horizontal plane. Sacrotuberous and sacrospinous ligaments traverse from hip bone to sacrum.Thus, greater and lesser sciatic notches are changed into respective foramina.

ANATOMY MCQS

1. Incidence of accessory renal artery is
a) 10% b) 15% c) 20% d) 30%.
2. Facia of Toldt is
a) anterior layer of fascia of Gerota b) posterior layer of fascia of gerota
c) same of fascia of zucker kandl d) same of fascia tranversalis.
3. Relationship of structures at renal hilum from anterior to posterior
a) artery – vein – pelvis b) vein – artery – pelvis c) vein – pelvis- artery d) artery – pelvis – vein.
4. Failure of union of collecting and secretory parts of kidney result in
a) horse – shoe kidney b) medullary sponge kidney c) polycystic kidney d) L shaped kidney or crossed fused ectopia.
5. Which of the following statements is correct?
a) at the pelvic brim ureter is crossed by iliac vessels b) genitofemoral nerve lies anterior to ureter c) female ureter lies in broad ligment and is crossed by uterine artery d) ureter crosses the ductus deferens and is crossed by seminal vesicle in male.
6. Which of the following is a direct branch of aorta?
a) superior suprarenal b) middle suprarenal c) inferior suprarenal d) none.
7. Accessory suprarenal gland may be seen in all except
a) spermatic cord b) epididymis c) broad ligament d) none.
8. Suprarenal cortex develops from
a) ectoderm b) mesoderm c) endoderm d) b + c.
9. First branch of abdominal aorta
a) celiac trunk b) inferior phrenic c) SMA d) IMA.
10. Which branch abdominal aorta arises at the same level as superior mesenteric artery?
a) superior suprarenal b) middle suprarenal c) renal d) b and c.
11. Paraaortic bodies are located on each side of
a) celiac trunk b) SMA c) IMA d) renal artery.
12. Which of the following is not true of lumbar plexus

a) formed by upper 4 lumbar nerves b) receives contributation from subcostal nerve c) located within the substance of psoas major d) medial cutaneous nerve of thigh is a branch of it.

13. Azygos vein pierces the diaphragm through

a) aortic opening b) vena caval opening c) oesophageal opening d) separate minor opening.

14. Number of ganglia in sympathetic chain

a) 3 b) 4 c) 5 d) 8.

15. Largest ganglion in the body

a) celiac b) nodose c) stellate d) ganglion impar.

16. Which of the following is not true regarding sympathetic chain

a) runs deep to medial arcuate ligament b) runs along the lateral margin of psoas c) has 4 ganglia d) upper two ganglia are fused.

17. Most fixed part of urinary bladder

a) neck b) base c) trigone d) no part is fixed.

18. Regarding trigone of bladder, not true is

a) located in base of bladder b) bar of marcier forms the base c) mucosa is smooth d) ureters open just superolateral to it.

19. Regarding male urethra which is not true

a) prostatic part is widest b) sphincter urethrae surrounds the prostatic part c) membranous part is vulnerable to injury in pelvic fracture d) S shaped when flaccid.

20. Glands of skene in females are homologous to male

a) cowper glands b) paraurethral glands c) prostate gland d) urethral glands.

21. Structures opening in penile urethra are all except

a) duct of bulbourethral glands b) duct of urethral glands c) lacunae of morgagni d) duct of Tyson's glands.

22. Ectopia vesicae is commonly associated with

a) hypospadius b) epispadius c) undescended testis

d) pseudohermaphroditism.

Ans :- 1) d, 2) a, 3) b, 4) c, 5) c, 6) b, 7) d, 8) b, 9) b, 10) b, 11) c, 12) d, 13) a, 14) b, 15) a, 16) b, 17) a, 18) d, 19) b, 20) c, 21) d, 22) b.

ANATOMY

MALE EXTERNAL GENITALIA AND REPRODUCTIVE ORGANS

1. There are 3 muscles in body of penis – two corpora cavernosa and one corpus spongiosa.
2. Tunica albuginea covers the corpora cavernosa. It has deep fibers enclosing each corpora cavernosa separately and superficial fibers enclosing both the corpora together.
3. Corpora cavernosa are forward continuation of crura and corpus spongiosa is forward continuation of bulb. Urethra is within spongiosa.
4. Buck's fascia or deep fascia of penis. Surrounds all the 3 erectile tissues.
5. Main artery of penis is internal pudendal artery – a branch of internal iliac artery. Superficial external pudendal artery – a branch of femoral artery supplies skin and fascia of penis.
6. Deep artery of penis supplies – corpora cavernosa. Dorsal artery of penis and artery of bulb supply corpus spongiosa. Both are branches of internal pudendal artery.
7. Scrotum is supplied by widely separatewd dermatomes (L_1, S_3). Hence spinal anaesthesia for whole scrotum is difficult.
8. Blood supply of scrotum : superficial and deep external pudendal, internal pudendal, cremesteric branch of inferior epigastric arteries.
9. Tunica vaginalis covers testis althrough except posterior border.
10. Mediastinum testis is thickened posterior border of tunica albuginea.
11. Seminiferous tubules anastomose with each other in mediastinum testis to form rete testis.
12. Testicular a) arterial supply - testicular artery – a branch of abdominal aorta.

b) Right testicular vein drains into IVC, left testicular vein into left renal vein. c) lymphatic drainage – preaortic and paraaortic d) nerve supply – T_{10} segmant.

13. Testicular descent : starts in 2^{nd} month of I.U.L. iliac fossa – 3^{rd} month, deep inguinal ring → 4-6^{th} month, inguinal canal – 7^{th} month, superficial inguinal ring at 8^{th} month, scrotum – 9^{th} month.
14. Male genital structures are predominantly developed from mesonephric / wolfian duct. Its development is influenced by mullerian inhibiting substance, testosterone and dihydrotestosterone. Structures developed are : trigone of bladder, epididymis, ejaculatory duct, seminal vesicles, ductus deferens.

