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# CEE Based Model Questions
# (Set-D)

**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. In the Miller–Urey experiment, the electrical discharge primarily simulated which condition of early Earth?**

A. Formation of the ozone layer
B. Lightning in the primitive atmosphere
C. Photosynthesis by early plants
D. Radioactive decay inside Earth

**2. Which evidence most directly supports common ancestry through similarities in early embryonic development?**

A. Similar adult body size
B. Similar habitats
C. Similar embryonic structures
D. Similar food preferences

**3. The modern synthetic theory of evolution combines natural selection with:**

A. Spontaneous generation alone
B. Genetics and population-level variation
C. Use and disuse of organs only
D. Inheritance of acquired characters only

**4. Which feature is characteristic of members of phylum Echinodermata?**

A. Jointed appendages
B. Water vascular system
C. Chitinous exoskeleton
D. Notochord throughout life

**5. Which animal has a pseudocoelom?**

A. Earthworm
B. Cockroach
C. Ascaris
D. Hydra

**6. In chordates, the notochord is best described as a:**

A. Dorsal supporting rod
B. Ventral blood vessel
C. Digestive gland
D. Paired excretory organ

**7. Which tissue is specialized for transmitting electrical impulses?**

A. Areolar tissue
B. Nervous tissue
C. Adipose tissue
D. Cartilage

**8. The cells responsible for forming myelin around axons in the peripheral nervous system are:**

A. Astrocytes
B. Microglia
C. Schwann cells
D. Ependymal cells

**9. Which connective tissue is adapted for storing fat and providing insulation?**

A. Adipose tissue
B. Hyaline cartilage
C. Dense regular tissue
D. Blood

**10. The main function of ciliated epithelium in the human respiratory tract is to:**

A. Produce red blood cells
B. Move mucus and trapped particles
C. Secrete digestive enzymes
D. Store calcium

**11. In the life cycle of Plasmodium, sexual reproduction occurs in the:**

A. Human liver
B. Human red blood cells
C. Female Anopheles mosquito
D. Human spleen

**12. The infective stage of Plasmodium transmitted to humans by a mosquito is the:**

A. Merozoite
B. Sporozoite
C. Gametocyte
D. Ookinete

**13. In an earthworm, the principal organs for excretion and osmoregulation are:**

A. Flame cells
B. Nephridia
C. Malpighian tubules
D. Green glands

**14. The clitellum of an earthworm is mainly associated with:**

A. Locomotion
B. Food digestion
C. Reproduction and cocoon formation
D. Blood circulation

**15. In a frog, oxygen can be absorbed through the skin because it is:**

A. Dry and keratinized
B. Thin, moist, and richly supplied with blood vessels
C. Covered with thick scales
D. Completely impermeable to gases

**16. The functional unit of the human kidney is the:**

A. Neuron
B. Nephron
C. Alveolus
D. Sarcomere

**17. Which process directly creates the pressure that drives blood out of the left ventricle into the aorta?**

A. Atrial relaxation
B. Ventricular systole
C. Ventricular filling
D. Closure of the semilunar valves

**18. The natural pacemaker of the human heart is the:**

A. AV node
B. Bundle of His
C. Sinoatrial node
D. Purkinje fibre network

**19. A person with blood group AB has which feature in the ABO system?**

A. Both anti-A and anti-B antibodies in plasma
B. Neither A nor B antigen on red cells
C. Both A and B antigens on red cells
D. Only A antigen on red cells

