

MDCAT Paper

(Biology Section)

- 1. The waxy layer on the epidermis of a leaf that prevents water loss is called:**
 - a. Cuticle
 - b. Epidermis
 - c. Guard cell
 - d. Stoma
- 2. Which plant hormone is primarily responsible for cell elongation?**
 - a Cytokinin
 - b Gibberellin
 - c. Auxin
 - d. Absciscic acid
- 3. The site of aerobic respiration in eukaryotic cells is:**
 - a Cytoplasm
 - b Mitochondria
 - c. Nucleus
 - d. Chloroplast
- 4. Which blood cells are responsible for immunity through antibody production?**
 - a Erythrocytes
 - b Neutrophils
 - c. B-lymphocytes
 - d. Platelets
- 5. The process by which plants lose water vapor through stomata is called:**
 - a Respiration
 - b Transpiration
 - c. Osmosis
 - d. Photosynthesis
- 6. Which vitamin is essential for normal blood clotting?**
 - a Vitamin A
 - b Vitamin K
 - c. Vitamin D
 - d. Vitamin C
- 7. The process of converting nitrogen gas into ammonia by bacteria is known as:**
 - a Nitrification
 - b Ammonification
 - c. Denitrification
 - d. Nitrogen fixation
- 8. Which structure controls the movement of substances into and out of the nucleus?**

- a Nucleolus
 - b Nuclear pores
 - c. Endoplasmic reticulum
 - d. Golgi apparatus
- 9. Which pigment captures light energy for photosynthesis?**
- a Xanthophyll
 - b Carotene
 - c. Chlorophyll-a
 - d. Anthocyanin
- 10. The enzyme responsible for breaking down starch into maltose is:**
- a. Amylase
 - b. Maltase
 - c. Lactase
 - d. Sucrase
- 11. The control center of reflex action is:**
- a. Cerebellum
 - b. Cerebrum
 - c. Spinal cord
 - d. Medulla oblongata
- 12. Motor neuron leaves from the _____ surface of the spinal cord and forms the _____ root.**
- a. Dorsal, Ventral
 - b. Ventral, Dorsal
 - c. Dorsal, Dorsal
 - d. Ventral, Ventral
- 13. During translation, which of the following is true?**
- a. tRNA binds with the larger unit of ribosomes
 - b. The first tRNA binds at the P site
 - c. The output of translation is proteins
 - d. All
- 14. Which of the following is not the function of the parasympathetic nervous system?**
- a. Contract pupil
 - b. Stimulates saliva production
 - c. Constrict bronchi
 - d. Inhibits urination
- 15. Which nervous system is often called "rest and rumination"?**
- a. Parasympathetic Nervous system
 - b. Sympathetic Nervous system

- c. Centralized Nervous system
- d. Spinal Nervous system

16. Which artery carries deoxygenated blood?

- a Pulmonary artery
- b Aorta
- c. Carotid artery
- d. Femoral artery

17. The functional unit of the kidney is called:

- a Glomerulus
- b Nephron
- c. Loop of Henle
- d. Bowman's capsule

18. The mode of nutrition in fungi is:

- a Autotrophic
- b Holozoic
- c. Saprophytic
- d. Parasitic only

19. Which component of blood is responsible for clot formation?

- a Plasma
- b Platelets
- c. Leukocytes
- d. Red blood cells

20. Which phase of mitosis is characterized by alignment of chromosomes at the equator?

- a Prophase
- b Metaphase
- c. Anaphase
- d. Telophase

21. The theory that says Mitochondria and chloroplast are ancient bacteria that now live inside larger cells is called:

- a. Darwin's theory
- b. Neo-Darwinism
- c. Lamarckism
- d. Endosymbiotic theory

22. What is the function of HIV's gp120 protein?

- a. Capsid assembly
- b. Binding to CD4 receptors
- c. Genome replication
- d. Viral exit

23. The light band of the sarcomere is called:

- a. H band
- b. A band
- c. I band

- d. M band

24. The infection of urinary bladder is known as:

- a. Urethritis
- b. Cystitis
- c. Pyelonephritis
- d. Glomerulonephritis

25. Which of the following is not a mode of transmission of AIDS?

- a. Through unsterilized needles
- b. Through contact with open wounds
- c. Through blood transfusion
- d. Through holding hands