15. Appendix of testis and vestigeal component are developed from paramesonephric duct. Appendix of epididymis develops from mesonephric duct.
16. Functional rete testis, vestigeal paradidymis, aberrant ductules develop from mesonephric tubules.
17. Phallus develops from genital tubercle, scrotum develops from genital swelling.
18. Varicocele is more common on left side as the left testicular vein drains into left renal vein at right angle, longer, crossed and compressed by colon.
19. Duct of seminal vesicle unites with the vas deferens to from the ejaculatory duct. This opens into prostatic urethra.
20. Prodstatic venous plexus communicates with vertebral venous plexus of Batson which is valveless. Prostatic carcinoma spreads to skull, vertebrae via this plexus.
21. Flow of semen in male genital tract: seminiferous tubules →epididymis →vas → ejaculatory duct → prostatic urethra→ rest of the urethra. Maturation of sperm occurs in epididymis (tail) and capacitation in female genital tract.
22. Ductus deferens is 45 cm long when uncurled. It courses along posterior border of testis →inguinal canal → pelvis. In pelvis, it hooks round inferior epigastric artery, crosses the obliterated umbillical artery, obturator and vesical vessels and ureter. At prostatic base, it joins the duct of seminal vesicle at acute angle to from ejaculatory duct.
23. Seminal vesicles lie between bladder and rectum.
Forms the main secretory fluid of semen. It is not a reservoir of sperms. Alkaline fluid contributes fructose and vesiculase to semen.
24. Prostate is separated from rectum by fascia of denonvillers.
25. Anterior lobe of prostate does not contain glandular tissue and hence does not form adenoma. In the posterior lobe adenoma does not occur, but carcinoma starts here. Median or middle lobe is a common site for carcinoma.
26. 75% of glandular tissue is in peripheral zone of prostate where carcinoma starts 25% of glandular tissue is in central zone which undergoes benign hypertrophy.
27. True capsule of prostate is actually condensation of peripheral part of prostate gland itself. No venous plexus is present here. False capsule is derived from pelvic fascia. Prostatic venous plexus is located on each side of it.

28. Prostatic urethra, prostatic utricle and openings of ejaculatory ducts are the 3 structures within the prostate gland.
29. Prostate is supplied by inferior vesical, middle rectal and internal pudendal arteries. Lymphatic drainage is to internal iliac and sacral nodes and partly to external iliac nodes.
30. Vertebral venous plexus of Batson : Valveless. Runs parallel to IVC and SVC and anastomose with them. 3 intercommunicating parts-epidural plexus, within vertebral bodies and infront as well as behind the vertebral bodies. Communicates above with intracranial venous sinuses and below with pelvic veins, portal vein, SVC, IVC. Spreads tumours and infection from prostate.
31. In females, skenes glands (paraurethral) are equivalent to prostate.
32. Primary sites for vertebral secondaries : breast (female), prostate (male), kidney (both sex).

FEMALE REDUCTIVE ORGANS

1. Ovarian fossa is bounded anteriorly by obliterated umbilical artery and posteriorly by ureter and internal iliac artery.
2. Ovary is covered by peritoneum except along anterior border or mesovarium. Ovary is connected to broad ligament (posterior layer) by mesovarium. It transmits vessels and nerves to / from ovary.
3. Ovarian artery arises from aorta below the origin of renal artery. It supplies : ovary, fallopian tube (lateral 1/3rd), sides of uterus, ureters. Uterine artery also supplies part of ovary. Hence, ovarian artery supplies part of uterus and uterine artery supplies part of ovary.
4. Parts of fallopian tube from medial to lateral : intra mural or interstitial, isthmus, ampulla, infundibulum or fimbrial part. The largest fimbria is called ovarian fimbria (does not arise from ovary). Ampulla is the widest and longest part and fertilization occurs here. Interstitial part is narrowest and shortest. Fallopian tube is supplied by both uterine and ovarian artery.
5. Normal anteversion (angle between long axes of uterus and vagina) = 90°. Normal anteflexion = 25°. Anteversion is maintained by uterosacral and round ligaments.
6. Uterine fundus lies above the openings of fallopian tubes.
7. Arbor – vitae-uteri are mucosal folds of cervix resembling branches of tree.
8. Broad ligament is a fold of peritoneum connecting uterus with lateral pelvic wall. Its upper border is free and contains fallopian tube. Suspensory ligament

of ovary = infundibulopelvic ligament is the part of broad ligament from ovary & infundibulum of fallopian tube to lateral pelvic wall.

9. Contents of broad ligament : uterine tube, round ligament, ligament of ovary, uterine and ovarian vessels and nerves, epoophoron and paroophoron, lymph nodes.

10. Patency of uterine tube is tested by Rubin's insufflation test and hysterosalpingo graphy, sono hysterosalpingography.

11. Broad ligament is a peritoneal ligament. Round ligament, transverse cervical ligament and uterosacral ligament are fibromuscular ligaments. Broad ligament, as a support to uterus is, not significant but the other 3 are mechanical / primary supports. The muscular / active supports include : pelvic diaphragm, urogenital diaphragm and perineal body.

12. Pelvic diaphragm resists rise of intra – abdominal pressure.

13. Urogenital diaphragm is formed by 2 deep transversus perinii and one sphincter urethrae muscle. Sphicter urethrae forms exernal urethral sphincter.

14. 10 muscles are attached to perineal body. It anchors the pelvic diaphragm and maintains the integrity of pelvic floor.

15. Mackenrodt's ligament or cardinal ligament of uterus is transverse cervical ligament – is a fan shaped condensation of pelvic fascia on either side of cervix above levator ani. It is a mechanical support of uterus.

16. Round ligament is 10-12 cm long, lies within broad ligament, traverses the inguinal canal and merges with labium majus. It maintains angle of anteversion along with uterosacral ligament. In the inguinal canal, it comes along with a peritoneal process which may persist after birth as canal of Nuck.

17. Uterine artery supplies : uterus, ovary, fallopian tube, ureter, structures within broad ligament. Uterus, fallopian tubes are in turn, partly supplied by ovarian artery.

18. Lymphatic drainage of uterus and cervix : fundus and upper body → aortic nodes + partly superficial inguinal nodes. Lower body → external iliac nodes. Cervix → external iliac, internal iliac, sacral.

19. Vagina : anterior wall 7.5 – 8cm, posterior wall 9-10 cm. Lined by nonkeratinising stratified squamous epithelium. 4 fornices posterior is the deepest and anterior is the shallowest. Supplied by vaginal, middle rectal and internal pudendal arteries.

20. Lymphatic drainage of vagina : upper third – external iliac, middle third internal iliac, lower third – superficial – inguinal.

21. Upper 2/3rd of vagina is pain insensitive, supplied by autonomic nerves, Lower 1/3rd is pain sensitive, supplied by pudendal nerve.