**20. Most oxygen in human blood is transported:**

A. Dissolved freely in plasma
B. Bound to haemoglobin
C. As bicarbonate ions
D. Bound to platelets

**21. The exchange of gases between alveoli and pulmonary capillary blood occurs mainly by:**

A. Active transport
B. Simple diffusion
C. Osmosis
D. Phagocytosis

**22. Which part of the brainstem contains important centres regulating breathing and heart rate?**

A. Medulla oblongata
B. Cerebellar cortex
C. Corpus callosum
D. Occipital lobe

**23. The hormone that increases water reabsorption in the kidney collecting ducts is:**

A. Insulin
B. ADH
C. Thyroxine
D. Glucagon

**24. A deficiency of thyroid hormone during early childhood can severely impair:**

A. Blood clotting only
B. Physical and mental development
C. Bile storage only
D. Formation of antibodies only

**25. Ovulation is most directly triggered by a surge of:**

A. FSH alone
B. LH
C. Progesterone
D. Prolactin

**26. The acrosome of a sperm cell contains enzymes that help it:**

A. Produce antibodies
B. Penetrate the egg coverings
C. Store glycogen for the embryo
D. Form the placenta

**27. Which organism causes tuberculosis?**

A. Salmonella Typhi
B. Mycobacterium tuberculosis
C. Vibrio cholerae
D. Candida albicans

**28. Which type of immunity is produced when a person receives ready-made antibodies?**

A. Natural active immunity
B. Artificial active immunity
C. Passive immunity
D. Cell-mediated memory alone

**29. A vaccine containing a weakened but living pathogen is classified as:**

A. Live attenuated
B. Toxoid
C. Antiserum
D. Antibiotic

**30. Which blood component is most directly involved in antibody production?**

A. Erythrocytes
B. B lymphocytes and their plasma-cell descendants
C. Platelets
D. Neutrophils only

**31. The main purpose of tissue typing before an organ transplant is to reduce the risk of:**

A. Dehydration
B. Immune rejection
C. Anaemia due to iron deficiency
D. Vitamin deficiency

**32. In in-vitro fertilization, fertilization takes place:**

A. In the fallopian tube in every case
B. Outside the body under laboratory conditions
C. In the uterus before ovulation
D. Inside the ovary before gamete formation

**33. Which practice is most effective in reducing the transmission of waterborne intestinal pathogens?**

A. Storing untreated water in open containers
B. Drinking adequately treated water
C. Using antibiotics routinely
D. Avoiding all cooked food

**34. The biological control of insect pests involves:**

A. Increasing pesticide residues
B. Using natural enemies of the pests
C. Eliminating all decomposers
D. Increasing soil salinity

**35. A reflex action is generally characterized by a response that is:**

A. Always consciously planned
B. Rapid and mediated through a reflex pathway
C. Possible only during sleep
D. Independent of the nervous system

**36. Seasonal migration in many birds is primarily associated with changes in:**

A. Environmental conditions and resource availability
B. Blood group
C. Number of chromosomes
D. Tooth structure

**37. Which pollutant is strongly associated with acid rain formation?**

A. Oxygen
B. Sulfur dioxide
C. Helium
D. Nitrogen gas

**38. A species assessed as facing an extremely high risk of extinction in the wild is categorized by the IUCN as:**

A. Least Concern
B. Near Threatened
C. Critically Endangered
D. Data Deficient

**39. Which characteristic is an adaptation commonly found in aquatic mammals?**

A. Complete absence of lungs
B. Streamlined body shape
C. Permanent gill respiration
D. No requirement for oxygen

**40. Ramsar sites are internationally recognized for the conservation of:**

A. Deserts only
B. Wetlands
C. Volcanic mountains only
D. Urban transport systems

# Set 2: Botany
# 40 MCQs | 4 options each
# Questions

**41. Which component of an enzyme is directly responsible for recognizing and binding its substrate?**

A. Active site
B. Cellulose wall
C. Centriole
D. Nuclear pore

**42. A plant cell placed in a highly concentrated salt solution loses water and its protoplast pulls away from the cell wall. This is:**

A. Cytokinesis
B. Plasmolysis
C. Translocation
D. Guttation

**43. Which mineral element is a central component of the chlorophyll molecule?**

A. Iron
B. Magnesium
C. Sodium
D. Iodine

**44. The scientific system of naming an organism with a genus name followed by a specific epithet is called:**

A. Artificial selection
B. Binomial nomenclature
C. Polyploidy
D. Ecological succession

**45. Which group consists of prokaryotic organisms?**

A. Fungi
B. Plantae
C. Bacteria
D. Animalia

**46. Cyanobacteria are ecologically important because many species can:**

A. Fix atmospheric nitrogen
B. Produce seeds
C. Form flowers
D. Conduct pollination

**47. Which statement about viruses is correct?**

A. They possess independent cellular metabolism
B. They reproduce only inside suitable host cells
C. All contain both DNA and RNA as their genome
D. They are always larger than bacteria

**48. The fungal group traditionally known as sac fungi is:**

A. Basidiomycetes
B. Ascomycetes
C. Bryophytes
D. Chlorophytes

**49. Lichens are commonly described as a close association between a fungus and:**

A. A flowering plant root
B. An alga or cyanobacterium
C. An insect larva
D. A moss capsule only

**50. Which pigment gives many red algae their characteristic colour and helps them absorb light at depth?**

A. Phycoerythrin
B. Melanin
C. Haemoglobin
D. Xanthophyll alone

**51. The dominant, independent plant body in bryophytes is the:**

A. Sporophyte
B. Gametophyte
C. Seed
D. Embryo sac

**52. In ferns, the sporangia are commonly borne on structures called:**

A. Sori
B. Cotyledons
C. Anthers
D. Stomata

**53. Which feature distinguishes gymnosperms from angiosperms?**

A. They have vascular tissue
B. They produce pollen
C. Their seeds are not enclosed within a fruit
D. They carry out photosynthesis

