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CEE Based Model Questions (Set-C)

**CEE 200 Most Probable MCQs prepared for MBBS, BDS & BSc Nursing
Aspirants**

Instruction:

Marking Scheme: +1 mark for each correct answer and -0.25 mark for each incorrect answer.

Zoology

40 MCQs | 4 options each

Questions

1. Which cell junction chiefly prevents leakage between adjacent epithelial cells?

- A. Desmosome
- B. Tight junction
- C. Gap junction
- D. Hemidesmosome

2. Which part of the nephron is especially responsive to ADH for water reabsorption?

- A. Ascending limb of the loop of Henle
- B. Glomerulus
- C. Collecting duct
- D. Bowman's capsule

3. The normal pacemaker of the human heart is the:

- A. AV node
- B. SA node
- C. Bundle of His
- D. Purkinje fibres

4. Which immunoglobulin can cross the placenta and provide passive immunity to a fetus?

- A. IgA
- B. IgM
- C. IgE
- D. IgG

5. Fertilization in humans usually occurs in the:

- A. Cervix
- B. Uterine cavity
- C. Ampulla of the fallopian tube
- D. Vagina

6. Which hormone stimulates Leydig cells to produce testosterone?

- A. FSH
- B. LH
- C. Prolactin
- D. Oxytocin

7. A person with blood group AB normally has which antibodies in plasma against A and B antigens?

- A. Anti-A only
- B. Anti-B only
- C. Both anti-A and anti-B
- D. Neither anti-A nor anti-B

8. The primary site of gaseous exchange in human lungs is the:

- A. Bronchi
- B. Terminal bronchioles
- C. Alveoli
- D. Pleura

9. Which vitamin is essential for the synthesis of several blood-clotting factors?

- A. Vitamin A
- B. Vitamin C
- C. Vitamin K
- D. Vitamin E

10. During skeletal muscle contraction, calcium binds to:

- A. Myosin head
- B. Troponin C
- C. Tropomyosin directly
- D. Actin's active site

11. Which brain region plays a major role in thermoregulation?

- A. Medulla oblongata
- B. Hypothalamus
- C. Cerebellum
- D. Occipital lobe

12. Which enzyme joins Okazaki fragments during DNA replication?

- A. DNA helicase
- B. DNA ligase
- C. RNA primase
- D. Topoisomerase

13. Which cells produce and secrete large quantities of antibodies?

- A. Neutrophils
- B. Plasma cells
- C. Erythrocytes
- D. Platelets

14. The functional contractile unit of striated muscle is the:

- A. Myofibril
- B. Sarcomere
- C. Fascicle
- D. Tendon

15. Glucose absorption from the intestinal lumen along with sodium is an example of:

- A. Simple diffusion
- B. Facilitated diffusion only
- C. Secondary active transport
- D. Primary active transport by a glucose pump

16. Which hormone can lower blood calcium concentration?

- A. Parathyroid hormone
- B. Calcitonin
- C. Aldosterone
- D. Glucagon

17. Which fetal blood vessel normally becomes the ligamentum arteriosum after birth?

- A. Foramen ovale
- B. Ductus arteriosus
- C. Ductus venosus
- D. Umbilical vein

18. Which cells form myelin in the peripheral nervous system?

- A. Astrocytes
- B. Oligodendrocytes
- C. Schwann cells
- D. Microglia

19. A codon is a three-nucleotide sequence found on:

- A. DNA polymerase
- B. mRNA
- C. Ribosomal proteins
- D. Amino acids

20. Which enzyme begins protein digestion in the stomach?

- A. Trypsin
- B. Pepsin
- C. Amylase
- D. Pancreatic lipase

21. Vaccination with an antigen generally produces:

- A. Natural passive immunity
- B. Artificial passive immunity
- C. Artificial active immunity
- D. Innate immunity only