22. Vagina has no gland of its own. It maintains its moisture by secretions from cervical and greater vestibular glands.

23. Mullerian or paramesonephric duct, located lateral to mesonephric duct form most of the female genitalia – uterus, fallopian tube, cervix.

24. Wolfian duct /mesonephric duct forms : trigone of bladder, gartner's duct.

25. Vestigenal elements in female = epoophoron, parophoron and aberrant ductules.

26. Gartner's duct : develops from mesonephric duct.Ends near the margin of hymen. May form Gartner duct cyst in the anterior or lateral wall of vagina.

27. Development of external genitalia : a) labia majora →genital swelling, b) labia minora → urethral fold c) clitoris → genital tubercle d) vestibule – urogenital membrane.

PERINEUM

1. Pelvic diaphragm is formed by levator ani and pubococcygeus.

2. External anal sphineter surrounds the whole length of anal canal.

3. Pudendal canal lies on the lateral wall of ischiorectal fossa just above sacrotuberous ligament formed by splitting of fascia lunata. Pudendal nerve supplies – skin, muscles, mucus membrane of both urogenital and anal triangles.

4. Colles' fascia is deep membranous layer of superficial perineal fascia. It is continuous with the posterior border of perineal membrane.

5. Perineal membrane is thickend to form transverse perineal ligament. The gap between transverse perineal ligament and arcuate pubic ligament transmits deep dorsal vein of penis.

6. Structures piercing the perineal membrane :

a) Male : urethra and urethral artery, deep and dorsal artery of penis, artery and nerve to bulb, duct of bulbourethral glands, branches of perineal nerve.

b) Female : urethra, deep and dorsal artery of penis, vagina, posterior labial arteries and nerves, artery and nerve to bulb, branches of perineal nerve.

7. Deep perineal space / pouch is the space between superior and inferior fascia of urogenital diaphragm.

8. Deep perineal muscles : sphincter urethrae, deep transversus perineii. Superficial muscles : Ischiocavernosus, bulbospongiosus and superficial transversus perneii.

9. Gynaecological perineum : space between posterior commissure and anus. It is 2.5 cm in length.

10. Corpus cavernosa (2) are present in clitoris (like penis) but corpus spongiosa is absent (unlike penis).

11. Contents of superficial perineal space : root of penis / body of clitoris, superficial perineal muscles (see point no – 8), branches of perineal nerve and artery, branches of artery of penis, ducts of bulbourethral glands in males / greater vestibular glands and ducts in females.

12. Contents of deep perineal space : part of urethra (+vagina in females), deep perineal muscles (see point no – 8), dorsal nerve and artery of penis / clitoris, muscular branches of perineal nerve, bulbourethral gland in males.

13. Pudendal nerve is the principal nerve of perineum and external genitalia. It arises from sacral plexus (S_2, S_3, S_4). Branches are inferior rectal, perineal, dorsal nerve of penis / clitoris.

14. Internal pudendal artery : principal artery of perineum and external genitalia. It is the smaller terminal branch of internal iliac artery (anterior division). Passes in front of piriformis and through the lesser sciatic foramen.
Branches : inferior rectal, perineal, artery of penis / clitoris (like the branches of pudendal nerve).

15. Narrowest part of male urethra : external meatus followed by, membranous part.

PELVIC WALLS

1. After birth, proximal part of umbilical artery persists to form first part of superior vesical artery and the distal part forms medial umbilical ligament.

2. Branches of anterior division of internal iliac artery : Male : superior vesical, obturator, middle rectal, inferior vesical, inferior gluteal, internal pudendal. Female : no inferior vesical artery. There are vaginal and uterine artery.

3. Branches of posterior division of internal iliac artery : superior gluteal, lateral sacral, illio-lumbar.

4. External illiac nodes (8-10) receive lymphatics from inguinal lymph nodes, infraumbillical anterior abdominal wall, membranous urethra, prostate, base of bladder, cervix, part of vagina. Efferents pass to common illiac nodes.

5. Internal illiac nodes receive lymphatics from deep perineum, pelvic viscera, muscles of buttock and back of thigh. Efferents to common illiac nodes.
6. Common illiac nodes receive lymphaties from external and internal illiac nodes. Efferents to lateral aortic nodes.
7. Sacral plexus is formed by lumbosacral trunk, S_1 –S_3 (ventral rami) and part of S_4.
8. Important nerve supply : Pyriformis → S_1, S_2. Obturator internus → L_5, S_1, S_2. Levator ani, coccygeus → S_4.
9. There are 4 sympathetic ganglia on each side in the pelvic sympathetic system and one in front of coccyx (ganglion impar).
10. Levator ani has 2 parts : illiococcygeus, pubococcygeus. It fixes the perineal body and prevents increased abdominal pressure.
11. Strongest ligament in the body : illio – lumbar.
12. Greater and lesser sciatic foramina are separated by : sacrospinous ligament.

ANATOMY MCQS

1. Which of the following is true of female clitoris?
a) no corpus spongiosa b) single corpora cavernosa c) no corpus cavernosa
d) none.
2. Which of the following is not true of penis?
a) deep artery of penis supplies corpora cavernosa b) dorsal artery of penis supplies corpus spongiosa c) both are branches of internal pudendal artery
d) urethra runs between two corpora cavernosa.
3. Lymphatic drainage from testis is to
a) superficial inguinal nodes b) deep inguinal nodes c) external illiac nodes d) pre and paraaoetic nodes.
4. Regarding testicular descent which is not true?
a) starts at 4^{th} month I.U.L. b) seen in deep ring at 4 – 6^{th} month c) seen in inguinal canal in 7^{th} month d) reaches scrotum at 9^{th} month.
5. Appendix of testis develops from
a) mullerian duct b) wolfian duct c) mesonephric tubules d) paramesonephric tubules.
6. Ejaculatory duct

a) opens into prostatic urethra b) develops from paramesonephric duct c) both are true d) both are false.

7. Sperms are fully mature in

a) head of epididymis b) fail of epididymis c) vas deferens d) female genital tract.

8. Fructose of semen comes from

a) seminal vesicle b) vas deferens c) prostate d) epididymis.

9. Regarding prostate not true is

a) carcinoma is common in peripheral zone b) 25% of glandular tissue is in peripheral zone c) prostatic urethra and ejaculatory ducts are within the gland d) supplied by inferior rectal and vesical arteries.