**54. In Pinus, the male gametophyte is represented by the:**

A. Pollen grain
B. Ovule
C. Seed coat
D. Megaspore mother cell

**55. Which floral part develops into the fruit after fertilization in a typical angiosperm?**

A. Anther
B. Ovary
C. Stigma
D. Petal

**56. A flower with fused petals is described as:**

A. Polypetalous
B. Gamopetalous
C. Apetalous
D. Polysepalous

**57. Which family includes pea, bean, and many plants with a papilionaceous corolla?**

A. Fabaceae
B. Brassicaceae
C. Liliaceae
D. Solanaceae

**58. Which of the following is a characteristic feature of the family Solanaceae?**

A. Flowers always lack a corolla
B. Stamens are typically five and epipetalous
C. Ovary is always inferior
D. Seeds are enclosed in naked cones

**59. Neem is scientifically known as:**

A. Ocimum sanctum
B. Azadirachta indica
C. Rauwolfia serpentina
D. Zingiber officinale

**60. Which medicinal plant is associated with the alkaloid reserpine?**

A. Tulasi
B. Sarpagandha
C. Ginger
D. Neem

**61. In a pond ecosystem, phytoplankton generally occupy which trophic level?**

A. Primary producers
B. Primary consumers
C. Secondary consumers
D. Decomposers only

**62. In the nitrogen cycle, conversion of atmospheric nitrogen into biologically usable nitrogen compounds is called:**

A. Denitrification
B. Nitrogen fixation
C. Transpiration
D. Fermentation

**63. Which gas is the principal contributor to the enhanced greenhouse effect from human fossil-fuel combustion?**

A. Carbon dioxide
B. Neon
C. Hydrogen
D. Argon

**64. Ecological succession beginning in an area without previously developed soil is called:**

A. Secondary succession
B. Primary succession
C. Seasonal migration
D. Artificial hybridization

**65. A plant adapted to dry habitats is termed a:**

A. Hydrophyte
B. Xerophyte
C. Mesophyte
D. Halophyte in every case

**66. Which organelle is the principal site of aerobic respiration in eukaryotic cells?**

A. Golgi apparatus
B. Mitochondrion
C. Chloroplast
D. Lysosome

**67. The fluid-mosaic model describes the structure of the:**

A. Cell membrane
B. Cellulose cell wall only
C. Chromosome
D. Nucleolus

**68. Which organelle modifies, sorts, and packages many proteins for transport?**

A. Golgi apparatus
B. Ribosome alone
C. Centromere
D. Vacuolar membrane only

**69. During which phase of mitosis do chromosomes align at the equatorial plate?**

A. Prophase
B. Metaphase
C. Anaphase
D. Telophase

**70. Crossing over normally occurs during which stage of meiosis?**

A. Leptotene of prophase I
B. Pachytene of prophase I
C. Metaphase II
D. Telophase II

**71. The enzyme that synthesizes a new DNA strand during DNA replication is:**

A. DNA polymerase
B. Lipase
C. Pepsin
D. Amylase

**72. In the central dogma of molecular biology, information is ordinarily transferred from:**

A. Protein to DNA
B. DNA to RNA to protein
C. Lipid to RNA to DNA
D. Carbohydrate to protein to DNA

**73. If an organism has genotype Aa and the alleles show complete dominance, which phenotype is expected?**

A. Recessive phenotype only
B. Dominant phenotype
C. Both phenotypes must appear equally
D. No phenotype is expressed

**74. When both alleles are fully expressed in a heterozygote, the inheritance pattern is:**

A. Complete dominance
B. Codominance
C. Lethal inheritance
D. Incomplete penetrance by definition

**75. Down syndrome is most commonly associated with:**

A. Monosomy X
B. Trisomy 21
C. Trisomy 18
D. XXY sex chromosomes

**76. The plant tissue responsible for most upward transport of water and mineral salts is:**

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

**77. The main driving force for the ascent of sap in tall plants is generally explained by:**

A. Cohesion-tension generated by transpiration
B. Gravity pulling water upward
C. Active pumping by every xylem vessel
D. Diffusion of sugars from leaves into roots