22. Which structure controls the amount of light entering the eye?

- A. Cornea
- B. Iris
- C. Lens
- D. Retina

23. The principal nitrogenous waste excreted by adult humans is:

- A. Ammonia
- B. Urea
- C. Uric acid
- D. Creatine

24. Which gland secretes melatonin?

- A. Pineal gland
- B. Thymus
- C. Adrenal cortex
- D. Anterior pituitary

25. Crossing over between homologous chromosomes occurs during which stage of meiosis?

- A. Leptotene
- B. Zygotene
- C. Pachytene
- D. Telophase I

26. Which enzyme converts fibrinogen into fibrin during blood clotting?

- A. Thrombin
- B. Plasmin
- C. Heparin
- D. Prothrombin

27. The main function of pulmonary surfactant is to:

- A. Increase surface tension
- B. Reduce surface tension
- C. Transport oxygen in blood
- D. Stimulate mucus secretion

28. Which hormonal surge triggers ovulation?

- A. FSH surge only
- B. LH surge
- C. Progesterone surge
- D. Prolactin surge

29. Which duct connects the gallbladder to the biliary duct system?

- A. Cystic duct
- B. Pancreatic duct
- C. Hepatic vein
- D. Ureter

30. Which type of RNA carries amino acids to the ribosome?

- A. mRNA
- B. rRNA
- C. tRNA
- D. snRNA

31. The loop of Henle is important for:

- A. Producing red blood cells
- B. Creating an osmotic gradient in the renal medulla
- C. Filtering plasma proteins
- D. Secreting insulin

32. Which cranial nerve carries the sensation of smell?

- A. Optic nerve
- B. Olfactory nerve
- C. Trigeminal nerve
- D. Facial nerve

33. Which organelle modifies, sorts and packages proteins for secretion?

- A. Lysosome
- B. Golgi apparatus
- C. Peroxisome
- D. Centrosome

34. The refractory period of a neuron helps ensure:

- A. Backward propagation of action potentials
- B. One-way propagation of an action potential
- C. Permanent depolarization
- D. Complete absence of ion movement

35. Which hormone promotes milk ejection from mammary glands?

- A. Prolactin
- B. Oxytocin
- C. Estrogen
- D. FSH

36. Which leukocytes are normally the most abundant in peripheral blood?

- A. Eosinophils
- B. Basophils
- C. Neutrophils
- D. Monocytes

37. Inadequate insulin secretion or action can lead to:

- A. Diabetes mellitus
- B. Diabetes insipidus
- C. Addison disease
- D. Myasthenia gravis

38. The corpus luteum primarily secretes:

- A. Testosterone
- B. Progesterone
- C. Thyroxine
- D. ADH

39. Which connective tissue cell releases histamine during many allergic reactions?

- A. Fibroblast
- B. Mast cell
- C. Chondrocyte
- D. Osteocyte

40. Most digestion and absorption of dietary nutrients occur in the:

- A. Stomach
- B. Small intestine
- C. Large intestine
- D. Esophagus

Botany

40 MCQs | 4 options each

Questions

41. Which plant tissue transports sugars from source tissues to sink tissues?

- A. Xylem
- B. Phloem
- C. Cork
- D. Sclerenchyma

42. The Casparian strip is present in the:

- A. Leaf epidermis
- B. Root endodermis
- C. Palisade mesophyll
- D. Phloem companion cells

43. Which plant hormone promotes stomatal closure during water stress?

- A. Auxin
- B. Gibberellin
- C. Absciscic acid
- D. Cytokinin

44. The first stable product of carbon fixation in most C4 plants is:

- A. 3-phosphoglycerate
- B. Oxaloacetate
- C. Ribulose biphosphate
- D. Glucose

45. Which enzyme is responsible for biological nitrogen fixation?

- A. Nitrogenase
- B. Nitrate reductase
- C. Rubisco
- D. Catalase

46. Which generation produces spores by meiosis in plants with alternation of generations?

- A. Gametophyte
- B. Sporophyte
- C. Endosperm
- D. Pollen tube

47. Double fertilization in angiosperms produces:

- A. Two embryos
- B. A zygote and the primary endosperm nucleus
- C. Two endosperms
- D. An embryo and a pollen tube

48. Lateral roots originate mainly from the:

- A. Pericycle
- B. Cortex
- C. Epidermis
- D. Pith

49. Photorespiration begins when Rubisco acts as a/an:

- A. Carboxylase on PEP
- B. Oxygenase on RuBP
- C. Kinase on ATP
- D. Hydrolase on starch