10. Anterior boundary of ovary is formed by

a) obliterated umbilical artery b) internal illiac artery c) ureter d) none.

11. Part of ovary not covered by peritoneum

a) anterior border b) posterior border c) medial border d) lateral border.

12. Ovarian artery supplies all except – a) ovary b) uterus c) ureter d) none.

13. Widest part of fallopian tube

a) intramural b) isthmus c) ampulla d) infundibulum.

14. Regarding uterine angles not true is

a) normal anteversion - 90° b) normal anteflexion 125° c) anteversion is maintained by broad ligament d) uterosacral and round ligaments participate in maintaining anteversion.

15. Fallopian tube is contained within

a) upper margin of broad ligament b) lower margin of broad ligament

c) infundibulopelvic ligament d) round ligament.

16. Broad ligament contains all except

a) round ligament b) fallopian tube c) mesovarium d) ovarian vessels.

17. Which of the following provides weakest support to uterus?

a) broad ligament b) mackenrodt ligament c) round ligament d) uterosacral ligament.

18. Urogenital diaphragm is formed by

a) 2 deep transversus perinii b) sphincter urethrae c) a + b d) a+b+ 1 superficial transversus perinii.

19. Lymphatics from lower 1/3rd of vagina drains into

a) superficial inguinal b) deep inguinal c) external illiac d) internal illiac nodes.

20. Gartner's duct develops from
a) mesonephric duct b) paramesonephric duct c) epoophoron d) paraphooron.
21. urethral fold gives rise to – a) labia majora b) labia minora c) clitoris d) none.
22. Pelvic diaphragm is formed by
a) pubococcygeus and ischiococcygeus b) levator ani and pubococcygeus
c) levator ani and ischiococcygeus d) all.
23. Which of the following is not a deep perineal muscle?
a) sphincter urethrae b) deep transversus perinii c) ischiocavernosus d) none.
24. Deep perineal space contains all except
a) urethra b) deep perineal muscles c) dorsal artery of penis / clitoris d) duct of bulbourethral gland in male and greater vestibular gland in female.
25. All are branches of pudendal nerve except
a) inferior vesical b) inferior rectal c) dorsal nerve of penis / clitoris d) perineal.
26. In females, all are branches of anterior division of internal illiac artery except
a) superior vesical b) inferior vesical c) inferior gluteal d) internal pudendal.
27. All are branches of posterior division of internal illiac artery except
a) superior gluteal b) inferior gluteal c) iliolumbar d) lateral sacral.
28. Predominant lymphatic drainage of cervix is to
a) external illiac nodes b) internal illiac nodes c) common illiac nodes d) pre and paraaortic nodes.
29. Pyriformis is supplied from – a) L_5, S_1 b) S_1, S_2 c) $S_{2,3,4,}$ d) $L_5 – S_2$.
30. Strongest ligament of body is
a) ilio – lumbar b) anterior cruciate ligament c) ligamentum patellac d) sacro – tuberous ligament.

Ans :- 1) a, 2) d, 3) d, 4) a, 5) a, 6) a, 7) b, 8) a, 9) d, 10) a, 11) a, 12) d, 13) c, 14) c, 15) a, 16) c, 17) a, 18) c, 19) a, 20) a, 21) b, 22) b, 23) c, 24) d, 25) a, 26) b, 27) b, 28) a, 29) b, 30) a.

ANATOMY

HEAD, NECK, BRAIN

1. Structures passing through different foramina at the base of skull : a) Foramen ovale : mandibular nerve, lesser petrosal nerve, accessory meningeal

artery, emissary vein. b) Foramen rotundum : maxillary nerve c) foramen spinosum – middle meningeal artery d) foramen lacerum (upper part) : internal carotid artery, venous and sympathetic plexus, greater petrosal nerve, (joins deep petrosal nerve to form nerve of pterygoid canal) e) carotid canal : internal carotid artery, venous and sympathetic plexus. F) hypoglossal canal : hypoglassal nerve, meningeal branch of ascending pharyngeal artery, emissary vein.

2. Relationship of sella turcica : tuberculum sellae in front, dorsum sellae behind. Superolateral angles of dorsum sellae forms posterior clinoid process.

3. a) Cilliary ganglion has sensory root from nasocilliary nerve and motor ganglion at Edinger – westphal nucleus. b) Otic ganglion has sensory branch from auriculo temporal nerve and motor root from nerve to medial peterygoid.

4. Structures passing through superior orbital fissure : lacrimal, frontal trochlear, nasocilliary and oculomotor nerve, superior ophjthalmic vein, anastomotic branch of middle meningeal artery.

5. Derivatives of pharyngeal / branchial arch :

Arch	Muscul skeletal element	Nerve
a) 1st Meckel's cartilage	Incus,muscles of Mastication	V1 of 5th nerve. = mandibular nv.
b) 2nd Reichart's cartilege	Stapes, styloid process, stylohyoi ligament, Lesser cornu and upper half of hyoid, muscle of facial expression.	7th nerve
c) III rd.	Greater cornu and lower half of hyoid, stylopharyngeus.	9th nerve.
d) IV th & VI th arch.	Laryngial cartileges, cricothyroid muscles and pharyngeal constrictors	External and recurrent laryngial nv.

6. Derivatives of pharyngeal pouches

Pouch	Derivative
● Dorsal part of I & II (tubo tympanic recess)	● Auditory tube, mastoid antrum.
● Ventral part of II.	● palatine tonsil.
● III	● Thymus, inferior parathyroid,
● IV	● Superior parathyroid.
● V (ultimobranchial body)	● Parafollicular 'c' cells of thyroid.

7. Structures passing through foramen transversarium : vertebral artery, vein, branch from inferior cervical ganglion.

8. Dangerous area of scalp : loose areolar tissue layer.

9. Muscle of a) Smiling – zygomaticus major b) sadness : levator labi superioris, angularis. c) Anger : dilator naris, depressor septi d) grief – depressor anguli oris.

10. Muscles of mastication : temporalis, massetor, lateral and medial pterygoid, tensor & levator veli palatini, myelohyoid, anterior belly of diagastric.

11. a) In supranuclear lesion of facial nerve, only lower part of opposite half of face is paralysed. b) In infranuclear lesion (Bell's palsy) the whole of the face of same side is paralysed.