26. The structure formed when the cell reaches its maximum size:

- a. Primary Cell wall
- b. Secondary Wall
- c. Middle Lamellae
- d. All

27. The Cristae in mitochondria is composed of:

- a. Phospholipid
- b. Lipoprotein
- c. Glycoprotein
- d. Nucleoprotein

28. The small oval bodies which act as filtering structures are:

- a. Afferent lymph vessel
- b. Lymph Node
- c. Efferent lymph vessel
- d. Lymphatic trunk

29. Which of the following takes part in the formation of the cranium?

- a. Frontal bone
- b. Occipital bone
- c. Sphenoid
- d. Ethmoid
- e. All

30. Vital capacity of lungs is:

- a. $TV + IRV + ERV$
- b. $TV + IRV + RV$
- c. $TV + ERV$
- d. $IRV + ERV$

31. Which part of the human ear is responsible for maintaining balance?

- a. Cochlea
- b. Ossicles
- c. Semicircular canals
- d. Eardrum

32. The connective tissue that attaches muscle to bone is called:

- a. Ligament
- b. Tendon
- c. Cartilage
- d. Fascia

33. Which organ produces bile?

- a. Pancreas
- b. Gall bladder
- c. Liver
- d. Small intestine

34. Which biome is characterized by permafrost?

- a. Tundra
- b. Desert
- c. Taiga
- d. Savanna

35. What is the genetic material of bacteriophages?

- a. Double-stranded DNA or RNA
- b. Only DNA
- c. Only RNA
- d. Protein

36. The process of synthesizing glucose from non-carbohydrate sources is:

- a. Glycogenolysis
- b. Gluconeogenesis
- c. Glycolysis
- d. Glycogenesis

37. Which chamber of the human heart pumps blood into the lungs?

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

38. Which of the following is NOT a function of the liver?

- a. Detoxification
- b. Urea formation
- c. Insulin secretion
- d. Bile production

39. Which molecule is known as the energy currency of the cell?

- a. ADP
- b. ATP
- c. AMP
- d. NADH

- 40. The part of the brain that controls voluntary movements is:**
- a. Cerebrum
 - b. Cerebellum
 - c. Medulla
 - d. Hypothalamus
- 41. Which type of RNA carries amino acids to the ribosome?**
- a. mRNA
 - b. rRNA
 - c. tRNA
 - d. snRNA
- 42. Which disease is caused by deficiency of insulin?**
- a. Goiter
 - b. Diabetes mellitus
 - c. Rickets
 - d. Beriberi
- 43. What type of symmetry is found in starfish?**
- a. Asymmetrical
 - b. Radial
 - c. Bilateral
 - d. None
- 44. Which gas is absorbed during photosynthesis?**
- a. Oxygen
 - b. Carbon dioxide
 - c. Nitrogen
 - d. Methane
- 45. Which process produces gametes in humans?**
- a. Mitosis
 - b. Meiosis
 - c. Binary fission
 - d. Budding
- 46. Which part of the hindbrain is responsible for regulating breathing patterns?**
- a. Medulla oblongata
 - b. Cerebellum
 - c. Brain stem
 - d. Pons
- 47. When a neuron's membrane potential is between -70 mV and -90 mV, it is said to be in a state of:**
- a. Depolarization
 - b. Hyperpolarization
 - c. Repolarization
 - d. No polarization
- 48. Addison's disease occurs because of the under-secretion of which hormone?**
- a. Antidiuretic hormone
 - b. Aldosterone

- c. Corticosterone
- d. Melanocyte-stimulating hormone

49. Human immunodeficiency virus attacks which of the following cells for its multiplication?

- a. Neutrophils
- b. Macrophages
- c. Cytotoxic T cells
- d. Helper T cells

50. Carbon dioxide enters the leaf through:

- a. Chloroplasts
- b. Mesophyll
- c. Thylakoids
- d. Stomata

51. Which of the following is respiratory fuel?

- a. Sucrose
- b. Glucose
- c. Galactose
- d. Mannose

52. Lysosomes originate from which cell organelle?

- a. Rough endoplasmic reticulum
- b. Smooth endoplasmic reticulum
- c. Golgi apparatus
- d. Cell membrane

