



MITTAL CLASSES

IIT-JEE | MEDICAL | FOUNDATION

Paper Code:11M-SP-1

SAMPLE PAPER

Class – XI Med

Time: 2 Hour

M. Marks: 480

General Instructions:

1. Answers have to be marked on the OMR sheet.
2. The question paper consists of 120 multiple choice questions (single correct option) divided into five sections.
Section – A contains 30 questions (Q1 to Q30) of Physics.
Section – B contains 30 questions (Q31 to Q60) of Chemistry.
Section – C contains 60 questions (Q61 to Q120) of Biology.
3. Each question carries **+4** marks for correct answer and **–1** mark for wrong answer.
4. The Question Paper contains blank spaces for your rough work. No additional sheets will be provided for rough work.
5. Blank papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.
6. Write your Name, Father Name, Class, and Date in the space provided at the bottom of this sheet.

NAME: _____

FATHER NAME: _____

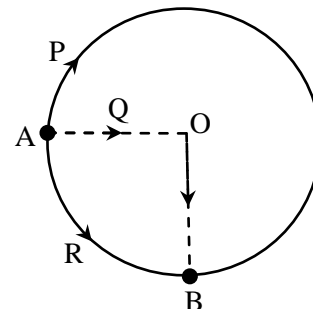
CLASS: _____

DATE: _____

PHYSICS

- Which of the following system of units is not based on units of mass, length and time alone ?
(A) SI
(B) MKS
(C) FPS
(D) CGS
- Which of the following does not have the dimensions of force ?
(A) Potential gradient
(B) Energy gradient
(C) Weight
(D) Rate of change of momentum
- One centimeter on the main scale of vernier calipers is divided into ten equal parts. If 10 divisions of vernier scale coincide with 8 small divisions of the main scale, the least count of the calipers is
(A) 0.01 cm
(B) 0.02 cm
(C) 0.05 cm
(D) 0.005 cm
- When a copper sphere is heated, maximum percentage change will be observed in -
(A) radius
(B) area
(C) volume
(D) none of these
- Three particles P, Q and R are situated at point A on the circular path of radius 10 m. All three particles move along different paths and reach point B as shown in figure. Then the ratio of

distance traversed by particles P and Q is :



- (A) $\frac{3}{4}$
(B) $\frac{1}{3}$
(C) $\frac{3\pi}{4}$
(D) $\frac{\pi}{3}$
- If displacement of a particle is zero, the distance covered :
(A) must be zero
(B) may or may not be zero
(C) cannot be zero
(D) depends upon the particle
- A car travels a distance d on a straight road in two hours and then returns to the starting point in next three hours. Its average speed is :
(A) $\frac{d}{5}$
(B) $\frac{2d}{5}$
(C) $\frac{d}{2} + \frac{d}{3}$
(D) none of these

Space for rough work



8. The velocity-time relation of an electron starting from rest is given by $u = kt$, where $k = 2 \text{ m/s}^2$. The distance traversed in 3 sec is :
- (A) 9m
(B) 16 m
(C) 27 m
(D) 36 m
9. The displacement of a particle starting from rest (at $t=0$) is given by $s = 6t^2 - t^3$. The time when the particle will attain zero velocity again, is :
- (A) 4s
(B) 8s
(C) 12s
(D) 16s
10. If a train travelling at 72 km/h is to be brought to rest in a distance of 200 m, then its retardation should be
- (A) 20 ms^{-2}
(B) 2 ms^{-2}
(C) 10 ms^{-2}
(D) 1 ms^{-2}
11. A body is released from the top of a tower of height H meters. It takes t time to reach the ground. Where is the body $\frac{t}{2}$ time after the release?
- (A) At $\frac{H}{2}$ meters from ground
(B) At $\frac{H}{4}$ meters from ground
(C) At $\frac{3H}{4}$ meters from the ground
(D) At $\frac{H}{6}$ meters from the ground
12. If a ball is thrown vertically upwards with 40 m/s, its velocity after two seconds will be
- (A) 10 ms^{-1}
(B) 20 ms^{-1}
(C) 30 ms^{-1}
(D) 40 ms^{-1}
13. A shell is fired vertically upwards with a velocity v_1 from the deck of a ship moving with a speed v_2 . A person on the shore observes the motion of the shell as a parabola. Its horizontal range is given by:
- (A) $\frac{2v_1^2 v_2}{g}$
(B) $\frac{2v_1 v_2^2}{g}$
(C) $\frac{2v_1 v_2}{g}$
(D) $\frac{2v_1^2 v_2^2}{g}$
14. A ball is thrown at an angle θ to the horizontal and the range is maximum. The value of $\tan \theta$ is.
- (A) 1
(B) $\sqrt{3}$
(C) $\frac{1}{\sqrt{3}}$
(D) 2
15. The equation of a projectile is $y = \sqrt{3}x - \frac{gx^2}{2}$. The angle of projection is:
- (A) 30°
(B) 60°
(C) 45°
(D) none