12. Anaesthetist's artery : facial artery.

13. a) Lacrimal gland : located in the antero lateral part of roof of bony orbit. J shaped. Indented by levator paepebrae superioris. Orbital part is larger than palpebral part.

b) Nasolacrymal duct : 18 mm. valve of Hasner. Open into inferior meat us.

14. Contents of carotid sheath : common carotid artery, internal carotid artery, internal jugular vein, vagus nerve.

15. Common malignancy to spread to left supraclavicular lymph node (virchow's / scalene nodes) : CA stomach, testis.

16. Vertebral artery is a branch of 1st part of subclavian artery. It is the first and largest branch of sub-clavian artery. Two vertebral arteries join to form basilar artery that runs in prepontine cistern.

17. Froin's syndrome : obstruction in sub arachnoid space by spinal tumour causes yellow discolouration of fluid below the level of obstruction. High protein – normal cell count (albunio – cytological dissociation). Queckenstedi's test : No sudden rise fall of CSF pressure by coughing or jugular comnpression.
18. Meckel's cave (= trigeminal cave) : A recess of dura matter in relation to attached margin of tentorium.
19. Cavernous sinus : paired on either side of body of sphenoid bone. Floor is formed by endosteal dura matter. Roof, lateral and medial wall-formed by meningeal dura matter. Structures passing in the lateral wall – 3rd, 4th, ophthalmic and maxillary nerves + trigeminal ganglion. 6th nerve and internal carotid artery with its venous and sympathetic plexus run through the centre of the sinus. Tributaries : superior ophthalmic vein, inferior ophthalmic vein, central retinal vein, superior, middle and inferior cerebral veins. Right and left intercommunicate. Drain into – transverse sinus, internal jugular vein, facial vein, pterygoid plexus. In carotid cavernous fistula, superior opthalmic vein is enlarged.
20. a) Superior sagittal sinus : starts by union of tiny meningeal veins and ends by being continuous with right transeverse sinus. May be continuous with left also. b) Inferior sagittal sinus joins great vein of Galen to form straight sinus. Straight sinus is continuous with left transverse sinus (may be right also). Each transverse sinus becomes continuous with sigmoid sinus. Sigmoid sinus becomes continuous with internal jugular vein. Confluence of venous sinuses is called 'torcula'.
21. There are paired and unpaired dural venous sinuses. Superior sagittal, inferior sagittal, straight sinus – are unpaired. Transeverse sinus, sigmoid sinus, cavernous sinus, super and inferior petrosal sinuses are paired.
22. Cavenous sinus drains into transverse sinus via superior petrosal sinus and into internal jugular vein via inferior petrosal sinus.
23. Middle meningeal artery : A branch of maxillary artery (1st part). Enters the middle cranial fossa via foramen spinosum. It is the artery of extradural haemorrhage – frontal (anterior) branch is commonly involved which is larger than pariental branch.
24. Cervical part of ICA has no branch. Hypophyseal branches (to pituitary) arise from cavernous part. Cerebral part gives rise to :- anterior and middle cerebral, posterior communicating, ophthalmic, anterior choroidal arteries.

25. Extra ocular muscles include : a) Voluntary : all recti (4), obliques (2), levator palpebrae superioris (b) involuntary : superior tarsal (deeper portion of levator palpebrae superioris), inferior tarsal and orbitalis. All recta are inserted into sclera posterior to limbus. Nerve supply : SO – 4^{th} (trochlear), LR 6^{th} and all others – 3^{rd}.

26. Optic nerve : Formed by axons of ganglion cell layer of retina 4 cm long. Enclosed by 3 meningeal sheaths.

27. Oculomotor (3^{rd} nerve) : Somatic – motor nerve. Innervates both extra ocular and intraocular muscles. Causes – contration of pupil and accommodation, somatic afferent and proprioception to muscles of eyeball (releyed to mesencephalic nucleus of 5^{th} nerve. Nucleus located in midbrain at the level of superior colliculus. Edinger west phal nucleus gives fibres to cilliaris and constrictor papillae. Effects of 3^{rd} nerve palsy : ptosis, mydriasis, mild proptosis, lateral squint, diplopia, loss of accommodation. Supranuclear paralysis of 3^{rd} nerve causes loss of conjugate movement of eye.

28. Weber's syndrome : midbrain lesion with ipsilateral paralysis of 3^{rd} nerve and contralateral hemiplegia.

29. Cilliary ganglion : peripheral parasympathetic ganglion in the course of 3^{rd} nerve. Lies near the apex of orbit between optic nerve and lateral rectus tendon. Motor root from nerve to inferior oblique and sensory root from nasocilliary nerve.

30. 6^{th} nerve (abducent) has longest intracranial course. Compressed most commonly by pathologies (tumour, infection etc.)

31. Lacrimal nerve is the smallest and frontal nerve is the largest branch of ophthalmic nerve.

32. Terminal branches of external carotid artery : superficial temporal, maxillary.

33. Infra hyoid muscles of neck : sternohyoid, sternothyroid, thyrohyoid, omohyoid. All are supplied by ansa cervicalis except thyrohyoid which is supplied by C_1 through hypoglossal nerve.

34. Supra hyoid muscles : diagstric, stylohyoid, mylohyoid and geniohyoid. Geniohyoid is supplied by C_1 through 12^{th} nerve. Hyoglossus by 12^{th} nerve.