50. Why do most leaves appear green?

- A. Chlorophyll absorbs green light most strongly
- B. Chlorophyll reflects or transmits much of the green light
- C. Carotene absorbs only green light
- D. Leaves contain no pigments that absorb visible light

51. Which tissue provides flexible support to young, growing plant organs?

- A. Collenchyma
- B. Sclerenchyma fibres
- C. Cork
- D. Mature xylem vessels

52. Pollen grains develop from:

- A. Megaspores
- B. Microspores
- C. Zygotes
- D. Synergids

53. Which floral structure receives pollen grains?

- A. Anther
- B. Stigma
- C. Ovary wall
- D. Filament

54. In a typical dicot stem, vascular bundles are arranged:

- A. Scattered throughout the ground tissue
- B. In a ring
- C. Only in the pith
- D. In the epidermis

55. Water rises through xylem largely because of:

- A. Root pressure alone
- B. Transpiration pull
- C. Phloem loading
- D. Guttation

56. Tendrils coiling around a support demonstrate:

- A. Phototropism
- B. Thigmotropism
- C. Hydrotropism
- D. Geotropism

57. In cereal grains, the principal food-storage tissue is commonly the:

- A. Endosperm
- B. Testa
- C. Micropyle
- D. Funicle

58. Which of the following is a gymnosperm?

- A. Mango
- B. Pinus
- C. Pea
- D. Sunflower

59. Stomatal opening and closing primarily depend on changes in:

- A. Guard-cell turgor
- B. Xylem lignin
- C. Pollen viability
- D. Root-cap thickness

60. Which plant hormone promotes cell division and can delay leaf senescence?

- A. Cytokinin
- B. Ethylene
- C. Absciscic acid
- D. Jasmonic acid

61. The fleshy part of a strawberry develops mainly from the enlarged:

- A. Ovary
- B. Receptacle
- C. Seed coat
- D. Style

62. Which plant disease is caused by a virus?

- A. Citrus canker
- B. Tobacco mosaic
- C. Wheat rust
- D. Late blight of potato

63. Which bacterium commonly forms nitrogen-fixing root nodules in legumes?

- A. Rhizobium
- B. Lactobacillus
- C. Nitrosomonas
- D. Acetobacter aceti

64. The dominant generation in bryophytes is the:

- A. Sporophyte
- B. Gametophyte
- C. Seedling
- D. Embryo

65. Secondary growth in vascular plants is mainly produced by:

- A. Apical meristems only
- B. Vascular cambium and cork cambium
- C. Guard cells
- D. Root hairs

66. Which structure protects the root apical meristem as the root grows through soil?

- A. Root cap
- B. Stomatal pore
- C. Lenticel
- D. Leaf sheath

67. The Calvin cycle takes place in the:

- A. Thylakoid lumen
- B. Chloroplast stroma
- C. Mitochondrial matrix
- D. Cytosol only

68. The effect of day length on flowering is called:

- A. Vernalization
- B. Photoperiodism
- C. Plasmolysis
- D. Abscission

69. Which cells are closely associated with sieve-tube elements in angiosperm phloem?

- A. Companion cells
- B. Tracheids
- C. Guard cells
- D. Bulliform cells

70. A plant that completes its life cycle in one growing season is called:

- A. Biennial
- B. Annual
- C. Perennial
- D. Epiphyte

71. The conversion of nitrate into nitrite in plants is catalysed by:

- A. Nitrate reductase
- B. Nitrogenase
- C. Rubisco
- D. Amylase

72. Which leaf tissue usually contains the greatest concentration of chloroplasts?

- A. Upper epidermis
- B. Palisade mesophyll
- C. Lower cuticle
- D. Leaf veins only

73. Transfer of pollen from the anther to the stigma of the same flower is called:

- A. Xenogamy
- B. Autogamy
- C. Geitonogamy
- D. Apomixis

74. Which tissue mainly transports water and mineral ions from roots to aerial parts?

- A. Phloem
- B. Xylem
- C. Epidermis
- D. Cork

75. Which cell division generally produces genetically similar daughter cells for growth?

- A. Meiosis I
- B. Mitosis
- C. Reduction division
- D. Crossing over

76. The egg apparatus of a typical angiosperm embryo sac contains:

- A. One egg and two synergids
- B. Two eggs and one antipodal cell
- C. Three polar nuclei
- D. Four synergids

