EXCEL (12TH) ISMART SAMPLE PAPER
(Medical)

Test ID : 00000000

Time : 90 min. M. Marks: 352

The Test Consists (TOTAL 88 QUESTIONS)		
SUBJECTS	**Qs.**	**SYLLABUS**
PHYSICS	22	Units & Dimensions, Kinematics, Newton's Laws of Motion, Work, Power, Energy, Circular Motion, Rotational Motion
CHEMISTRY	22	Atomic Structure, Mole Concept, Periodic Classification, Chemical Bonding, Redox Reactions
BOTANY	22	The Living world, Biological Classification, Plant Kingdom
ZOOLOGY	22	Animal Kingdom, Biomolecules, Structural organization in animals, Breathing and Exchange of gases

INSTRUCTIONS TO CANDIDATE

- Please read the instructions given for each question carefully and fill the correct answer against the question numbers on the answer sheet in the respective subject.
- **Use ball point pen to darken the appropriate circle & mark should completely fill the circle.**
- The Question paper contains blank spaces for your rough work. No additional sheet will be provided for rough work.
- Blank papers, Clipboards, Log Tables, Slide rule, Calculators, Cellular phones, Pagers and Electronic gadgets in any form are not allowed.
- Write your Name, Student ID in the block at the top of the Answer Sheet. Also write your Name & Student ID in the space provided on this cover page of question paper.

Name:_____**Student ID**_____

Physics
Objective Questions [+4, –1]

1. For a moving body, correct statement among the following is
   (A) When displacement is zero, distance travelled is not zero
   (B) When displacement is zero, distance travelled is also zero
   (C) When distance is zero, displacement is not zero
   (D) Distance travelled and displacement are always equal.

2. The location of a particle has changed. What can we say about the displacement and the distance covered by the particle
   (A) Both cannot be zero
   (B) One of the two may be zero
   (C) Both must be zero
   (D) If one is positive, the other is negative and vice versa

3. A car moves for half of its time at 80 km/h and for rest half of time at 40 km/h. Total distance covered is 60 km. The average speed of the car is
   (A) 60 km/h
   (B) 80 km/h
   (C) 120 km/h
   (D) 180 km/h

4. A ball is thrown vertically upwards with a speed of 10 m/s from the top of a tower 200m height and another is thrown vertically downwards with the same speed simultaneously. The time difference between them on reaching the ground is $(g = 10m/s^2)$
   (A) 12s
   (B) 6s
   (C) 2s
   (D) 1s

5. The distance moved by a freely falling body (starting from rest) during the 1st, 2nd and 3rd ... nth second of its motion, are proportional to
   (A) $(n - 1)$
   (B) $(2n - 1)$
   (C) $(n^2 - 1)$
   (D) $(2n - 1)/n^2$

6. A body projected vertically up on some planet with a velocity of 10m/s reaches a height of 20m. If it is projected with a velocity of 20m/s, then the maximum height reached by the body is
   (A) 20 m
   (B) 10 m
   (C) 80 m
   (D) 40 m

7. A ball is thrown vertically upwards from the top of a tower at $4.9\ ms^{-1}$. It strikes the pond near the base of the tower after 3 *seconds*. The height of the tower is
   (A) 73.5 *m*
   (B) 44.1 *m*
   (C) 29.4 *m*
   (D) None of these

8. The displacement of a particle is given by $y = a + bt + ct^2 - dt^4$. The initial velocity and acceleration are respectively
   (A) $b, -4d$
   (B) $-b, 2c$
   (C) $b, 2c$
   (D) $2c, -4d$

9. The relation $3t = \sqrt{3x} + 6$ describes the displacement of a particle in one direction where x is in *metres* and t in sec. The displacement, when velocity is zero, is
   (A) 24 *metres*
   (B) 12 *metres*
   (C) 5 *metres*
   (D) Zero

10. A suitable unit for gravitational constant is
    (A) kg –m sec^{-1}
    (B) N m^{-1} sec
    (C) N m^2 kg^{-2}
    (D) kg m sec^{-1}

11. Choose the correct statement
(A) a dimensionally incorrect equation may be correct
(B) a dimensionally correct equation is always correct
(C) a dimensionally correct equation may be incorrect
(D) a dimensionally incorrect equation is never incorrect.