53. Neurilemma cells are also known as?

- a. Photoreceptors
- b. Odontoblasts
- c. Ganglion
- d. Schwann cells

54. An activated enzyme consisting of a polypeptide chain and a cofactor is called?

- a. Apoenzyme
- b. Holoenzyme
- c. Conjugated enzyme
- d. Hybrid enzyme

55. The humerus makes a ball and socket joint with:

- a. Clavicle
- b. Sternum
- c. Innominate
- d. Scapula

56. A chemical which is applied on nonliving surfaces in order to control bacteria is called:

- a. Disinfectants
- b. Antiseptic
- c. Vaccines
- d. Antibiotics

57. Iliac vein from the lower limb unites to form:

- a. Vena cava
- b. Renal vein
- c. Hepatic portal vein
- d. Cardiac vein

58. A bacterial cell envelope does not include:

- a. Slime
- b. Capsule
- c. Cell wall
- d. Cell membrane

59. Rugae are:

- a. Gastric folds
- b. Intestinal folds
- c. Colonic folds
- d. Oesophageal folds

60. During a muscular contraction, which of the following elements maintains constant length?

- a. I band
- b. H zone
- c. A band
- d. Sarcomere

61. Glycolysis takes place in:

- a. Nucleus
- b. Cytosol
- c. Mitochondria
- d. Ribosomes

62. What is the interaction between genes occupying different loci known as?

- a. Dominance
- b. Pleiotropy
- c. Epistasis
- d. None of these

63. The largest lymphoid tissue of the body is:

- a. Spleen
- b. Liver
- c. Bone marrow
- d. Tonsils

64. Which of the following is common feature of all cells?

- a. Intracellular organelles
- b. A lipid cell membrane
- c. Nuclear membrane
- d. RNA genome

65. Antagonistic organelles of the cell?

- a. Nucleus and RER
- b. RER and SER
- c. Mitochondria and Chloroplast
- d. RER and Golgi bodies

66. Which of the following is NOT innervated by the autonomic nervous system?

- a. Branching muscle cell
- b. Intestinal muscle cell
- c. Striated skeletal muscle cell
- d. Myocardial cell

67. Which of the following structures in the plant cell is responsible for photosynthesis?

- a. Mitochondria
- b. Chloroplast
- c. Nucleus
- d. Ribosomes

68. Which of the following is a characteristic feature of prokaryotic cells?

- a. Presence of a true nucleus
- b. Presence of mitochondria
- c. Absence of membrane-bound organelles
- d. Presence of Golgi apparatus

69. The primary structure of a protein refers to:

- a. Its three-dimensional shape
- b. The sequence of amino acids in the polypeptide chain
- c. Its subunit organization
- d. The folding pattern of the protein

70. Which part of the human brain is responsible for controlling balance and coordination?

- a. Cerebrum
- b. Medulla Oblongata
- c. Cerebellum
- d. Thalamus

71. Viruses use which of the following enzyme for the breakdown of the bacterial cell wall?

- a. Lysozyme
- b. Lipase
- c. Protease
- d. Nuclease

72. What type of virus is the poliovirus?

- a. DNA enveloped virus
- b. RNA enveloped virus
- c. DNA naked virus
- d. RNA naked virus