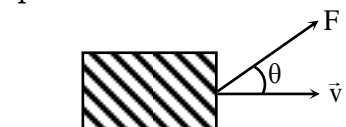
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16. The equation of a projectile is $y = 16x - \frac{x^2}{4}$. The horizontal range is:
(A) 16 m
(B) 8 m
(C) 64 m
(D) 12.8 m
17. Essential characteristic of equilibrium is:
(A) Momentum equals zero
(B) Acceleration equals zero
(C) K.E. equals zero
(D) Velocity equals zero
18. When a constant force is applied to a body, it moves with uniform:
(A) Acceleration
(B) Velocity
(C) Speed
(D) Momentum
19. An object of mass 10 kg moves at a constant velocity of 10 m/s. A constant force then acts for 4 seconds on the object giving it a speed of 2 m/s in opposite direction. The acceleration produced is:
(A) 3 m/s^2
(B) -3 m/s^2
(C) 0.3 m/s^2
(D) -0.3 m/s^2
20. When we kick a stone, we get hurt. Due to which of the following properties of stone does it happens?
(A) Inertia
(B) Velocity
(C) Reaction
(D) Momentum
21. If force $F = 500 - 100t$, then impulse as a function of time will be:
(A) $500t - 50t^2$
(B) $50t - 10$
(C) $50 - t^2$
(D) $100t^2$
22. A person is standing in an elevator. In which situation he finds his weight less?
(A) when the elevator moves upward with constant acceleration
(B) when the elevator moves downward with constant acceleration
(C) when the elevator moves upward with uniform velocity
(D) when the elevator moves downward with uniform velocity
23. A block of mass 2 kg is placed on the floor. The coefficient of static friction is 0.4. Force of 2.8 N is applied on the block. The force of friction between the block and the floor is
(A) 2.8 N
(B) 8.0 N
(C) 2.0 N
(D) zero
24. Which of the following statement is incorrect for a conservative field?
(A) Work done in going from initial to final position is equal to change in kinetic energy of the particle.
(B) Work done depends on path but not on initial and final positions.
(C) Work done does not depend on path but depends only on initial and final positions
(D) Work done on a particle in the field for a round trip is zero.

Space for rough work

25. A constant force \vec{F} is acting on a body of mass m with constant velocity \vec{v} as shown in the figure. The power P exerted is



- (A) $Fv \cos \theta$
 (B) $\frac{F \cos \theta}{mg}$
 (C) $\frac{Fmg \cos \theta}{v}$
 (D) $\frac{mg \sin \theta}{F}$
26. The centre of mass of a system of particles does not depend on
 (A) masses of the particles
 (B) internal forces of the particles
 (C) position of the particles
 (D) relative distance between the particles
27. A person of mass m is standing on one end of a plank of mass M and length L and floating in water. The person moves from one end to another and stops. The displacement of the plank is

- (A) $\frac{Lm}{(m+M)}$
 (B) $Lm(M+m)$
 (C) $\frac{(M+m)}{Lm}$
 (D) $\frac{LM}{(m+M)}$