77. Which ecological relationship benefits one organism while harming the other?

- A. Mutualism
- B. Commensalism
- C. Parasitism
- D. Neutralism

78. Which structure enables vegetative propagation in potato?

- A. Tuber
- B. Thorn
- C. Tendril
- D. Pneumatophore

79. The release of liquid droplets through hydathodes at leaf margins is called:

- A. Transpiration
- B. Guttation
- C. Translocation
- D. Bleeding

80. Which of the following is a characteristic feature of C₄ plants compared with C₃ plants?

- A. Initial carbon fixation occurs through PEP carboxylase
- B. They do not require light
- C. They have no chloroplasts
- D. They cannot carry out the Calvin cycle

Chemistry

50 MCQs | 4 options each

Questions

81. What is the oxidation number of sulfur in H_2SO_4 ?

- A. +2
- B. +4
- C. +6
- D. -2

82. Which quantum number determines the shape of an atomic orbital?

- A. Principal quantum number
- B. Azimuthal quantum number
- C. Magnetic quantum number
- D. Spin quantum number

83. Which gas is evolved when an active metal reacts with dilute hydrochloric acid?

- A. Oxygen
- B. Hydrogen
- C. Chlorine
- D. Carbon dioxide

84. Which solution has the highest pH at the same concentration?

- A. HCl
- B. CH_3COOH
- C. NaCl
- D. NaOH

85. The hybridization of carbon in ethyne (C_2H_2) is:

- A. sp^3
- B. sp^2
- C. sp
- D. dsp^2

86. Which intermolecular force is particularly important between water molecules?

- A. London dispersion only
- B. Hydrogen bonding
- C. Metallic bonding
- D. Covalent bonding between separate molecules

87. For an exothermic reaction, the enthalpy change (ΔH) is:

- A. Positive
- B. Negative
- C. Always zero
- D. Equal to activation energy

88. Which combination forms a buffer solution?

- A. HCl and NaCl
- B. NaOH and KCl
- C. CH_3COOH and CH_3COONa
- D. HNO_3 and KNO_3

89. The unit of the rate constant for a first-order reaction is:

- A. $\text{mol L}^{-1} \text{s}^{-1}$
- B. s^{-1}
- C. $\text{L mol}^{-1} \text{s}^{-1}$
- D. $\text{L}^2 \text{mol}^{-2} \text{s}^{-1}$

90. Oxidation occurs at which electrode in an electrochemical cell?

- A. Cathode
- B. Anode
- C. Salt bridge
- D. Voltmeter

91. Which element has the highest electronegativity?

- A. Oxygen
- B. Nitrogen
- C. Fluorine
- D. Chlorine

92. Which compound gives a positive iodoform test?

- A. Methanol
- B. Propanone
- C. Benzene
- D. Ethanoic acid

93. The major product of adding HBr to propene in the absence of peroxide is:

- A. 1-bromopropane
- B. 2-bromopropane
- C. 1,2-dibromopropane
- D. Propanol

94. Which functional group characterizes aldehydes?

- A. -COOH
- B. -CHO
- C. -OH
- D. -O-

95. Which reagent is commonly used to distinguish aldehydes from most ketones?

- A. Tollens' reagent
- B. Sodium chloride solution
- C. Dilute hydrochloric acid
- D. Limewater

96. Which of the following is an aromatic heterocyclic compound?

- A. Cyclohexane
- B. Pyridine
- C. Propane
- D. Cyclobutane

97. Which monomer is used to manufacture PVC?

- A. Ethene
- B. Chloroethene
- C. Styrene
- D. Tetrafluoroethene

98. Which gas law relates volume to absolute temperature at constant pressure?

- A. Boyle's law
- B. Charles's law
- C. Dalton's law
- D. Graham's law

99. Increasing pressure on a gaseous equilibrium generally favours the side with:

- A. More gaseous molecules
- B. Fewer gaseous molecules
- C. More solid particles
- D. Higher activation energy