73. It refers to the final changes within an immature virion that result in an infectious virus particle:

- a. Assembly
- b. Coating
- c. Integration
- d. Maturation

74. The replication of the HIV nucleic acid depends on:

- a. Protease
- b. Reverse transcriptase
- c. Transcriptase
- d. Integrase

75. Which structure in the chloroplast contains chlorophyll pigments?

- a. Stroma
- b. Thylakoid membrane
- c. Outer membrane
- d. Inner membrane

76. Which type of immunity develops after vaccination?

- a. Natural active immunity
- b. Artificial active immunity

- c. Natural passive immunity
 - d. Artificial passive immunity
- 77. What is the main nitrogenous waste in humans?**
- a. Ammonia
 - b. Uric acid
 - c. Urea
 - d. Creatinine
- 78. Which organelle packages proteins for secretion?**
- a. Lysosome
 - b. Ribosome
 - c. Golgi apparatus
 - d. Smooth ER
- 79. The movement of molecules from higher concentration to lower concentration without energy is called:**
- a. Active transport
 - b. Diffusion
 - c. Osmosis
 - d. Facilitated diffusion
- 80. Which blood group is known as the universal donor?**
- a. A
 - b. B
 - c. AB
 - d. O
- 81. What is the interaction between genes occupying different loci known as?**
- a. Dominance
 - b. Pleiotropy
 - c. Epistasis
 - d. None of these

(Chemistry Section)

- 82. In free radical mechanism, the step in which free radical reacts with free radical is called:**
- a. Initiation
 - b. Propagation
 - c. Termination
 - d. All of the above
- 83. The chlorination of methane to give CCl₄ is an example of:**
- a. An addition reaction
 - b. A chain reaction
 - c. A reduction
 - d. An elimination reaction

84. In which reaction addition Markownikov's rule is not obeyed?

- a. $\text{CH}_3\text{CH}=\text{CH}_2 + \text{HCl} \rightarrow$
- b. $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 + \text{HI} \rightarrow$
- c. $\text{CH}_3\text{CH}=\text{CH}_2 + \text{HBr} \rightarrow$
- d. $\text{CH}_3\text{CH}=\text{CHCH}_3 + \text{HBr} \rightarrow$

85. Which ion is the most stable carbocation?

- a. CH_3^+
- b. $(\text{CH}_3)_2\text{CH}^+$
- c. $\text{CH}_3\text{-CH}_2^+$
- d. $(\text{CH}_3)_3\text{C}^+$

86. The general formula for alkene is:

- a. $\text{C}_n\text{H}_{2n+2}$
- b. C_nH_{2n}
- c. $\text{C}_n\text{H}_{2n-2}$
- d. None of these

87. The dehydration of tertiary alcohols can be done in the presence of:

- a. $\text{Al}_2\text{O}_3/340\text{--}450^\circ\text{C}$
- b. 75% conc. $\text{H}_2\text{SO}_4/140\text{--}170^\circ\text{C}$
- c. 20% conc. $\text{H}_2\text{SO}_4/85^\circ\text{C}$
- d. All of these

88. The resonance energy of benzene is:

- a. -150.5 kJ/mole
- b. 150.5 kJ/mole
- c. 231.5 kJ/mole
- d. 358.5 kJ/mole

89. Benzene structure is actually:

- a. Equilibrium mixture of all 5 contributors
- b. Like two Kekule's structures
- c. Resonance hybrid of all 5 contributors
- d. Like three Dewar's structures

90. What is the heat of hydrogenation of 1,3-cyclohexadiene?

- a. -119.5 kJ/mol
- b. -150.5 kJ/mol

c. -231.5 kJ/mol

d. -208.5 kJ/mol

91. Which of the following does not contain isolated rings?

a. Biphenyl

b. Phenanthrene

c. Diphenyl methane

d. Tetraphenyl methane

92. The formula of benzoyl chloride is:

a. $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$

b. $\text{C}_6\text{H}_5\text{CHCl}_2$

c. $\text{C}_6\text{H}_5\text{CCl}_3$

d. $\text{C}_6\text{H}_5\text{COCl}$

93. Benzene cannot undergo:

a. Substitution reaction

b. Addition reaction

c. Oxidation reaction

d. Elimination reaction

94. _____ is less reactive than benzene although it contains Ortho, Para directing group:

a. Nitrobenzene

b. Chlorobenzene

c. Phenol

d. Benzene sulphonic acid

95. Benzene reacts with benzoyl chloride in presence of AlCl_3 to give:

a. Benzaldehyde

b. Benzyl chloride

c. Acetophenone

d. Benzophenone

96. Which reagent can best be used to distinguish between 1-hexene and toluene?

a. Aqueous ammoniacal AgNO_3 solution

b. Iodine in aqueous sodium hydroxide

c. Bromine in carbon tetrachloride

d. Dilute aqueous sulphuric acid

97. Which of the following is produced by the action of CH_3Cl on benzene in presence of AlCl_3 followed by oxidation in the presence of acidified KMnO_4 ?