35. Nerves in carotid triangle : 10, 11, 12 and superior laryngeal branch of 10^{th}.

36. Carotid sinus is a bulbous dilatation located at the termination of CCA (origin of ICA) and acts as baroreceptor. Carotid body is located behind the bifurcation of CCA. It is supplied mainly by 9^{th} nerve and partly by 10^{th} nerve.
37. Ansa cervicalis : thin nerve loop in the anterior wall of carotid sheath. Supplies the infrahyoid muscles except thyrohyod. Superor root is a continuation of descending branch of 12^{th} nerve and fibres come foom C_1 nerve. Inferior root comes from C_2, C_3 nerves (descending cervical nerves).
38. Parotid duct : 5 cm long. Emerges from middle of anterior border. Runs on masseter. Opens into vestibule of mouth opposite 2^{nd} upper molar.
39. Nerve supply of parotid : secretomotor from parasympathetic via auriculotemporal. Relay in otic ganglion.
40. 7^{th} nerve : Parasympathetic, secretomotor fibers from 7^{th} nerve supplies sub mandibular, sub lingual and lacrimal gland but not parotid. Fibres of 7^{th} nerve arise from 4 nuclei in the lower pons important branches of 7^{th} nerve. Chorda tympani, greater petrosal, nerve to stapedeus, posterior auricular. Chorda tympani arises from vertical part 6 mm avbove the stylomastoid foramen. 3 important ganglia in relation to 7^{th} nerve – geniculate, pterygo palatine and sub mandibular.
41. Important branches of maxillary artery : middle meningeal, accessory meningeal, inferior alveolar, anterior tympanic, deep auricular, greater palatine. Supply muscles of mastication.
42. Mandibular nerve : largest of 3 branches of 5^{th} nerve. Nerve of 1^{st} arch. Carries both sensory and motor nerves. Important branches – auriculotemporal lingual, inferior alveolar. Motor root tested clinically by clenching teeth.
43. Otic ganglion : parasympathetic ganglia supplying secretomotor fibers to parotid. Related to mandibular nerve, but functionally a part of glossopharyngial (9^{th}) nerve. Motor root comes from lesser petrosal nerve and sensory root from auriculo temporal nerve.
44. Submandibular duct : 5 cm long. Arises from anterior end of deep part. Crossed by lingual nerve. Opens on floor of moluth at the side of frenulum at the summit of sublingual papilla.
45. Blood supply of thyroid : inferior thyroid artery from thyrocervical trunk (branch of subclavian artery), superior thyroid artery from external carotid and

lowest thyroid or arteria thyroidea ima (present in 3 %) from brachiocephalic trunk or arch of aorta directly.

46. Branches of subclavian artery : vertebral, internal thoracic (mammary), thyrocervical trunk, costocervical trunk, dorsal scapular. Both thyrocervical trunk and internal thoracic arteries arise from 1st part of subclavian artery (former from the front and the latter from behind). Costocervical trunk arises from 2nd part.

47. Internal jugular vein begins as a continuation of sigmoid sinus at the jugular foramen, and ends by joining with subclavian vein to become brachiocephalic vein posterior to sternal end of clavicle. Two brachiocephalic veins join at the level of 1st costal cartilege to become SVC.

48. Glossopharyngial nerve : Nerve of 3rd arch. Motor to stylopharyngius, secretomotor to parotid, gustatory to posterior third of tongue (anterior 2/3rd by chorda tympani of 7th nerve) and sensory to pharynx, tonsil, posterior third of tongue, carotid body and carotid sinus. Important braches – lingual, tympanic.

49. 4 nuclei of vagus : located in medulla. N. of tractus solitarius, N. ambiguous, dorsal nucleus of vagus, N. of spinal tract of trigeminal.

50. Paralysis of vagus nerve produces : nasal regurgitation, nasal twang of voice, hoarseness, cadaveric postion of cord, dysphagia.

51. Important branches of vagus : a) recurrent laryngeal : courses in the tracheo – esophageal groove. Supplies all intrinsic muscles of larynx except cricothyroid. b) Superior laryngeal – divides into external and internal laryngeal c) meningeal.

52. Sternocleidomastoid and trapezeus are supplied by spinal accessory (11th) nerve.

53. All muscles of tongue are supplied by hypoglassal nerve except palatoglossus which is supplied by cranial accessory nerve through vagus and pharyngeal plexus.

54. Cervical sympathetic ganglia : total 3. Superior is formed by fusion of upper 4, middle by 5th & 6th and inferior by 7th and 8th. When 1st thoracic ganglia is fused with the inferior cervical ganglia, it is called cervico-thoracic or stellate ganglia.

55. Horner syndrome : enophthalmos, ptosis, miosis, anhydrosis, loss of cilio-spinal reflex. Occurs due to injury / compression to cervical sympathetic trunk.

56. Cervical plexus is formed by ventral rami of upper 4 cervical nerves.
57. Phrenic nerve : mixed nerve conveys motor fibers to diaphragm and receives sensory fibers from diaphragm. Arises from $C_{3, 4, 5}$ – chiefly C_4. Formed at the level of thyroid cartilege.
58. Prevertebral space contains : vertebral artery, 4 muscles, joints. 1st 3 parts of vertebral artery are in neck. 4th part enters the cranial cavity through foramen magnum. Second part traverses through foramen transversarium of $C_1 – C_6$ vertebrae.
59. Prevertebral muscles : longus colli, longus capitis, rectus capitis anterior and lateralis.
60. Anterior longitudinal ligament and posterior longitudinal ligament are anterior and posterior to the vertebral bodies respectively and ligamentum flavum is posterior to spinal canal.
61. Ligaments connecting axis with the occipital bone : membrana tectoria, cruciate ligament, apical ligament of dens, alar ligament. They support atlantooccipital as well as atlanto-axial joints. Membrana tectoria is upward continuatioin of posterior longitudinal ligament.
62. Flax cerebri encloses : superior sagittal sinus, inferior sagittal sinus and straight sinus. Tentorium cerebelli encloses transverse sinuses, superior petrosal sinus.
63. Substantia gelationosa : Found at the tip of posterior horn. Extends through the entire extent of spinal cord. Lamina II of cord. Relay station of pain and temperature fibres. Its axons give rise to lateral spinothalamic tract.
64. Rubrospinal tract : Efferent pathway for cerebellum and corupus striatum. Starts at the red nucleus of midbrain. Crossed fibers, spinal segment $C_1 – C_5$. 1st termination is in anterior grey column cells.
65. Location of cranial nerve nuclei a) 1st and 2nd → forebrain b) 3rd and 4th → midbrain c) 5th – 8th → pons d) 9th – 12th → medulla. Of these, 3rd nerve is at the level of superior colliculus, 4th nerve at the level of inferior colliculus, 8th nerve at the junction of pons and medulla.
66. Location of specific nuclei : a) Medulla → dorsal nucleus of vagus, tractus solitarius, gracillis, cuneatus, ambiguous, arcuate, inferior olivary, b) Pons → superior and inferior salivatory, vestibular, cochlear. c) Midbrain → Edinger – westphal, pretectal, red.
67. Important centres in medulla – respiratory, cardiac, vasomotor centres.