**78. The Calvin–Benson cycle occurs in the:**

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

**79. Which plant hormone is most closely associated with cell elongation and apical dominance?**

A. Auxin
B. Ethylene only
C. Abscisic acid only
D. Jasmonic acid only

**80. The production of a whole plant from a small piece of plant tissue under sterile culture conditions demonstrates:**

A. Biomagnification
B. Totipotency
C. Denitrification
D. Transpiration pull

# Chemistry
# 50 MCQs | 4 options each
# Questions

**81. The number of moles in 9 g of water is approximately:**

A. 0.25 mol
B. 0.50 mol
C. 1.00 mol
D. 2.00 mol

**82. Which pair represents isotopes of the same element?**

A. 1123Na{}^{23}_{11}\mathrm{Na}1123Na and 1224Mg{}^{24}_{12}\mathrm{Mg}1224Mg
B. 1735Cl{}^{35}_{17}\mathrm{Cl}1735Cl and 1737Cl{}^{37}_{17}\mathrm{Cl}1737Cl
C. 614C{}^{14}_{6}\mathrm{C}614C and 714N{}^{14}_{7}\mathrm{N}714N
D. 1840Ar{}^{40}_{18}\mathrm{Ar}1840Ar and 2040Ca{}^{40}_{20}\mathrm{Ca}2040Ca

**83. The maximum number of electrons that can occupy the third principal energy level is:**

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

**84. Which quantum number specifies the orientation of an orbital in space?**

A. Principal quantum number, nnn
B. Azimuthal quantum number, lll
C. Magnetic quantum number, mlm_lml
D. Spin quantum number, msm_sms

**85. Which element has the highest electronegativity?**

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

**86. The molecular shape of ammonia, $NH_3$, is:**

A. Trigonal planar
B. Trigonal pyramidal
C. Tetrahedral with four bonded atoms
D. Linear

**87. The hybridization of the carbon atom in ethyne, HC≡CH, is:**

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

**88. Which molecule has a permanent dipole moment?**

A. $CO_2$
B. $BF_3$
C. $CCl_4$
D. $H_2O$

**89. The strongest intermolecular attraction between ordinary water molecules is:**

A. Metallic bonding
B. Hydrogen bonding
C. Ionic bonding between all molecules
D. Covalent bonding between separate molecules

**90. In the reaction 2Mg+O2→2MgO2Mg + O_2 \rightarrow 2MgO2Mg+O2→2MgO, magnesium is:**

A. Reduced
B. Oxidized
C. Neither oxidized nor reduced
D. Acting as a catalyst

**91. How many molecules are present in 0.5 mol of a substance?**

A. 3.011×10233.011 \times 10^{23}3.011×1023
B. 6.022×10236.022 \times 10^{23}6.022×1023
C. 1.204×10241.204 \times 10^{24}1.204×1024
D. 6.022×10226.022 \times 10^{22}6.022×1022

**92. At constant temperature and pressure, equal volumes of ideal gases contain equal numbers of molecules when they have the same:**

A. Molar mass
B. Density
C. Volume only, regardless of temperature
D. Temperature and pressure

**93. Which gas law states that the pressure of a fixed amount of gas is inversely proportional to its volume at constant temperature?**

A. Charles' law
B. Boyle's law
C. Avogadro's law
D. Dalton's law of partial pressures

**94. For a reaction at equilibrium, the value of the equilibrium constant changes when the:**

A. Concentration is changed at constant temperature
B. Catalyst is added
C. Temperature is changed
D. Pressure is changed at constant temperature

**95. For an exothermic equilibrium reaction, increasing temperature generally shifts equilibrium toward the:**

A. Products
B. Reactants
C. Side with more catalyst
D. Side with the larger molecules only

**96. A solution contains 0.2 mol of solute in 500 mL of solution. Its molarity is:**

A. 0.1 M
B. 0.2 M
C. 0.4 M
D. 2.5 M

**97. The pH of a 10−5 M10^{-5}\,\mathrm{M}10−5M strong acid solution at 25°C, assuming ideal dilute behaviour, is approximately:**

A. 2
B. 5
C. 7
D. 9

**98. Which solution is expected to have a pH greater than 7 at 25°C?**

A. 0.1 M0.1\,\mathrm{M}0.1M HCl
B. 0.1 M0.1\,\mathrm{M}0.1M NaOH
C. 0.1 M0.1\,\mathrm{M}0.1M $HNO_3$
D. Pure water with no dissolved substances