- a. Toluene
- b. ortho-Xylene
- c. meta-Xylene
- d. Benzoic acid

98. Which one does not undergo polymerization?

- a. Benzene
- b. Ethyne
- c. Ethene
- d. Chloroprene

99. When toluene reacts with Cl_2 in the presence of sunlight, the final product will be:

- a. Benzotrichloride
- b. Benzal chloride
- c. Benzyl chloride
- d. Chlorobenzene

100. The conversion of benzene to chlorobenzene is an example of _____ reaction.

- a. Electrophilic addition
- b. Nucleophilic addition
- c. Electrophilic substitution
- d. Nucleophilic substitution

101. The order of reactivity of halogens with alkanes is:

- a. $\text{I}_2 > \text{F}_2 > \text{Cl}_2 > \text{Br}_2$
- b. $\text{I}_2 < \text{Br}_2 < \text{Cl}_2 < \text{F}_2$
- c. $\text{I}_2 > \text{Br}_2 > \text{Cl}_2 > \text{F}_2$
- d. $\text{I}_2 < \text{Br}_2 < \text{F}_2 < \text{Cl}_2$

102. For the reaction $2\text{A} + 3\text{B} \rightarrow \text{C}$, if 6 moles of A and 12 moles of B are mixed, how many moles of C are formed, assuming complete reaction?

- a. 2 moles
- b. 3 moles
- c. 4 moles
- d. 6 moles

103. In the reaction $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$, 14 g of N_2 reacts with 8 g of H_2 . What is the maximum mass of NH_3 produced?

- a. 8.5 g
- b. 17 g
- c. 34 g
- d. 12 g

104. What is the electron configuration of Cu^+ (atomic number 29)?

- a. $[\text{Ar}] 4s^1 3d^9$
- b. $[\text{Ar}] 3d^{10}$
- c. $[\text{Ar}] 4s^2 3d^8$
- d. $[\text{Ar}] 4s^1 3d^{10}$

105. Which of the following quantum numbers is invalid for an electron in a 4p orbital?

- a. $n=4, l=1, m_l=0, m_s=+1/2$
- b. $n=4, l=2, m_l=-1, m_s=-1/2$
- c. $n=4, l=1, m_l=+1, m_s=+1/2$
- d. $n=4, l=1, m_l=0, m_s=-1/2$

106. What is the wavelength of light emitted when an electron in a hydrogen atom transitions from $n=4$ to $n=2$?

- a. 656 nm
- b. 486 nm
- c. 410 nm
- d. 364 nm

107. A gas at 2 atm and 5 L is compressed to 1 L. What is the final pressure at constant temperature?

- a. 8 atm
- b. 10 atm
- c. 12 atm
- d. 6 atm

108. Which compound has the highest boiling point due to hydrogen bonding?

- a. CH_3NH_2
- b. H_2O
- c. CH_3F
- d. HF

109. For $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$, $\Delta H = -198 \text{ kJ/mol}$, what happens if pressure is increased?

- a. Shifts to reactants
- b. Shifts to products
- c. No shift
- d. Temperature increases

110. What is the major product of $\text{CH}_3\text{CH}=\text{CH}_2$ with HBr in the presence of peroxides?

- a. $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$
- b. $\text{CH}_3\text{CHBrCH}_3$
- c. $\text{CH}_2\text{BrCH}_2\text{CH}_3$
- d. $\text{CH}_3\text{CH}_2\text{Br}$

111. The distillation which is carried out under reduced pressure is called as:

- a. Pressure distillation
- b. Reduced distillation
- c. Vacuum distillation
- d. Low boiling distillation