12. The dimensions of power are
(A) $M^1L^2T^{-3}$ (B) $M^2L^1T^{-2}$
(C) $M^1L^2T^{-1}$ (D) $M^1L^1T^{-2}$

13. A ball is thrown vertically upwards from the foot of a tower. It crosses the top of the tower twice after an interval of 4 s and reaches the foot of the tower 8 s after it was thrown. What is the height of the tower? Take g = 10 ms^{-2}.
(A) 60 m (B) 80 m
(C) 100 m (D) 120 m

14. Two cars travelling on a straight road cross a kilometre stone A at the same time with velocities 20 ms^{-1} and 10 ms^{-1} with constant accelerations of 1 ms^{-2} and 2 ms^{-2} respectively. If they cross another kilometre stone B at the same instant, the distance between A and B is
(A) 600 m (B) 800 m
(C) 1000 m (D) 1200 m

15. The acceleration a of a body moving with initial velocity u changes with distance x as $a = k^2\sqrt{x}$, where k is a positive constant. The distance travelled by the body when its velocity becomes $2u$ is
(A) $\left(\frac{3u}{2k}\right)^{\frac{3}{4}}$ (B) $\left(\frac{3u}{2k}\right)^{\frac{4}{3}}$
(C) $\left(\frac{3u}{2k}\right)^{3/2}$ (D) $\left(\frac{3u}{2k}\right)^{2/3}$

16. The angle made by the vector $\vec{A} = \hat{\imath} + \hat{\jmath}$ with x-axis is
(A) 90° (B) 45°
(C) 22.5° (D) 30°

17. The sum of magnitudes of two forces acting at a point is 16N. If the resultant force is 8N and its direction is perpendicular to smaller force, then the forces are :
(A) 6N & 10N (B) 8N & 8N
(C) 4N & 12N (D) 2N & 14N

18. If vectors $\vec{P}$, $\vec{Q}$ and $\vec{R}$ have magnitudes 5, 12 and 13 units and $\vec{P} + \vec{Q} = \vec{R}$, then the angle between $\vec{Q}$ and $\vec{R}$ is :
(A) $cos^{-1}\left(\frac{5}{12}\right)$ (B) $cos^{-1}\left(\frac{5}{13}\right)$
(C) $cos^{-1}\left(\frac{12}{13}\right)$ (D) $cos^{-1}\left(\frac{2}{13}\right)$

19. A ball is projected from the ground at angle θ with the horizontal. After 1 s it is moving at angle 45^o with the horizontal and after 2 s it is moving horizontally. What is the velocity of projection of the ball ?
(A) $10\sqrt{3}$ ms^{-1} (B) $20\sqrt{3}$ ms^{-1}
(C) $10\sqrt{5}$ ms^{-1} (D) $20\sqrt{2}$ ms^{-1}

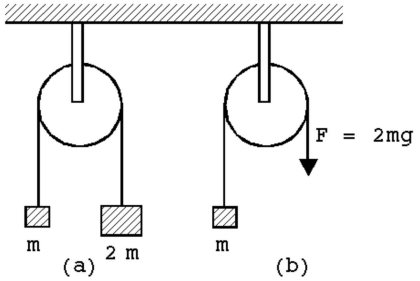
20. A rifle shoots a bullet with a muzzle velocity of 500 ms^{-1} at a small target 50 m away. To hit the target the rifle must be aimed (Take g = 10 ms^{-2})
(A) exactly at the target
(B) 10 cm below the target
(C) 5 cm above the target
(D) 5 cm below the target

21. A material body A of mass m_1 exerts a force on another material body of mass m_2. If the acc. be a_2, the magnitude of the acc. of A is :

(A) Zero (B) m_2a_2/m_1

(C) m_1a_2/m_2 (D) a_2

22. The pulley arrangements shown in the figure are identical, the mass of the rope being negligible. In case (a) mass m is lifted by attaching a mass of 2m to the other end of the rope. In case (b) the mass m is lifted by pulling the other end of the rope with a constant downward force F = 2mg, where g is the acceleration due to gravity. The acceleration of mass m in case (a) is :



(A) Zero (B) More than that in case (b)

(C) Less than that in case (b) (D) Equal to that in case (b)

CHEMISTRY

Objective Questions [+4, –1]