**99. A buffer solution resists changes in pH because it contains:**

A. Only a strong acid
B. A weak acid and its conjugate base, or a weak base and its conjugate acid
C. Only pure water
D. An insoluble metal and no ions

**100. The half-life of a first-order reaction is:**

A. Directly proportional to initial concentration
B. Independent of initial concentration
C. Always zero
D. Inversely proportional to the square of the rate constant

**101. A catalyst increases the reaction rate mainly by:**

A. Increasing the enthalpy of reactants
B. Lowering the activation energy pathway
C. Changing the equilibrium constant at fixed temperature
D. Increasing the amount of product allowed at equilibrium

**102. In a galvanic cell, oxidation occurs at the:**

A. Cathode
B. Anode
C. Salt bridge only
D. External voltmeter

**103. During electrolysis, the quantity of substance deposited at an electrode is proportional to the total electric charge passed, provided other relevant conditions are fixed. This is associated with:**

A. Faraday's law of electrolysis
B. Boyle's law
C. Hess's law
D. Raoult's law only

**104. Which thermodynamic quantity is a measure of the dispersal of energy in a system?**

A. Entropy
B. Molarity
C. Atomic number
D. Activation energy

**105. A reaction is spontaneous at constant temperature and pressure when its Gibbs free-energy change is:**

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

**106. Which isotope is commonly used in radiocarbon dating of once-living material?**

A. Carbon-12
B. Carbon-13
C. Carbon-14
D. Oxygen-18

**107. Which substance is commonly used as a primary standard in acid–base titration because of its high purity and stability?**

A. Sodium hydroxide pellets exposed to air
B. Anhydrous sodium carbonate
C. Concentrated hydrochloric acid
D. A freshly prepared unknown solution

**108. The oxidation number of sulfur in H2SO4H_2SO_4H2SO4 is:**

A. +2
B. +4
C. +6
D. −2

**109. Which oxide is amphoteric?**

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

**110. Which gas turns moist blue litmus paper red and is associated with acidic properties in water?**

A. Ammonia
B. Hydrogen chloride
C. Oxygen
D. Nitrogen

**111. The major constituent of natural gas is usually:**

A. Methane
B. Ethyne
C. Benzene
D. Carbon disulfide

**112. Which allotrope of carbon conducts electricity effectively because of delocalized electrons?**

A. Diamond
B. Graphite
C. Amorphous sulfur
D. White phosphorus

**113. The principal ore of aluminium is:**

A. Haematite
B. Bauxite
C. Galena
D. Cinnabar

**114. In metallurgy, a flux is added mainly to:**

A. Convert every metal into a gas
B. React with gangue to form slag
C. Increase the mass of the ore without reaction
D. Stop all oxidation reactions

**115. Stainless steel resists corrosion primarily because chromium forms a:**

A. Thick, soluble salt layer
B. Thin, protective oxide film
C. Layer of liquid mercury
D. Permanent coating of carbon dioxide

**116. Which ion is central to the oxygen-carrying function of haemoglobin?**

A. $Na^{+}$
B. $Fe^{2+}$
C. $Zn^{2+}$
D. $Ca^{2+}$

**117. Which metal ion is essential for the structure and catalytic function of many enzymes and is also involved in immune function?**

A. Zinc
B. Lead
C. Mercury
D. Cadmium

**118. The toxicity of lead is especially concerning because it can damage the:**

A. Nervous system and blood-forming processes
B. Cellulose cell wall of plants only
C. Ozone layer directly
D. Nitrogen molecule

**119. Which functional group is present in aldehydes?**

A. −COOH-COOH−COOH
B. −CHO-CHO−CHO
C. −OH-OH−OH only
D. −NH2-NH_2−NH2 only

**120. The IUPAC name of CH3CH2CH2OHCH_3CH_2CH_2OHCH3CH2CH2OH is:**

A. Propan-1-ol
B. Propan-2-ol
C. Ethanol
D. Butan-1-ol

**121. Which pair consists of functional isomers?**

A. Ethanol and dimethyl ether
B. Propane and propene
C. Ethane and ethyne
D. Methane and methanol

**122. A nucleophile is a species that typically:**

A. Accepts an electron pair
B. Donates an electron pair
C. Always contains no electrons
D. Must be a neutral metal atom

**123. Which reaction is a typical example of electrophilic addition?**

A. Addition of HBr to ethene
B. Substitution of methane by chlorine under light
C. Oxidation of ethanol to ethanoic acid
D. Ester hydrolysis