112. HF has higher boiling point than HCl due to:

- a. Dipole-dipole force
- b. Dipole induced dipole forces
- c. London dispersion force
- d. Hydrogen bonding

113. Lattice energy decreases when:

- a. Charge to size ratio increases
- b. Charge to size ratio decreases
- c. Charge increases
- d. Size decreases

114. The shape of H_2S is:

- a. Angular
- b. Tetrahedral
- c. Octahedral
- d. Trigonal planar

115. Ionization energies of atoms depend upon the factors:

- a. Atomic radius of atoms

- b. Nature of orbital
- c. Shielding effect of inner electrons
- d. All of these

116. Which of the following shows optical isomerism?

- a. $\text{CH}_3\text{CH}_2\text{OH}$
- b. $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$
- c. $\text{CH}_3\text{CH}_2\text{CH}_3$
- d. CH_3COCH_3

117. In aldol condensation, carbanion acts as:

- a. Acid
- b. Base
- c. Nucleophile
- d. Electrophile

118. Which of the following does not react with bases?

- a. Carboxylic acids
- b. Phenol
- c. Ethanol
- d. HCl

119. Which enzyme is raised in rickets?

- a. Alkaline phosphatase
- b. LDH-1
- c. Acidic phosphatase
- d. None

120. The type and relative abundance of isotopes in an element can be determined by:

- a. Infrared spectroscopy
- b. Ultraviolet spectroscopy
- c. Mass spectrometry
- d. Nuclear magnetic resonance spectroscopy

121. The atomic mass of an element depends upon:

- a. The atomic number of the element
- b. The number of electrons in the element
- c. The number of isotopes of the element and their relative abundances

- d. None of the above

122. Which of the following compounds does NOT have a tendency to form hydrogen bonding?

- a. Ammonia
- b. Ethyl alcohol
- c. Carboxylic acid
- d. Hydrocarbon

123. The boiling point of a liquid is the temperature at which:

- a. Surface tension is greater than the atmospheric pressure
- b. Viscosity is less than the atmospheric pressure
- c. Vapor pressure equals the atmospheric pressure
- d. Viscosity equals the atmospheric pressure

124. The oxidation number of 'Mn' in KMnO_4 is:

- a. 0
- b. +1
- c. -7
- d. +7

125. What happens during dehydration of alcohol?

- a. Addition of water
- b. Removal of H_2
- c. Removal of H_2O
- d. Oxidation

126. Transition metals show variable oxidation states because:

- a. They are radioactive
- b. They have filled d-orbitals
- c. They have unpaired d-electrons
- d. They are noble gases

(Physics Section)

127. In case of motion of a paratrooper, when the weight of the paratrooper and air resistance become equal, the paratrooper falls with:

- a. Variable acceleration
- b. Zero acceleration
- c. Uniform acceleration

d. Gravitational acceleration

128. Which of the following has no acceleration?

- a. Man driving a car on a busy road
- b. Rock rolling down a mountain
- c. A luggage in a flying airplane
- d. A bike moving on a rough road

129. When collision between the bodies in a system is inelastic in nature, then for the system:

- a. Momentum changes but K.E remains conserved
- b. K.E changes but momentum remains conserved
- c. Both momentum and K.E change
- d. Both momentum and K.E remain conserved

130. The frequency of vibration in a string is given by $f = \frac{1}{2L} \sqrt{\frac{F}{m}}$ The unit of m is:

- a. kg
- b. kg m⁻¹
- c. km
- d. None of these

131. The ratio of distance to displacement along a semicircle of radius r is:

- a. 2π
- b. π
- c. $\pi/2$
- d. $\pi/4$

132. A force of $3\hat{i} + 2\hat{j} + 4\hat{k}$ N gives a displacement of $10\hat{j}$ m. The work done is:

- a. 20 J
- b. 26 J
- c. 32 J
- d. Zero

133. A man pulls a bag with a force of 20 N at an angle of 60° with the horizontal plane. If the bag covers 15 m, the work done is:

- a. 50 J
- b. 75 J
- c. 150 J
- d. 100 J

134. The acceleration of a body traveling with uniform speed in a circle is:

- a. Zero
- b. Directed towards the center
- c. Directed away from the center
- d. Directed along the tangent