23. The energies E_1 and E_2 of two radiations are 25 eV and 50eV respectively. The relation between their wavelengths i.e., λ_1 and λ_2 will be

(A) $\lambda_1 = \frac{1}{2}\lambda_2$ (B) $\lambda_1 = \lambda_2$

(C) $\lambda_1 = 2\lambda_2$ (D) $\lambda_1 = 4\lambda_2$

24. According to Bohr's atomic theory, which of the following is correct ?

(A) Potential energy of electron $\propto \frac{Z^2}{n^3}$ (B) The product of velocity of electron and principle quantum number $(n) \propto Z^2$

(C) Frequency of revolution of electron in an orbit $\propto \frac{Z^2}{n^3}$ (D) Coulombic force of attraction on the electron $\propto \frac{Z^2}{n^2}$

25. The triad of nuclei that is isotonic is

(A) ${}^{14}_{6}C, {}^{14}_{7}N, {}^{19}_{9}F$ (B) ${}^{12}_{6}C, {}^{14}_{7}N, {}^{19}_{9}F$

(C) ${}^{14}_{6}C, {}^{14}_{7}N, {}^{17}_{9}F$ (D) ${}^{14}_{6}C, {}^{15}_{7}N, {}^{17}_{9}F$

26. The sum of number of neutrons and protons in all of the isotopes of hydrogen is :-

(A) 3 (B) 4

(C) 5 (D) 6

27. Magnitude of kinetic energy in an orbit is equal to

(A) Half of the potential energy (B) Twice of the potential energy

(C) One fourth of the potential energy (D) None of the above

28. Which of the following statements is incorrect?

(A) The frequency of radiation is inversely proportional to its (B) Energy of radiation increases with increase in frequency

wavelength

(C) Energy of radiation decreases with increase in wavelength

(D) The frequency of radiation is directly proportional to its wavelength.

29. Which one of the following ions has electronic configuration [Ar]$3d^6$? (At. nos. Mn = 25, Fe = 26, Co = 27, Ni = 28)

(A) Co^{3+} (B) Ni^{3+}

(C) Mn^{3+} (D) Fe^{3+}

30. The correct order of increasing energy of atomic orbitals is

(A) $5p < 4f < 6s < 5d$ (B) $5p < 6s < 4f < 5d$

(C) $4f < 5p < 5d < 6s$ (D) $5p < 5d < 4f < 6s$

31. Which of the following orbitals will have zero probability of finding the electron in the *yz* plane ?

(A) p_x (B) p_y

(C) p_z (D) d_{yz}

32. Which one of the following ions has electronic configuration [Ar]$3d^6$? (At. nos. Mn = 25, Fe = 26, Co = 27, Ni = 28)

(A) Co^{3+} (B) Ni^{3+}

(C) Mn^{3+} (D) Fe^{3+}

33. The correct order of increasing energy of atomic orbitals is

(A) $5p < 4f < 6s < 5d$ (B) $5p < 6s < 4f < 5d$

(C) $4f < 5p < 5d < 6s$ (D) $5p < 5d < 4f < 6s$

34. The maximum number of elements is 3rd period is :

(A) 8 (B) 18

(C) 32 (D) between 8 and 18

35. With respect to radii, which of the following is correct?

(A) $A^+ > A > A^-$ (B) $A^+ > A^- > A$

(C) $A^- > A > A^+$ (D) $A > A^- > A^+$

36. Atomic number 34 belongs to :

(A) 3rd period, 15th group, *p*-block (B) 4th period, 16th group, *p*-block

(C) 4th period, 2nd group, *s*-block (D) 5th period, 12th group, *d*-block

37. Which one of the following is smallest in size?

(A) N^{3-} (B) O^{2-}

(C) F^- (D) Na^+

38. What is the atomicity of O_2 ?

(A) 1 (B) 2

(C) 3 (D) none of these

39. Molar mass of 1 mol of methane gas is :

(A) 16 (B) 8

(C) 32 (D) 4

40. no. of molecules present in 2 moles of O_3 ?