28. Which of the following pairs do not match:
 (A) rotational power-Joule/sec
 (B) torque-Newton meter
 (C) angular displacement-radian
 (D) angular acceleration – radian/sec
29. The moment of inertia of a disc of radius 0.5 m about its geometric axis is 2 kg-m². If a string is tied to its circumference and a force of 10 Newton is applied, the value of torque with respect to this axis will be:
 (A) 2.5 N-m
 (B) 5 N-m
 (C) 10 N-m
 (D) 20 N-m
30. A small steel sphere of mass m is tied to a string of length r and is whirled in a horizontal circle with a uniform angular velocity 2ω . The string is suddenly pulled, so that radius of the circle is halved. The new angular velocity will be
 (A) 2ω
 (B) 4ω
 (C) 6ω
 (D) 8ω

CHEMISTRY

31. The number of atoms present in 16 g of oxygen is
 (1) $6.02 \times 10^{11.5}$
 (2) 3.01×10^{23}
 (3) $3.01 \times 10^{11.5}$
 (4) 6.02×10^{23}

Space for rough work



32. What is the mass of a molecule of CH_4 :-
(1) 16 g
(2) 26.6×10^{22} g
(3) 2.66×10^{-23} g
(4) $16 N_{\text{Ag}}$
33. The number of carbon atoms present in a signature, if a signature written by carbon pencil, weighing 1.2×10^{-3} g is
(1) 12.04×10^{20}
(2) 6.02×10^{19}
(3) 3.01×10^{19}
(4) 6.02×10^{20}
34. Insulin contains 3.4% sulphur ; the minimum molecular weight of insulin is:
(1) 941.176
(2) 944
(3) 945.27
(4) None
35. An organic compound contains carbon, hydrogen and oxygen. Its elemental analysis gives 38.71% of C and 9.67% of H. The empirical formula of the compound would be
(1) CHO
(2) CH_4O
(3) CH_3O
(4) CH_2O
36. If $1/2$ mol of oxygen combine with Aluminium to form Al_2O_3 then weight of Aluminium metal used in the reaction is (Al = 27) –
(1) 27g
(2) 18g
(3) 54g
(4) 40.5g
37. An orbital with $l = 0$ is symmetrical about the:
(A) x-axis only
(B) y-axis only
(C) z-axis only
(D) nucleus
38. The orbital with maximum energy is
(A) 3d
(B) 5p
(C) 4s
(D) 6d
39. Which one of the following species will give a series of spectral lines similar to that of Mg^{2+} :
(A) Al^{3+}
(B) Na
(C) Mg^+
(D) F
40. Which is not a correct order of energy for 1st, 2nd and 3rd orbit:
(A) $E_1 > E_2 > E_3$
(B) $(\text{PE})_1 < (\text{PE})_2 < (\text{PE})_3$
(C) $(\text{KE})_1 > (\text{KE})_2 > (\text{KE})_3$
(D) (A) and (C) both
41. Going from K-shell to N-shell in case of H-atom:
(A) Kinetic energy decreases
(B) Total energy decreases
(C) Potential energy decreases
(D) None of these
42. For Li^{+2} ion, $r_2 : r_5$ will be:
(A) 9 : 25
(B) 4 : 25
(C) 25 : 4
(D) 25 : 9

Space for rough work



43. Mendeleev's periodic table is based on:-
(A) Atomic number
(B) Increasing order of number of protons
(C) Electronic configuration
(D) None of the above
44. Which statement is wrong for the long form of periodic table :-
(A) Number of periods are 7 and groups 18
(B) No. of valence shell electrons in a period are same
(C) IIIrd B group contains 32 elements
(D) Lanthanides and actinides are placed in same group
45. Which of the following electronic configuration belongs to inert gas elements :-
(A) $ns^2 (n - 1)d^{10}$
(B) $ns^2 (n - 1)s^2p^6$
(C) $ns^2 np^6$
(D) None of these
46. Which two elements are in same period as well as same group of modern periodic table :-
(A) $Z = 23, Z = 31$
(B) $Z = 65, Z = 66$
(C) $Z = 52, Z = 87$
(D) $Z = 58, Z = 46$
47. S^{-2} is not isoelectronic with :-
(A) Ar
(B) Cl^-
(C) HS^-
(D) Ti^{+3}
48. As we proceed across the period in periodic table, we find there is a decrease in :-
(A) Ionisation energy
(B) Electron affinity
(C) Electronegativity
(D) Atomic radii
49. Which of the following is an example of expanded octet?
(A) SF_6
(B) PF_5
(C) H_2SO_4
(D) All of these
50. Which of the compound is least soluble in water
(A) AgF
(B) AgCl
(C) AgBr
(D) AgI
51. Maximum no. of hydrogen bonds formed by a water molecule in ice is
(A) 4
(B) 3
(C) 2
(D) 1
52. Which is the most stable :-
(A) N_2
(B) N_2^+
(C) N_2^-
(D) N_2^{-2}
53. Which of the following compound possess dipole moment:-
(A) Water
(B) Boron trifluoride
(C) Benzene
(D) Carbon tetra chloride