**124. Which reagent can be used to distinguish an aldehyde from most ketones?**

A. Tollens' reagent
B. Sodium chloride solution
C. Pure water
D. Dilute sodium sulfate

**125. Esterification commonly occurs between:**

A. An alcohol and a carboxylic acid
B. An alkane and an alkali metal only
C. Two noble gases
D. A salt and a noble gas

**126. Which polymer is formed from amino acid monomers?**

A. Polyethylene
B. Protein
C. Polyvinyl chloride
D. Polystyrene

**127. Saponification is the alkaline hydrolysis of:**

A. Fats or oils to produce soap and glycerol
B. Alkanes to produce noble gases
C. Water to produce salt
D. Alcohols to produce oxygen only

**128. Which method is particularly suitable for separating coloured components of a mixture based on different affinities for stationary and mobile phases?**

A. Chromatography
B. Simple sieving only
C. Magnetic separation only
D. Decantation of immiscible solids only

**129. In a titration, the equivalence point is reached when:**

A. The indicator first enters the flask

B. The reacting substances have combined in stoichiometric proportions

C. The solution becomes colourless in every titration

D. The burette is completely empty regardless of the reaction

**130. Which method is most appropriate for determining the concentration of a known acid using a standard base?**

A. Acid–base titration

B. Paper chromatography only

C. Sublimation

D. Filtration alone

# Physics
# 50 MCQs | 4 options each
# Questions

**131. A car travels 150 m in 10 s at a constant speed. Its speed is:**

A. 10 m/s

B. 15 m/s

C. 20 m/s

D. 1500 m/s

**132. The slope of a velocity–time graph represents:**

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

**133. A body moving at constant speed in a circle has acceleration because:**

A. Its speed must increase continuously
B. Its direction of velocity changes
C. Its mass changes
D. Gravity becomes zero

**134. A 4 kg object accelerates at 3 m/s23\,\mathrm{m/s^2}3m/s2. The net force on it is:**

A. 1.33 N
B. 7 N
C. 12 N
D. 24 N

**135. A 2 kg object is lifted vertically by 5 m. Taking g=10 m/s2g=10\,\mathrm{m/s^2}g=10m/s2, the increase in gravitational potential energy is:**

A. 10 J
B. 25 J
C. 50 J
D. 100 J

**136. The kinetic energy of a body moving with speed vvv is proportional to:**

A. vvv
B. v2v^2v2
C. 1/v1/v1/v
D. 1/v21/v^21/v2

**137. A machine performs 600 J of work in 20 s. Its average power is:**

A. 12 W
B. 20 W
C. 30 W
D. 120 W

**138. The principle of conservation of linear momentum applies to a system when the net external force is:**

A. Maximum
B. Zero
C. Equal to its weight
D. Always upward

**139. The moment of a force about a pivot depends on the force and its:**

A. Temperature
B. Perpendicular distance from the pivot
C. Electrical resistance
D. Density only

**140. A hydraulic lift works according to:**

A. Pascal’s principle
B. Snell’s law
C. Faraday’s law
D. Doppler’s principle

**141. The SI unit of specific heat capacity is:**

A. J kg−1 K−1\mathrm{J\,kg^{-1}\,K^{-1}}Jkg−1K−1
B. J K−1\mathrm{J\,K^{-1}}JK−1
C. W m−1\mathrm{W\,m^{-1}}Wm−1
D. kg m s−1\mathrm{kg\,m\,s^{-1}}kgms−1

**142. Heat transfer through a metal rod from its hot end to its cold end mainly occurs by:**

A. Conduction
B. Convection only
C. Evaporation
D. Nuclear fusion

**143. During the melting of pure ice at its melting point, the supplied heat primarily increases the:**

A. Temperature of the ice continuously
B. Potential energy associated with the phase change
C. Mass of the ice
D. Gravitational acceleration

**144. For an ideal gas at constant volume, increasing its absolute temperature causes its pressure to:**

A. Decrease in inverse proportion
B. Increase in direct proportion
C. Remain constant under all conditions
D. Become zero

**145. The first law of thermodynamics expresses conservation of:**

A. Electric charge only
B. Energy
C. Angular momentum only
D. Atomic number

**146. The efficiency of a heat engine is the ratio of:**

A. Heat rejected to heat absorbed
B. Useful work output to heat absorbed
C. Heat absorbed to work output
D. Work output to total mass