100. Which salt produces an acidic aqueous solution because of hydrolysis?

- A. NaCl
- B. KNO_3
- C. NH_4Cl
- D. CH_3COONa

101. What is the molarity of a solution containing 0.5 mol solute in 2 L of solution?

- A. 0.10 M
- B. 0.25 M
- C. 1.0 M
- D. 4.0 M

102. Which alkali metal is the strongest reducing agent in aqueous solution among these options?

- A. Lithium
- B. Sodium
- C. Potassium
- D. Caesium

103. Which oxide is amphoteric?

- A. Na_2O
- B. SO_3
- C. Al_2O_3
- D. CO_2

104. Ethanol and dimethyl ether exhibit which type of isomerism?

- A. Chain isomerism
- B. Position isomerism
- C. Functional group isomerism
- D. Geometrical isomerism

105. Which reagent can convert an alkene into a vicinal diol under mild conditions?

- A. Cold, dilute alkaline KMnO_4
- B. Concentrated HCl
- C. Sodium metal
- D. Ammoniacal AgNO_3

106. Which subatomic particle has the smallest mass?

- A. Proton
- B. Neutron
- C. Electron
- D. Alpha particle

107. What is the maximum number of electrons in the shell with principal quantum number $n=3$?

- A. 8
- B. 18
- C. 32
- D. 9

108. Which method is suitable for separating miscible liquids with close boiling points?

- A. Filtration
- B. Fractional distillation
- C. Sublimation
- D. Decantation

109. Which of the following is a colligative property?

- A. Viscosity
- B. Surface tension
- C. Elevation of boiling point
- D. Colour

110. Which acid is commonly present in vinegar?

- A. Citric acid
- B. Lactic acid
- C. Ethanoic acid
- D. Oxalic acid

111. Which reagent can test for carbon-carbon unsaturation in many organic compounds?

- A. Bromine solution
- B. Limewater
- C. Fehling's solution
- D. Nessler's reagent

112. Which molecule has trigonal planar geometry around its central atom?

- A. NH_3
- B. BF_3
- C. H_2O
- D. CH_4

113. Which catalyst is commonly used in the Haber process?

- A. Iron
- B. Copper
- C. Silver
- D. Zinc

114. Which statement about isotopes is correct?

- A. They have the same neutrons but different protons
- B. They have the same protons but different neutrons
- C. They always have different atomic numbers
- D. They always have the same mass number

115. Which compound is most likely to undergo an SN1 reaction readily under suitable conditions?

- A. Methyl chloride
- B. Chloroethane
- C. Tert-butyl chloride
- D. Chloromethane

116. What is the conjugate base of H_2PO_4^- ?

- A. H_3PO_4
- B. HPO_4^{2-}
- C. PO_4^{3-}
- D. OH^-

117. Which metal is extracted from bauxite?

- A. Iron
- B. Aluminium
- C. Copper
- D. Zinc

118. Which gas turns limewater milky?

- A. Hydrogen
- B. Oxygen
- C. Carbon dioxide
- D. Nitrogen

119. Which of the following is a strong electrolyte in aqueous solution?

- A. Glucose
- B. Ethanol
- C. Sodium chloride
- D. Urea

120. Which compound contains an ester linkage?

- A. $\text{CH}_3\text{COOCH}_2\text{CH}_3$
- B. $\text{CH}_3\text{CH}_2\text{OH}$
- C. CH_3CHO
- D. CH_3COCH_3

121. Which law states that equal volumes of gases at the same temperature and pressure contain equal numbers of molecules?

- A. Avogadro's law
- B. Graham's law
- C. Henry's law
- D. Raoult's law

122. Which factor does not change the equilibrium constant for a given reaction?

- A. Temperature
- B. A catalyst
- C. Reaction identity
- D. Standard state convention

123. The approximate pH of 1.0×10^{-3} M strong HCl is:

- A. 1
- B. 2
- C. 3
- D. 11

124. Which of the following is a primary alcohol?

- A. Propan-1-ol
- B. Propan-2-ol
- C. Propanone
- D. Ethanal

125. Which element lies at the centre of the heme group in haemoglobin?

- A. Magnesium
- B. Iron
- C. Calcium
- D. Cobalt

126. Which of the following is a Lewis acid?

- A. NH_3
- B. OH^-
- C. BF_3
- D. Cl^-

127. What is the oxidation state of manganese in KMnO_4 ?

- A. +2
- B. +4
- C. +6
- D. +7

128. Which process generally increases the entropy of a substance?

- A. Gas condensing to liquid
- B. Crystallization
- C. Solid melting to liquid
- D. Gas compression