Space for rough work



54. The molecule does not have bent shape: -
(A) SO_2
(B) O_3
(C) H_2O
(D) NH_4^+
55. Of the following elements, which one has the same oxidation state in all of its compounds?
(A) Hydrogen
(B) Fluorine
(C) Carbon
(D) Oxygen
56. Oxidation number of Fe in $\text{Fe}_{0.94}\text{O}$ is:
(A) 200
(B) 200/94
(C) 94/200
(D) None
57. Select the example of disproportionation reaction
(A) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$
(B) $\text{NH}_4\text{NO}_3 \rightarrow \text{N}_2\text{O} + 2\text{H}_2\text{O}$
(C) $4\text{H}_3\text{PO}_3 \rightarrow \text{PH}_3 + 3\text{H}_3\text{PO}_4$
(D) $\text{AgCl} + 2\text{NH}_3 \rightarrow \text{Ag}(\text{NH}_3)_2\text{Cl}$
58. The reaction $2\text{K}_2\text{MnO}_4 + \text{Cl}_2 \rightarrow 2\text{KMnO}_4 + 2\text{KCl}$ is an example of
(A) Redox
(B) Reduction only
(C) Neutralization
(D) Disproportionation
59. $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$
Zn undergoes -
(A) Reduction
(B) Oxidation
(C) Both oxidation and reduction
(D) Neither oxidation nor reduction
60. In the reaction:
 $\text{MnO}_4^- + x\text{H}^+ + ne^- \rightarrow \text{Mn}^{2+} + y\text{H}_2\text{O}$
What is the value of n:
(A) 5
(B) 8
(C) 6
(D) 3

BIOLOGY

61. The number of known and described species that are in the range of, (approximately)
(a) 1.3 to 1.4 million
(b) 1.4 to 1.5 million
(c) 1.7 to 1.8 million
(d) 1.9 to 2.2 million
62. Select the total number from the following organism that multiply by budding. Hydra, Sponges, yeast, earthworm, Planaria, honey bee
(a) 2
(b) 3
(c) 4
(d) 5
63. Reproduction cannot be an all-inclusive defining characteristic of living organisms because
(a) All living organism do not show growth.
(b) Many organism do not reproduce.
(c) Non-living things show reproduction.
(d) All living organism show small period of reproductive phase in their life.

Space for rough work



64. Which two points are known as the twin characteristics of growth?
(1) Increase in mass
(2) Metabolism
(3) Increase in the number of individuals
(4) Sense of environment
(a) (1) and (2)
(b) (1) and (4)
(c) (2) and (3)
(d) (1) and (3)
65. Which one of the following aspects is an exclusive characteristic of living things?
(a) Isolated metabolic reactions occur in vitro.
(b) Increase in mass from inside only.
(c) Perception of events happening in the environment and their memory.
(d) Increase in mass by accumulation of material both on surface as well as internally.
66. A living organism can be exceptionally differentiated from a non-living thing on the basis of its ability for
(a) Reproduction and Excretion
(b) Growth and Movement
(c) Responsiveness to touch and temperature
(d) Interaction with environment and progressive evolution
67. Which of the following term include all other terms?
(a) Classification
(b) Nomenclature
(c) Taxonomy
(d) Systematics
68. Who was the first to attempt a more scientific basis of classification?
(a) Linnaeus
(b) Aristotle
(c) Whittaker
(d) Bentham and Hooker
69. Whittaker's kingdom are
(a) Plantae and Animalia
(b) Monera and Protista
(c) Fungi
(d) All of these
70. All prokaryotic groups are put under _____ kingdom
(a) Monera
(b) Plantae
(c) Fungi
(d) Protista
71. Most abundant microorganism are
(a) bacteria
(b) virus
(c) amoeba
(d) paramecium
72. Following are present in gut of cows and buffaloes and is responsible for the production of methane from the dung of these animals
(a) Methanogen
(b) Thermoacidophiles
(c) Halophils
(d) All of these
73. Heterotrophic bacteria helps in
(a) Curding of milk
(b) Production of antibiotic
(c) Nitrogen fixation in leguminous plant
(d) All of these