**147. Sound waves in air are primarily:**

A. Transverse electromagnetic waves
B. Longitudinal mechanical waves
C. Matter waves
D. Stationary electric fields

**148. If the frequency of a wave doubles while its speed remains constant, its wavelength becomes:**

A. Twice as large
B. Half as large
C. Four times as large
D. Unchanged

**149. The apparent change in frequency of a sound due to relative motion between source and observer is called the:**

A. Photoelectric effect
B. Doppler effect
C. Compton effect
D. Hall effect

**150. Resonance occurs when the driving frequency matches the system's:**

A. Zero frequency
B. Natural frequency
C. Average temperature
D. Electrical charge

**151. The refractive index of a medium is defined as the ratio of the speed of light in:**

A. The medium to vacuum
B. Vacuum to the medium
C. Air to glass density
D. Glass to water density

**152. When light travels from glass into air at an angle greater than the critical angle, it undergoes:**

A. Diffraction only
B. Total internal reflection
C. Polarization by absorption only
D. Nuclear scattering

**153. A convex lens forms a real image of an object placed beyond its focal point. The image can be projected onto a screen because it is:**

A. Virtual
B. Real
C. Always upright
D. Located at infinity in every case

**154. In Young's double-slit experiment, fringe spacing increases when the:**

A. Wavelength decreases
B. Distance to the screen increases
C. Slit separation increases
D. Light speed in vacuum decreases

**155. The phenomenon that demonstrates the wave nature of light particularly clearly is:**

A. Diffraction
B. Radioactive decay
C. Nuclear fission
D. Thermionic emission

**156. The electric field at a point is defined as force per unit:**

A. Mass
B. Positive test charge
C. Time
D. Resistance

**157. Two point charges of the same sign placed near each other will:**

A. Attract
B. Repel
C. Always become neutral
D. Produce no electric field

**158. The SI unit of electric potential difference is:**

A. Coulomb
B. Volt
C. Tesla
D. Farad

**159. A capacitor stores energy primarily in its:**

A. Magnetic poles
B. Electric field
C. Mechanical bearings
D. Nuclear core

**160. If the plate separation of a parallel-plate capacitor is doubled while the plate area and dielectric remain unchanged, its capacitance becomes:**

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

**161. A current of 3 A flows through a resistor of 4 Ω. The potential difference across it is:**

A. 0.75 V
B. 7 V
C. 12 V
D. 16 V

**162. Two resistors of 6 Ω each are connected in parallel. Their equivalent resistance is:**

A. 3 Ω
B. 6 Ω
C. 12 Ω
D. 36 Ω

**163. Electrical power dissipated by a resistor carrying current III with resistance RRR is:**

A. IRIRIR
B. I2RI^2RI2R
C. R/I2R/I^2R/I2
D. I/RI/RI/R

**164. The drift of charge carriers in a metallic conductor under an applied electric field produces:**

A. Electric current
B. Gravitational waves
C. Nuclear fission
D. Sound without energy transfer

**165. The magnetic force on a moving charged particle is zero when its velocity is:**

A. Perpendicular to the magnetic field
B. Parallel or antiparallel to the magnetic field
C. At 45° to the field only
D. Always nonzero

**166. The SI unit of magnetic flux density is:**

A. Weber
B. Tesla
C. Henry
D. Ohm

**167. According to Faraday's law, an induced emf is produced when there is a change in:**

A. Magnetic flux linked with a circuit
B. The mass of the conductor only
C. The colour of the conductor
D. The gravitational constant

**168. A transformer operates on the principle of:**

A. Mutual electromagnetic induction
B. Chemical decomposition
C. Photoelectric emission
D. Static friction

**169. A transformer has 500 turns in the primary and 100 turns in the secondary. If the primary voltage is 220 V, the ideal secondary voltage is:**

A. 22 V
B. 44 V
C. 110 V
D. 440 V

**170. The energy of a photon is directly proportional to its:**

A. Wavelength
B. Frequency
C. Period squared
D. Speed squared in vacuum

**171. The photoelectric effect supports the idea that light energy is transferred in:**

A. Continuous packets of any size only
B. Discrete quanta called photons
C. Sound waves
D. Neutrons only

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

A. Momentum
B. Electric charge alone
C. Temperature alone
D. Volume

**173. An alpha particle is:**

A. An electron
B. A helium nucleus
C. A photon
D. A neutron alone

**174. In beta-minus decay, a neutron in the nucleus transforms into a:**

A. Proton, electron, and antineutrino
B. Proton and positron only
C. Pair of photons only
D. Helium nucleus

**175. The half-life of a radioactive isotope is the time required for the number of undecayed nuclei to fall to:**

A. One-quarter of the original number
B. Half of the original number
C. Zero in all cases
D. Twice the original number

**176. Nuclear fission involves:**

A. Joining light nuclei into a heavier nucleus
B. Splitting a heavy nucleus into lighter nuclei
C. Removing electrons from an atom only
D. Converting sound into heat