(A) $2N_A$ (B) N_A

(C) $4N_A$ (D) $5N_A$

41. What is the empirical formula of the compound that contains 0.483 g of nitrogen and 1.104 g of oxygen?

(A) N_2O (B) NO

(C) NO_2 (D) N_2O_3

42. How many H atoms are contained in 1.50 g of glucose $C_6H_{12}O_6$?

(A) 3.0×10^{22} (B) 1.20×10^{23}
(C) 2.40×10^{23} (D) 6.02×10^{22}

43. Which of the following compound does not follow octet rule?
(A) CO_2 (B) PCl_3
(C) ICl (D) ClF_3

44. In the electronic structure of H_2SO_4, the total number of unshared electrons is
(A) 20 (B) 16
(C) 12 (D) 8

BIOLOGY

Objective Questions [+4, –1]

45. Which taxonomic aid gives comprehensive account of complete compiled information of a genus or family at a particular time?
(A) Taxonomic key (B) Herbarium
(C) Monograph (D) Flora

46. Which one is odd/not a category?
(A) Species (B) Class
(C) Phylum (D) Glumaceae/Malvaceae

47. Which one of the following has least similar characters?
(A) Family (B) Class
(C) Genus (D) Species

48. The most common method of asexual reproduction in algae involves formation of
(A) Conidia (B) Aplanospores
(C) Zoospores (D) Akinete

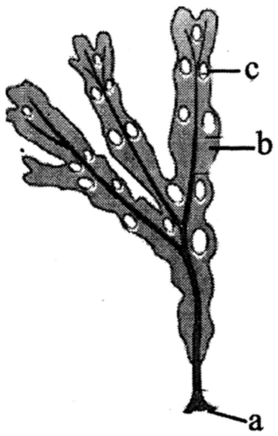
49. Which of the following algae is colonial and motile?
(A) *Spirogyra* (B) *Sargassum*
(C) *Fucus* (D) *Volvox*

50. Who is known as "the father of Phycology"?
(A) H.A. de Bary (B) F.E. Fritsch
(C) J. Eichler (D) John Ray

51. Characteristic of fern is :
(A) Circinate ptyxis (B) Reticulate vanation
(C) Parallel venation (D) None of these

52. Antherozoid attractant in an archegonial ooze of fern is:
(A) Sugar (B) Amino acid
(C) Malic acid (D) Mucilage

53. Choose the correct option-
(A) *Selaginella* has small leaves (microphylls) (B) *Selaginella* has large leaves (megaphylls)
(C) Ferns have megaphylls (D) Both A and C

54. 

What is most correct about the identification of the figure and its labelling a, b & c ?

		(a)	(b)	(c)
(A)	*Dictyota*	Holdfast for attachment	Lamina for buoyancy	Lamina for photosynthesis
(B)	*Fucus*	Holdfast for attachment	Lamina for photosynthesis	Air bladder for buoyancy
(C)	*Laminaria*	Air bladder for buoyancy	Lamina for buoyancy	Holdfast for photosynthesis
(D)	*Fucus*	Holdfast for photosynthesis	Lamina for buoyancy	Air Bladder for respiration

55. Study the following table carefully and give the **correct** answer from the options:-

	Column-I	**Column-II**	**Column-III**
A	*Spirugyra*	Protein source	Green algae
B	*Sargassum*	Brown algae	Phaeophyceae
C	*Gelidium*	Agar-Agar	Chlorophyceae
D	*Pinus*	Monoecious	Heterostorous

(A) A & B – incorrect , C & D correct
(B) A, B & D –correct , only C is incorrect
(C) A & D – incorrect , B & C correct
(D) B & D –correct , C & A incorrect

56. The life cycle in Bryophyta is haplo-diplontic type, it means that :-
(A) Haploid generation is multicellular and diploid generation is single celled
(B) Haploid generation is dominant & multicellular, diploid generation is also multicellular but comparatively less developed
(C) Haploid & diploid generations are equally developed
(D) Haploid generation is highly reduced

57. Conjugation in bacteria was discovered by
(A) Lederberg
(B) Mendel
(C) Zinder and Lederberg
(D) Kornberg

58. Prokaryotes divide by
(A) Meiosis
(B) Mitosis
(C) Amitosis
(D) None

59. Following viruses have ss-RNA and ds-DNA respectively
(A) Bacteriophage and TMV
(B) HIV and Bacteriophage
(C) TMV and HIV
(D) Bacteriophage and HIV

60. Diatomaceous earth is used for all except-
(A) Polishing
(B) Filteration of oils and syrups
(C) Sound and fire proof room
(D) Biogas production

61. Which ones forms bloom in polluted water mostly-
(A) Cyanobacteria
(B) Green algae
(C) Red algae
(D) Brown algae

62. All of the following diseases cause by bacteria except-
(A) Flu
(B) Cholera
(C) Tetanus
(D) Typhoid

63. Consider the given statements:
(A) Viruses clearly represent alternation of generation
(B) Common cold or "flu" caused by viruses
(C) If viruses infect a cell, they take over the machinery of the host cell to replicate themselves
(D) A virus is a nucleoprotein and the protein part is infectious.