Space for rough work



74. Kingdom protista include
(a) Chrysophyte
(b) Dinoflagellate
(c) Euglenoids
(d) All of these
75. The earliest classification used only
(a) Physiological characters
(b) Gross anatomical characters
(c) Gross morphological characters
(d) All of these
76. The classification based on evolutionary history was
(a) Phylogenetic classification
(b) Artificial classification
(c) Numerical classification
(d) None of these
77. Volvox is a
(a) Unicellular algae
(b) Filamentous algae
(c) Colonial algae
(d) Symbiotic algae
78. 50 per cent CO₂ fixation on earth is carried out by
(a) Protist
(b) Higher plants
(c) Algae
(d) None of these
79. Green algae are kept in
(a) Phaeophyceae
(b) Xanthophylls
(c) Chlorophyceae
(d) Rhodophyceae
80. Pyrenoids are located in
(a) Cytoplasm
(b) Mitochondria
(c) Chloroplast
(d) Nucleus
81. The algae which possess chlorophyll a, c, carotenoids and xanthophylls belong to
(a) Green algae
(b) Brown algae
(c) Both (a) and (b)
(d) None of these
82. Slipper animalcule is –
(a) Entamoeba
(b) Paramecium
(c) Giardia
(d) Euglena
83. Which protozoan is harmful to sericulture
(a) Babesia
(b) Monocystis
(c) Nosema
(d) Plasmodium
84. Which animal do not possess larval stage in its lifecycle –
(a) Ascaris
(b) Frog
(c) Taenia
(d) Pheretima
85. Members of phylum Arthropoda lack one of the following feature :-
(a) External skeleton made of chitin
(b) Compound eyes
(c) Excretion by malpighian tubules
(d) Usually a close type of blood vascular system

Space for rough work



86. Which mollusca is called tusk shell :-
(a) Neopilina
(b) Pila
(c) Dentalium
(d) Doris
87. Aristotle lantern is found in :-
(a) Sea - urchin
(b) Sepia
(c) Star fish
(d) Obelia
88. Stomochord (Buccal diverticulum) is present in:-
(a) Amphioxus
(b) Herdmania
(c) Balanoglossus
(d) Asterias
89. Radish is an example of
(a) Fusiform root
(b) Napiform root
(c) Conical root
(d) Tuberos root
90. Shoot/Stem develops from –
(a) Plumule
(b) Radicle
(c) Both 1 & 2
(d) Endosperm
91. Thorns and spines are –
(a) Defensive organs
(b) Respiratory organs
(c) Both 1 & 2
(d) Storage organs
92. A modification of petiole is –
(a) Phyllode
(b) Phylloclade
- (c) Cladode
(d) Corm
93. If the filaments are fused in a single group the condition is
(a) Monoadelphous
(b) Polyadelphous
(c) Both 1 & 2
(d) Diadelphous
94. Which of the following is false fruit?
(a) Pome
(b) Pepo
(c) Hesperidium
(d) Drupe
95. Which of the following represents the edible part of the fruit of Litchi –
(a) Endocarp
(b) Pericarp
(c) Juicy aril
(d) Mesocarp
96. Point out the correct example of cruciferae –
(a) Mustard
(b) Pea
(c) onion
(d) Brinjal
97. What do you call an organization of group of similar cells along with intercellular substances?
(a) Organ
(b) System
(c) Tissue
(d) Cell membrane