68. Bulbar paralysis : paralysis of muscles supplied by 9 – 12 cranial nerves arising from medulla.
69. Trapezoid body : A transverse band of fibers behind ventral part of pons. Formed by the fibres arising in the cochlear nuclei of both sides. Part of auditory pathway.
70. Tectum of midbrain is composed of superior (on each side) and inferior (on each side) colliculi. Midbrain anterior to cerebral aqueduct is called cerebral peduncle.
71. Medial and lateral geniculate bodies constitute metathalamus. Located posterolateral to midbrain. Superior colliculus is connected to LGB and inferior colliculus to MGB. LGB is in visual pathway and MGB is in auditory pathway.
72. Red nucleus : a) Afferents from → superior cerebellar peduncle, globus pallidus, subthalamic nucleus, cerebral cortex b) efferents to : spinal cord via rubrospinal tract, reticular formation, thalamus, olivary nucleus and subthalmic nucleus. [Note : both afferent from and efferent to subthalamic nucleus] inhibits muscle tone.
73. a) Central sulcus of Rolando divides frontal lobe from parietal lobe. b) Calcrine sulcus divides parietal lobe from occipital lobe.
74. Diencephalon is composed of : thalamus, metathalamus (LGB and MGB), epithalamus, hypothalamus, subthalamus.
75. LGB has 6 layers : 1, 4, 6 receive optic fibers from contralateral side and 2, 3, 5 receive optic fibres from same side.
76. Thalamus : composed of grey matter. Located in the lateral wall of 3rd ventricle the main relay station(except olfactory).
77. Pineal body : projects between two superior colliculi. Located below splenium of corpus callosum and is separated from corpus collosum by tela choroidea of 3rd ventricle.
78. Hypothalamus : the head ganglion of autonomic nervous system. Located on floor and lateral wall of 3rd ventricle (below thalamus). Important nuclei → supra optic, paraventricular, ventromedial, dorsomedial, tuberal, mamillary body.
79. Basal ganglia = caudate nucleus + putamen + globus pallidus. Caudate N + putamen = striatum.
80. Corpus callosum : largest commissure of brain. Connect the two cerebral hemispheres 4 parts. From anterior to posterior genu, body, splenium and

rostrum lies posteroinferior to genu. Splenium is thickest. Rostrum and forceps minor (genu) connect to frontal lobes. Forceps major (splenium) connects two occipital lobes. Lateral ventricles become wide apart and parallel in callosal agenesis.

81. Internal capsule : V shaped. Separates the parts of corpus striatum. Contains fibers from and to the cerebral cortex.

82. Important pathways : a) cortico spinal = pyramidal tract : motor cortex → internal capsule → brainstem → decussation at medulla → spinal cord → effector region. b) Visual : retina → optic nerve → optic chiasm → optic tract → LGB → optic radiation (superior colliculus and pretectal nucleus involved) → visual cortex in occipital lotbe. c) Auditory : cochlear nuclei → ± crossing at trapezoid body → superior olivary nuclei → inferior colliculus → MGB → auditory radiation → auditory cortex (temporal).

83. Important areas in cerebral cortex.

Area	Location (lobe)	Area number (Brodmann's)
a) Precentral gyrus and paracentral lobule. Motor area.	Frontal	4.
b) Frontal eye field in middle frontal gyrus.	Frontal	6, 8
c) Broca's motor speech area	Frontal	44, 45
d) Somato sensory	Parietal	3, 1, 2
e) Visual cortex in and around post calcarine sulcus.	Occipital	17
f) Visual association visuo – psychic	Occipital	18, 19
g) Auditory : superior temporal and anterior transverse temporal gyrus	Temporal	41, 42
h) Wernicke's	Temporal	22

ANATOMY MCQS

1. Structure passing through foramen rotundum
a) middle meningeal artery b) maxillary nerve c) greater petrosal nerve d) mandibular nerve.
2. Middle meningeal artery passes through
a) foramen lacerum b) foramen ovale c) foramen spinosum d) foramen rotundum.
3. All of the following structures pass through foramen ovale except
a) manidibular nv. b) greater petrosal nerve c) accessory meningeal artery d) emissary vein.
4. Greater petrosal nerve passe through
a) foramen lacerum b) foramen rotundum c) foramen ovale d) foramen spinosum.
5. Otic ganglion receives sensory branch from
a) greater auricular nerve b) auriculo temporal nerve c) marginal mandibular nerve d) facial nerve.
6. All of the following pass through superior orbital fissure except
a) 3rd nerve b) lacrimal nerve c) nasociliary nerve d) superior ophthalmic artery.
7. Nerve of 1st arch is
a) V_2 segment of 5th nerve b) maxillary nerve c) mandibular nerve d) facial nerve.
8. Greater cornu of hyoid bone arises from
a) 1st arch b) 2nd arch c) 4th arch d) none.
9. 7th nerve is a derivative of – a) 1 arch b) 2nd arch c) 3rd arch d) 4th arch.
10. Pharyngial pouch giving rise to palatine tonsil
a) 1st b) dorsal part of 2nd c) ventral part of 2nd d) 3rd.
11. Which of the following statements is wrong?
a) superior parathyroid develops from 4th pharyngeal pouch b) inferior parathyroid develops from 3rd pouch c) parafollicular 'c' cells of thyroid develops from 5th pouch d) palatine tonsil develops from 3rd pouch.
12. Foramen transversarium of C_7 vertebrae give passage to all except

a) vertebral artery b) vertebral vein c) accessory branch of subclavian artery d) branch of inferior cervical ganglion.

13. Which of the following is not a muscle of mastication

a) buccinator b) masseter c) both pterygoids d) temporalis.

14. Which of the following is anaesthetist's artery?

a) lingual b) facial c) mandibular d) external carotid.

15. Which of the following is a content of carotid sheath?

a) 7^{th} nerve b) 8^{th} nerve c) 9^{th} nerve d) 10^{th} nerve.

16. Vertebral artery is a branch of

a) sub clavian A b) brachiocephalic trunk c) left common carotid A d) aortic arch.

17. First branch of subclavian artery

a) thyrocervical trunk b) costocervical trunk c) internal mammary A d) subclavian A.

18. Albumino – cytological dissociation is a feature of

a) Froin's syndrome b) Horner's syndrome c) Wilson's disease d) obstructive hydrocephalus.

19. Structures passing through cavernous sinus are all except

a) 3^{rd} nerve b) 4^{th} nerve c) 6^{th} nerve d) 7^{th} nerve.