135. The power required to raise a 500 kg block vertically to 15 m in 50 s is:

- a. 1 hp
- b. 2 hp
- c. 3 hp
- d. 4 hp

136. The period of a satellite in a circular orbit of radius R is T . For radius $4R$ the period is:

- a. $8T$
- b. $4T$
- c. $T/4$
- d. $T/8$

137. According to Faraday's law of electromagnetic induction:

- a. The direction of induced current opposes the cause
- b. Induced emf $\propto$ rate of change of magnetic flux
- c. The direction of induced emf opposes the cause
- d. None of these

138. A second's pendulum in a space lab at height $3R$ from Earth has a time period of:

- a. Zero
- b. $2/3$ s
- c. 2 s
- d. Infinite

139. The energy stored in a 3 F capacitor is 24 J. The potential difference is:

- a. 4 kV
- b. 8 kV
- c. 16 kV
- d. 64 kV

140. The half-life of a radioactive sample (mean life = 200 s) in minutes is:

- a. 0.69 min
- b. 2 min
- c. 2.57 min
- d. 2.31 min

141. A coil (area = 5 m^2) in a magnetic field changing from 1 Wb/m^2 to 4 Wb/m^2 in 3 s induces emf:

- a. 15 V
- b. 10 V
- c. 1 V
- d. 5 V

142. The speed of sound in air is 350 m/s. A 0.5 m closed tube emits fundamental frequency:

- a. 50 Hz

- b. 350 Hz
- c. 175 Hz
- d. 500 Hz

143. The measure in radians of angle 330° is:

- a. $5\pi/6$
- b. $11\pi/6$
- c. $\pi/6$
- d. $7\pi/6$

144. If solenoid turns are doubled and length made $1/4$ th (current constant), magnetic field:

- a. Increases $\times 2$
- b. Increases $\times 4$
- c. Decreases $\times 2$
- d. Increases $\times 8$

145. A stationary wave in a pipe (open at one end. with two loops ($\lambda = 10$ cm) has length:

- a. 10 cm
- b. 15 cm
- c. 12.5 cm
- d. 7.5 cm

146. Magnetic flux changing at 1 Wb/min induces emf:

- a. 1 V
- b. 60 V
- c. $1/60$ V
- d. 0.5 V

147. A 100 W heater heats 500 g water for 5 min ($c = 4.2$ J/g $^\circ$ C.. Temperature change:

- a. 140°C
- b. 40°C
- c. 0.2°C
- d. 14°C

148. Raising gas temperature from 27°C to 327°C doubles:

- a. r.m.s speed
- b. Mean speed squared
- c. Mean speed
- d. Mean square speed

149. Force F between charges at distance d becomes at $d/2$.

- a. 4F
- b. 2F
- c. F

d. $F/2$

150. Time constant for capacitor charging is time to:

- a. Deposit 63% of equilibrium charge
- b. Deposit 36% of equilibrium charge
- c. Deposit $63\times$ equilibrium charge
- d. Deposit $36\times$ equilibrium charge

151. A gas undergoes a cycle of pressure and volume changes. The net work done by the gas is:

- a. -600 J
- b. -200 J
- c. 0 J
- d. 200 J

152. Magnitude of $\frac{1}{4\pi\epsilon_0}$

- a. 9×10^9
- b. 9×10^{-9}
- c. 8.85×10^{12}
- d. 8.85×10^{-12}

153. Proton (mass (1.67×10^{-27}) kg) balanced in electric field E:

- a. 10^{-7} V/m
- b. 10^{-9} V/m
- c. 10^6 V/m
- d. 10^{-8} V/m

154. Wire resistance R stretched to double length becomes:

- a. $2R$
- b. $4R$
- c. $R/2$
- d. $R/4$

155. Energy stored per unit volume in strained wire (Y = Young's modulus):

- a. $\frac{1}{2} \times \text{load} \times \text{extension}$
- b. $Y/2$
- c. $\frac{1}{2} \times [\text{Strain}]^2$
- d. $[\text{Stress}][\text{Strain}]$