129. Which of these polymers is formed by condensation polymerization?

- A. Polyethene
- B. PVC
- C. Nylon-6,6
- D. Polystyrene

130. Which statement best describes a catalyst?

- A. It changes the equilibrium constant
- B. It increases activation energy
- C. It provides an alternative pathway with lower activation energy
- D. It is always consumed completely

Physics

50 MCQs | 4 options each

Questions

131. A body moves 12 m east and then 5 m west. Its displacement is:

- A. 17 m east
- B. 7 m east
- C. 7 m west
- D. 17 m west

132. The slope of a velocity-time graph represents:

- A. Displacement
- B. Acceleration
- C. Momentum
- D. Power

133. A 2 kg object accelerates at 3 m/s^2 . The net force acting on it is:

- A. 1.5 N
- B. 5 N
- C. 6 N
- D. 9 N

134. The dimensional formula of pressure is:

- A. $\text{MLT}^{-2}\text{ML}^{-2}\text{MLT}^{-2}$
- B. $\text{ML}^{-1}\text{T}^{-2}\text{ML}^{-1}\text{T}^{-2}\text{ML}^{-1}\text{T}^{-2}$
- C. $\text{ML}^2\text{T}^{-2}\text{ML}^2\text{T}^{-2}\text{ML}^2\text{T}^{-2}$
- D. $\text{M}^{-1}\text{LT}^{-2}\text{M}^{-1}\text{LT}^{-2}\text{M}^{-1}\text{LT}^{-2}$

135. A projectile is launched horizontally. Neglecting air resistance, its horizontal acceleration is:

- A. g
- B. $g/2$
- C. Zero
- D. Dependent on its mass

136. The work done by a centripetal force during uniform circular motion is:

- A. Positive
- B. Negative
- C. Zero
- D. Infinite

137. If the speed of an object doubles, its kinetic energy becomes:

- A. Twice
- B. Three times
- C. Four times
- D. Half

138. The SI unit of power is:

- A. Joule
- B. Watt
- C. Newton
- D. Pascal

139. Which quantities are conserved in an isolated elastic collision?

- A. Momentum only
- B. Kinetic energy only
- C. Both momentum and kinetic energy
- D. Neither momentum nor kinetic energy

140. Near Earth's surface, gravitational potential energy relative to a chosen reference level is expressed as:

- A. $\frac{GMm}{r}$ in all situations
- B. mgh
- C. $\frac{1}{2}mv^2$
- D. $\frac{F}{t}$

141. A spring obeys Hooke's law when:

- A. Force is proportional to extension
- B. Force is constant for all extensions
- C. Extension depends only on mass
- D. The spring is permanently deformed

142. The time period of a simple pendulum undergoing small oscillations depends on:

- A. Mass of the bob
- B. Amplitude only
- C. Length and gravitational acceleration
- D. Material of the bob

143. Heat transfer through a vacuum occurs by:

- A. Conduction only
- B. Convection only
- C. Radiation
- D. Conduction and convection

144. Specific heat capacity is the heat required to raise the temperature of unit mass of a substance by:

- A. 1 K
- B. 10 K
- C. 100 K
- D. Any fixed amount

145. During a phase change at constant pressure, supplied heat primarily changes the:

- A. Temperature only
- B. Phase and internal energy without a temperature rise during the change
- C. Mass
- D. Gravitational acceleration

146. For an ideal gas at constant temperature, if its volume is halved, its pressure becomes:

- A. Half
- B. Double
- C. Four times
- D. Unchanged

147. The root-mean-square speed of gas molecules increases when:

- A. Absolute temperature increases
- B. Molecular mass increases at fixed temperature
- C. Temperature decreases
- D. Gas molecules stop moving

148. The first law of thermodynamics expresses the conservation of:

- A. Charge
- B. Mass only
- C. Energy
- D. Momentum

149. The speed of sound in air generally increases with:

- A. Increasing temperature
- B. Increasing frequency alone
- C. Increasing amplitude
- D. Decreasing temperature