20. Structure enlarged in carotico – cavernous fistula

a) superior ophthalmic vein b) inferior ophthalmic vein c) superior orbital vein d) central retinal vein

21. Pulsatile exopthalmos with enlarged superior ophthalmic vein is a feature of

a) cavernous aneurysm b) cartico – cavernous fistula c) hemangioma of cavernous sinus d) paraganglionoma of 6^{th} nerve.

22. Inferior sagittal vein joins

a) great vein Galen b) transverse sinus c) sigmoid sinus c)straight sinus.

23. Transverse sinus is continuous with a) sigmoid sinus b) superior sagittal sinus c) straight sinus d) inferior sagittal sinus.

24. Torcula is a) jugular bulb b) carotid bulb c) confluence of dural venous sinuses d) small aneurysm of basilar A.

25. Which of the venous sinuses is unpaired ?

a) cavernous sinus b) straight sinus c) transverse sinus d) sigmoid sinus.

26. Which of the following is not true about middle meningeal artery a) is a branch of mandibular artery b) passes through foramen spinosum c) rupture causes extradural haemorrhage d) anterior branch is more commonly involved in EDH.

27. Lateral rectus muscle is supplied by _____ nerve a) 3rd b) 4th c) 6th d) 7th.

28. Nucleus of oculomotor nerve is located in a) thalamus b) midbrain c) pons d) medulla.

29. 3rd nerve palsy causes all except a) ptosis b) mydriasis c) diplopia d) medial squint.

30. Nerve most likely to be compressed in intracranial pathology a) 6th b) 7th c) 9th d) 10th.

31. Infrathyroid muscles include all except a) sternohyoid b) sternothyroid c) thyrohyoid d) myelohyoid.

32. Thyrohyoid and geniohyoid are supplied by a) C_1 through 12th nerve b) C_2 through 12th nerve c) Ansa cervicalis d) recurrent laryngeal nerve.

33. Ansa cervical supplies all except a)sternohyoid b) sternothyroid c) thyrohyoid d) omohyoid.

34. Cranial nerves passing through carotid triangle are all except a) 9, b) 10 c) 11 d) 12.

35. 7th nerve supplies all glands except a)submandibular b) parotid c) sublingual d) lacrimal.

36. Regarding parotid duct not true is a) 5 cm long b) emerges from anterior border c) runs on buccinator d) opens opposite 2nd upper molar.

37. Nerve to stapedius is a branch of a) 6th nerve b) 5th nerve c) 7th nerve d) 8th nerve.

38. Ganglia not related to 7th nerve a) otic b) pterygopalatine c) geniculate d) mandibular.

39. Internal jugular vein begins as a continuation of a) transverse sinus b) straight sinus c) sigmoid sinus d) inferior sagittal sinus.

40. Nerve of 3rd arch is a) Vth b) VII th c) VIII th d) IX th.

41. Cranial accessory nerve supplies a) genioglossus b) palatoglossus c) hyoglossus d) all.

42. Anterior two third of tongue is supplied by (sensory) a) chorda tympani b) glossopharyngial c) vagus d) cranial accessory.

43. Trapezeus is supplied by _____ nerve a) 9th b) 10th c) 11th d) 12th.
44. Stellate ganglion is formed by fusion of _____ ganglia a) superior and middle cervical ganglia b) middle and inferior cervical ganglia c) inferior cervical and 1st thoracic ganglia d) 1st and 2nd thoracic ganglia.
45. Cervical plexus is formed by ventral rami of a) upper 4 cervical nerves b) lower 4 cervical nerves c) all cervical and thoracic nerve d) lower 4 cervical and 1st thoracic nerve.
46. Principal contribution in phrenic nerve comes from a) C_3 b) C_4 c) C_5 d) C_6.
47. Falx cerebri encloses all except a) superior sagittal sinus b) inferior sagittal sinus c) straight sinus d) transverse sinus.
48. 3rd nerve nuclei in midbrain is seen at the level of –
a) superior colliculus b) inferior colliculus c) nucleus ambiguus d) arcuate nucleus.
49. Trapezoid body is formed by fibres of
a) cochlear nuclei b) optic pathway c) olfactory nerve d) chorda tympani .
50. True of lateral geniculate body is
a) component of metathalamus b) connected to superior colliculus
c) associated with visual pathway d) all.
51. Central sulcus of Rolando separates ___lobes
a) parietal from ocupital b) temporal from pariental c) frontal from parietal
d) temporal from occipital.
52. Regarding thalamus not true is
a) located on lateral wall of 3rd ventricle b) main relay station of sensory inputs
c) composed mainly of white matter d) 'head ganglion' of autonomic nervous system lies below it.
53. Lateral ventricles become parallelly oriented in agenesis of
a) corpus collosum b) basal ganglia c) thalamus d) internal capsule.
54. Thickest part of corpus callosum
a) rostrum b) body c) genu d) splenium.
55. Superior olivary nuclei fall in the ___ pathway
a) auditory b) visual c) pyramidal d) olfactory.
56. Broca's motor speech area is located in brodmann's area
a) 4 b) 22 c) 44 d) 17.
57. Auditory cortex is located in

a) post calcarine gyrus b) transverse temporal gyrus c) superior temporal gyrus d) b + c.

58. Wernicke's area is Brodmann's area – a) 4 b) 17 c) 22 d) 21.

59. Visual cortex is Brodmann area - a) 17 b) 22 c) 42 d) 44.

60. Internal capsule is ____ shaped a) V b) W c) Y d) C.

61. Not a part of basal ganglia

a) putamen b) globus pallidus c) internal capsule d) caudate nucleus.

Ans : -1) b, 2) c, 3) b, 4) a, 5) b, 6) d, 7) c, 8) d, 9) b, 10) c, 11) d, 12) c, 13) a, 14) b, 15) d, 16) a, 17) d, 18) a, 19) d, 20) a, 21) b, 22) a, 23) a, 24) c, 25) b, 26) a, 27) c, 28) b, 29) d, 30) a, 31) d, 32) a, 33) c, 34) a, 35) b, 36) c, 37) c, 38) a, 39) c, 40) d, 41) b, 42) a, 43) c, 44) c, 45) a, 46) b, 47) d, 48) a, 49) a, 50) d, 51) c, 52) c, 53) a, 54) d, 55) a, 56) c, 57) d, 58) c, 59) a, 60) a, 61) c.