156. Escape velocity to orbital velocity ratio:

- a. $\sqrt{2}$
- b. $\frac{1}{\sqrt{2}}$
- c. $\frac{1}{\sqrt{3}}$
- d. $\sqrt{3}$

157. Shortest X-ray wavelength at (2×10^4) V is:

- a. $1 \text{ \AA}$

- b. $10^3 \text{ \AA}$
- c. $0.5 \text{ \AA}$
- d. $10^5 \text{ \AA}$

158. Photoelectric effect: max electron energy depends on:

- a. Frequency of light
- b. Intensity of light
- c. Both
- d. None

159. Half-life 2400 years, activity drops from 720 to 90 counts/s in:

- a. 3000 years
- b. 7200 years
- c. 4800 years
- d. 19200 years

160. The energy stored in a parallel plate capacitor is 24 J. What is the potential difference between the plates if the capacitance of the capacitor is 3F?

- a. 4kV
- b. 8 kV
- c. 16kV
- d. 64 kV

(English Section)

163. Fill in the blank: The boys ran through the sprinkler and then the mud.

- a. at
- b. in
- c. onto
- d. into

164. Fill in the blank: They will be treated ____ any other applicant.

- a. as
- b. like
- c. that
- d. of

165. Fill in the blank: Where are they travelling ____ this summer?

- a. to
- b. from
- c. No preposition
- d. in

166. Fill in the blank: Charles talks ____ his brother does.

- a. the way

- b. like
- c. that
- d. of

167. Fill in the blank: The teacher divided the class ____ four groups for the project.

- a. into
- b. in
- c. onto
- d. at

168. Find the error: The committee meet every Monday to discuss upcoming events.

- a. committee
- b. meet
- c. discuss
- d. upcoming

169. Find the error: Neither the manager nor his assistants was available for comment.

- a. Neither
- b. nor
- c. was
- d. assistants

170. Choose the correct option: I can't find the keys, they must be ____ the drawer.

- a. at
- b. on
- c. in
- d. into

171. Choose the correct option: Of your three dogs, which is the cutest?

- a. Of your three dogs, which is cutest?
- b. Of your three dogs, which the cuter?
- c. Of your two dogs, which is the more cuter?
- d. Of your three dogs, which is the cutest?

(Analytical Reasoning)

172. If all doctors are intelligent and some teachers are doctors, which of the following must be true?

- a. Some teachers are intelligent.
- b. All teachers are intelligent.
- c. No teacher is intelligent.
- d. Some doctors are not intelligent.

173. A clock shows the time as 3:15. What is the angle between the hour hand and the minute hand?

- a. 0°
- b. 7.5°
- c. 15°
- d. 30°

174. Ali is taller than Bilal but shorter than Kamran. Hamza is shorter than Bilal. Who is the tallest?

- a. Ali
- b. Bilal
- c. Kamran
- d. Hamza

175. In a certain code, CAT = 3120, DOG = 4157. Using the same code, what will be the code for BAT?

- a. 2120
- b. 2230
- c. 2130
- d. 2310

176. Statements:

- I. The price of aircraft fuel has risen during the past few months.
- II. Many Passenger airlines in Pakistan have been forced to cut their air fares by about 10%

Conclusion:

- a. Statement I is the cause and statement II is its effect.
- b. Statement II is the cause and statement I is its effect.
- c. Both statement I and II are independent causes.
- d. Both statement I and II are effects of independent causes.

177. Which number comes next in the series?

2, 6, 12, 20, 30?

- a. 36
- b. 40
- c. 42
- d. 44

178. What comes next?

AZ, BY, CX, DW ?

- a. EV
- b. FU
- c. EX
- d. EZ

179. If 3 cats catch 3 mice in 3 minutes, how many cats are needed to catch 100 mice in 100 minutes?

- a. 3
- b. 4

- c. 1
- d. 100

180. Three of the words will be in the same classification, the remaining one will not be. Your answer will be the one word that does NOT belong in the same classification as the others.

- a. Tulip
- b. Rose
- c. Bud
- d. Daisy