150. A wave has a frequency of 50 Hz and a wavelength of 4 m. Its speed is:

- A. 12.5 m/s
- B. 46 m/s
- C. 200 m/s
- D. 400 m/s

151. The splitting of white light into its constituent colours by a prism is called:

- A. Interference
- B. Diffraction
- C. Dispersion
- D. Polarization

152. An object placed at the centre of curvature of a concave mirror forms an image that is:

- A. Virtual, erect and magnified
- B. Real, inverted and the same size
- C. Real, erect and diminished
- D. Virtual and inverted

153. The power of a lens with focal length +0.5 m is:

- A. -2 D
- B. +2 D
- C. +0.5 D
- D. -0.5 D

154. Total internal reflection occurs when light travels:

- A. From a rarer to a denser medium at any angle
- B. From a denser to a rarer medium at an angle greater than the critical angle
- C. Only through a vacuum
- D. At normal incidence

155. The SI unit of electric charge is:

- A. Ampere
- B. Coulomb
- C. Volt
- D. Ohm

156. Two $6\ \Omega$ resistors connected in parallel have an equivalent resistance of:

- A. $12\ \Omega$
- B. $6\ \Omega$
- C. $3\ \Omega$
- D. $1\ \Omega$

157. A 12 V battery drives a current of 2 A through a resistor. Its resistance is:

- A. $4\ \Omega$
- B. $6\ \Omega$
- C. $10\ \Omega$
- D. $24\ \Omega$

158. Electrical power dissipated in a resistor can be calculated using:

- A. $P=VI$ $P=V^2/R$ $P=I^2R$
- B. $P=V/IP=V/IP=V/I$ only
- C. $P=IRP=IRP=IR$
- D. $P=R/VP=R/VP=R/V$

159. The magnetic field around a long, straight current-carrying wire consists of:

- A. Radial lines
- B. Concentric circles
- C. Parallel lines only
- D. Ellipses

160. Which law states that induced current opposes the change that produces it?

- A. Snell's law
- B. Lenz's law
- C. Hooke's law
- D. Pascal's law

161. A transformer operates on the principle of:

- A. Electrolysis
- B. Mutual induction
- C. Photoelectric effect
- D. Thermionic emission

162. Which material is widely used as a semiconductor?

- A. Copper
- B. Silicon
- C. Mica
- D. Aluminium

163. In a p-n junction diode under forward bias, the depletion-layer width generally:

- A. Increases greatly
- B. Decreases
- C. Remains infinite
- D. Never changes

164. The photoelectric effect provides evidence for the:

- A. Wave-only nature of light
- B. Particle nature of light
- C. Sound nature of light
- D. Absence of photons

165. The half-life of a radioactive sample is the time required for:

- A. All nuclei to decay
- B. Half the original undecayed nuclei to remain
- C. Activity to double
- D. The mass to become zero

166. The charge of an alpha particle is:

- A. $-e-e-e$
- B. $+e+e+e$
- C. $+2e+2e+2e$
- D. $-2e-2e-2e$

167. Which electromagnetic radiation has the shortest wavelength?

- A. Radio waves
- B. Microwaves
- C. Visible light
- D. Gamma rays

168. The de Broglie wavelength of a particle is inversely proportional to its:

- A. Charge
- B. Momentum
- C. Electric potential only
- D. Temperature only

169. The energy of a photon is given by:

- A. hc/λ
- B. $h\lambda/ch$
- C. λ/hc
- D. $mc^2\lambda$

170. A convex lens forms a virtual, erect and magnified image when the object is:

- A. Beyond $2F$
- B. At $2F$
- C. Between the lens and its focal point
- D. At infinity

171. The magnetic force on a charged particle moving parallel to a uniform magnetic field is:

- A. Maximum
- B. Zero
- C. Always qvB
- D. Infinite

172. Which of the following is a scalar quantity?

- A. Displacement
- B. Acceleration
- C. Work
- D. Force

173. A 5 kg object has momentum of 20 kg m/s. Its speed is:

- A. 2 m/s
- B. 4 m/s
- C. 10 m/s
- D. 100 m/s

174. The coefficient of friction is:

- A. Measured in newtons
- B. Measured in pascals
- C. Dimensionless
- D. Measured in joules