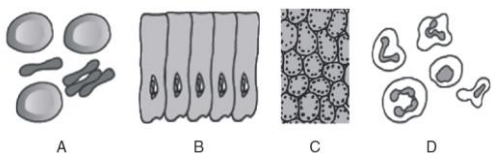
Space for rough work



98. Which of the following tissue has a free surface?
(a) Connective tissue
(b) Muscular tissue
(c) Epithelial tissue
(d) Neural tissue
99. If the cuboidal epithelium turns out to have microvilli on it, what will it be called?
(a) Ciliated columnar epithelium
(b) Pseudo ciliated epithelium
(c) Both (a) and (b)
(d) Ciliated epithelium
100. Whose products are called hormone and where are they secreted?
(a) Exocrine, blood
(b) Endocrine, blood
(c) Exocrine, lymph
(d) Endocrine, fluid bathing the gland
101. Which of the following junctions facilitate the cells to communicate with each other by connecting the cytoplasm of adjoining cells?
(a) Tight junction
(b) Adhering junction
(c) Gap junction
(d) Both (b) and (c)
102. Which of the following is not a part of areolar tissue?
(a) Fibroblasts
(b) Mast cells
(c) Fibro clasts
(d) All of these
103. What kind of tissue is goblet cells?
(a) Epithelial tissue
(b) Connective tissue
(c) Neural tissue
(d) All of these
104. What is the main function of blood?
(a) Protection of body
(b) Transport of various substances
(c) pH buffering
(d) Maintaining osmolarity balance
105. Unicellular organisms are not capable of
(a) Independent existence
(b) Performing essential functions of life
(c) Both (a) and (b)
(d) None of these
106. In which year Schwann studied different types of animal cells?
(a) 1839
(b) 1739
(c) 1639
(d) 1938
107. 'Omnis cellula e cellula' was given in the year _____
(a) 1756
(b) 1855
(c) 1945
(d) 1839

Space for rough work

108. Identify the A, B, C and D in the given figure.



- (a) A–WBC, B–Mesophyll cell, C–RBC, D–Columnar Epithelial cells
 (b) A–Columnar epithelial cells, B–Mesophyll cell, C–WBC, D–RBC
 (c) A–Mesophyll cell, B–WBC, C–Columnar epithelial cells, D–WBC
 (d) A–RBC, B–Columnar epithelial cells, C–Mesophyll Cell, D–WBC

109. If volume of the cell is filled with semi-fluid matrix called cytoplasm, what kind of cell is it?

- (a) Eukaryotic
 (b) Prokaryotic
 (c) Both (a) and (b)
 (d) None of these

110. Who was the first one to see a live cell?

- (a) Robert Hook
 (b) Leeuwenhoek
 (c) Robert Brown
 (d) None of these

111. ‘Cell wall is a unique structure of plant cells’. Who concluded this?

- (a) Schleiden
 (b) Schwann
 (c) Both (a) and (b)
 (d) None of these

112. Which of the following statement is not a part of final cell theory?

- (a) Cell has a thin outer layer called plasma membrane.

(b) All living organisms are made up of cells and products of cells

(c) All cells arise from pre-existing cells.

(d) All of these

113. Decreasing order of organic compound in proto-plasm is:-

- (a) Protein, lipid, Nucleic acid, Vitamin
 (b) Protein, Nucleic acid, carbohydrate, lipid
 (c) Carbohydrate, Lipid, Nucleic acid and vitamin
 (d) None of these

114. Which substance is not a carbohydrate ?

- (a) Starch
 (b) Glycogen
 (c) Wax
 (d) Glucose

115. Monosaccharide is –

- (a) Pentose Sugar
 (b) Hexose Sugar
 (c) Only Glucose
 (d) all the above

116. Which amino acid is non essential for human body?

- (a) Glycine
 (b) Phenylalanine
 (c) Arginine
 (d) Methionine

117. In which form, food is stored in animal body ?

- (a) Glucose
 (b) Glycogen
 (c) Cellulose
 (d) ATP

Space for rough work



118. Chemically enzymes are :-

- (a) Fats
- (b) Carbohydrates
- (c) Hydrocarbons
- (d) Proteins

119. For body growth and repair one needs :-

- (a) Carbohydrates
- (b) Fats
- (c) Proteins
- (d) Vitamins

120. Sucrose is composed of –

- (a) Glucose & Fructose
- (b) Glucose & Glycogen
- (c) Two molecules of Glucose.
- (d) Glycogen & Fructose

Space for rough work