**177. In a semiconductor, doping is used mainly to:**

A. Control its electrical conductivity
B. Eliminate all charge carriers
C. Convert it into a perfect insulator
D. Increase its nuclear binding energy

**178. A p-type semiconductor is formed by doping pure silicon with an impurity that has:**

A. Five valence electrons
B. Three valence electrons
C. Eight valence electrons
D. No valence electrons

**179. Which particle mediates the electromagnetic interaction in the Standard Model?**

A. Gluon
B. Photon
C. Higgs boson
D. Neutrino

**180. The Sun’s energy is produced mainly by:**

A. Chemical combustion of coal
B. Nuclear fusion of hydrogen into helium
C. Nuclear fission of uranium
D. Gravitational friction alone

# MAT
# 20 MCQs | 4 options each
# Questions

**181. Choose the word most nearly opposite in meaning to scarce.**

A. Rare
B. Limited
C. Abundant
D. Insufficient

**182. Complete the analogy:**

**Thermometer : Temperature :: Barometer : ?**

A. Humidity
B. Atmospheric pressure
C. Wind direction
D. Rainfall

**183. If all surgeons are doctors and some doctors are researchers, which conclusion must be true?**

A. All researchers are surgeons
B. Some surgeons are researchers
C. All surgeons are doctors
D. No doctor is a researcher

**184. Find the next number in the series:**

4, 9, 19, 39, 79, __4,\ 9,\ 19,\ 39,\ 79,\ __4, 9, 19, 39, 79, __

A. 119
B. 139
C. 159
D. 169

**185. Find the next letter in the sequence:**

B, E, I, N, T, ___

A. X
B. Y
C. Z
D. A

**186. A student walks 8 m east, turns left and walks 6 m, then turns left and walks 8 m. Where is the student relative to the starting point?**

A. 6 m north
B. 6 m south
C. 8 m east
D. At the starting point

**187. If the code for a word is the sum of the alphabetical positions of its letters, what is the code for NURSE?**

A. 65
B. 67
C. 69
D. 71

**188. Choose the odd one out.**

A. Triangle
B. Square
C. Pentagon
D. Sphere

**189. Five students—P, Q, R, S, and T—stand in a line. P is before Q, R is after Q, and S is before P. Which order could be correct?**

A. P, S, Q, R, T
B. S, P, Q, R, T
C. Q, P, S, R, T
D. S, R, P, Q, T

**190. If yesterday was Thursday, what day will it be 10 days after tomorrow?**

A. Sunday
B. Monday
C. Tuesday
D. Wednesday

**191. A book marked at Tk 800 is sold at a discount of 15%. What is the selling price?**

A. Tk 620
B. Tk 660
C. Tk 680
D. Tk 700

**192. A mixture contains milk and water in the ratio 5:2. If the total mixture is 28 litres, how much water does it contain?**

A. 6 L
B. 8 L
C. 10 L
D. 20 L

**193. The average of five numbers is 18. Four of them are 12, 16, 20, and 24. What is the fifth number?**

A. 16
B. 18
C. 20
D. 22

**194. A machine produces 240 items in 6 hours at a constant rate. How many items will it produce in 9 hours?**

A. 300
B. 320
C. 360
D. 400

**195. If 3 workers can complete a job in 12 days, how many days would 6 workers take, assuming equal productivity and no other changes?**

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

**196. A fair die is rolled once. What is the probability of obtaining a number greater than 4?**

A. 1/61/61/6
B. 1/31/31/3
C. 1/21/21/2
D. 2/32/32/3

**197. Which number completes the pattern?**

2483612510 ?\begin{matrix} 2 & 4 & 8\\ 3 & 6 & 12\\ 5 & 10 & \ ? \end{matrix}2354610812 ?

A. 15
B. 18
C. 20
D. 25

**198. A cube is painted on all six faces and then cut into 27 equal smaller cubes. How many small cubes have paint on exactly two faces?**

A. 8
B. 12
C. 6
D. 1

**199. A clock shows 3:00. What is the smaller angle between its hour and minute hands?**

A. 0°
B. 45°
C. 90°
D. 180°

**200. In a group of 40 students, 22 study Biology, 18 study Chemistry, and 10 study both. How many study neither subject?**

A. 8
B. 10
C. 12
D. 14

__Best Wishes__