175. The efficiency of a machine is:

- A. Input energy divided by output energy $\times 100\%$
- B. Useful output energy divided by input energy $\times 100\%$
- C. Always 100%
- D. Output power plus input power

176. Which lens is used to correct myopia?

- A. Convex lens
- B. Concave lens
- C. Cylindrical lens in every case
- D. No lens can correct it

177. In a series circuit, the current through each resistor is:

- A. Different through every resistor
- B. The same
- C. Always zero
- D. Proportional to its resistance

178. According to Coulomb's law, the force between two point charges varies with separation r as:

- A. r
- B. $1/r$
- C. $1/r^2$
- D. $1/r^3$

179. Which device converts mechanical energy into electrical energy using electromagnetic induction?

- A. Electric motor
- B. Generator
- C. Transformer
- D. Rectifier

180. The approximate acceleration due to gravity near Earth's surface is:

- A. 0.98 m/s^2
- B. 9.8 m/s^2
- C. 98 m/s^2
- D. 980 m/s^2

MAT

20 MCQs | 4 options each

Questions

181. Find the next number: 3, 7, 15, 31, 63, __

- A. 95
- B. 126
- C. 127
- D. 129

182. Choose the odd one out.

- A. Square
- B. Triangle
- C. Circle
- D. Cube

183. If NURSE is coded as OVSTF by shifting each letter one position forward, how is CARE coded?

- A. DBSF
- B. DBQD
- C. EBSF
- D. DASF

184. A is taller than B, and B is taller than C. Who is the shortest?

- A. A
- B. B
- C. C
- D. Cannot be determined

185. Complete the analogy: Book : Read :: Food : __

- A. Cook
- B. Eat
- C. Buy
- D. Serve

186. If today is Tuesday, what day will it be 17 days later?

- A. Thursday
- B. Friday
- C. Saturday
- D. Sunday

187. Find the missing number: 2, 6, 12, 20, 30, _

- A. 36
- B. 40
- C. 42
- D. 44

188. Which word does not belong?

- A. Rose
- B. Lily
- C. Tulip
- D. Carrot

189. Five workers complete a task in 12 days. At the same rate, how many days will 10 workers take?

- A. 3 days
- B. 6 days
- C. 12 days
- D. 24 days

190. A clock shows 3:00. What is the smaller angle between its hands?

- A. 0°
- B. 45°
- C. 90°
- D. 180°

191. Arrange these stages of human life in the correct order:

- 1. Adult**
- 2. Infant**
- 3. Adolescent**
- 4. Child**

- A. 2, 4, 3, 1
- B. 4, 2, 3, 1
- C. 2, 3, 4, 1
- D. 1, 3, 4, 2

192. If all roses are flowers and some flowers fade quickly, which conclusion must be true?

- A. All roses fade quickly
- B. Some roses fade quickly
- C. All roses are flowers
- D. No flowers are roses

193. Find the next letter: A, C, F, J, O, __

- A. S
- B. T
- C. U
- D. V

194. A person faces north and turns right twice. Which direction are they facing?

- A. East
- B. West
- C. South
- D. North

195. If 8 pens cost Rs. 120, what is the cost of 5 pens at the same rate?

- A. Rs. 60
- B. Rs. 70
- C. Rs. 75
- D. Rs. 80

196. Which number is different from the others?

- A. 16
- B. 25
- C. 36
- D. 45

197. Complete the analogy: Thermometer : Temperature :: Barometer : __

- A. Speed
- B. Pressure
- C. Humidity
- D. Rainfall

198. If CAT is written as 3120 using alphabet positions (C = 3, A = 1, T = 20), how is DOG written?

- A. 4157
- B. 4158
- C. 4617
- D. 4517

199. A bag contains 4 red balls and 6 blue balls. What is the probability of randomly drawing a red ball?

- A. $\frac{1}{5}$
- B. $\frac{2}{5}$
- C. $\frac{3}{5}$
- D. $\frac{4}{5}$

200. Choose the pair with the same relationship as Doctor : Hospital.

- A. Teacher : School
- B. Book : Page
- C. River : Water
- D. Car : Road

__ Best Wishes __