How many statements are incorrect -

(A) 2 (B) 4
(C) 1 (D) 3

64. Phylogenetic system of classification is based on -

(A) Floral characters (B) Evolutionary relationships
(C) Morphological features (D) Chemical constituents

65. Fungi show asexual reproduction by all of the following spores except-

(A) Conidia (B) Oospore
(C) Sporangiospore (D) Zoospores

66. Dikaryophase/Dikaryon formation is a specific characteristic of-

(A) All fungi (B) Phycomycetes and Ascomycetes
(C) Only Basidiomycetes (D) Both Ascomycetes and Basidiomycetes

67. A sponge can be distinguished from other animals by the presence of

(A) Hollow body (B) coelenteron
(C) choanocytes (D) dermal papillae

68. Animal of phylum Porifera are characterised by

(A) Diploblastic organisation (B) canal system
(C) coelom (D) coelenteron

69. Larva of sponge is known as

(A) planula larva (B) trochophore larva
(C) glochidium larva (D) amphiblastula larva

70. Glucose is :

(A) Aldose hexose sugar (B) Ketose hexose sugar
(C) Pyranose pentose sugar (D) Furanose pentose sugar

71. In helminthes, flame cells are component of their

(A) reproductive system (B) excretory system
(C) nervous system (D) respiratory system

72. Storing carbohydrates in the form of polysaccharides has following advantages :

(A) During their formation many molecules of water are removed from monosaccharide (dehydration synthesis), condensing the bulk to be store. (B) When necessary polysaccharides are broken down by enzymes for the release of energy
(C) Unlike small carbohydrates polysaccharides are relatively easy to store (D) All of these

73. Which is not a character of phylum porifera?

a. Generally marine & mostly asymmetrical
b. Water in canal system moves from osculum to spongocoel to ostia
c. Water transport helps to gather food, respiratory exchange & removal of waste
d. Digestion is intracellular
e. Sexes are not separate i.e. eggs & sperms are produced by same individual
f. Fertilisation is external & development is direct

(A) b & f (B) c & e
(C) b & e (D) e & f

74. Lecithin is a :

(A) Fatty acid (B) Phospholipid with

choline attached to phosphate group

(C) Chloesterol (D) Fat

75. Identify the correct match

(A) *Sycon*–scypha (B) *Spongilla*–bath sponge

(C) *Euspongia*–fresh water sponge (D) all of these

76. Choose the incorrect statement w.r.t. Cyclostomes

(A) Have a sucking and circular mouth (B) Mouth is without jaws

(C) Body devoid of scales and paired fins (D) Cranium and vertebral column are bony

77. Arrange the following in the increasing order of their complexities

Agnatha, urochordata, cephalochordate, tetrapoda

(A) urochordata, cephalochordate, agnatha, tetrapoda (B) cephalochordate, agnatha, tetrapoda, urochordata

(C) urochordata, agnetha, cephalochordate, tetrapoda (D) urochordata, cephalochordate, tetrapoda, agnathe

78. Cranium and Vertebral column are cartilagenous in :

(A) Cyclostomata and osteichthyes (B) Cyclostomata and Amphibia

(C) Cyclostomata and chondrichthyes (D) Cyclostomata and Urochordata

79. Ascaris is characterized by

(A) Presence of true coelom and rnetamerism (metamerization) (B) Absence of true coelom but presence of metamerism

(C) Presence of neither true coelom nor metamerism (D) Presence of true coelom but absence of metamerism

80. Which one of the following is not a characteristic of phylum Annelida?

(A) Ventral nerve cord (B) Closed circulatory system

(C) Segmentation (D) Pseudocoelom

81. Which one of the following groups of animals is bilaterally symmetrical and triploblastic?

(A) Sponges (B) Coelenterates (Cnidarians)

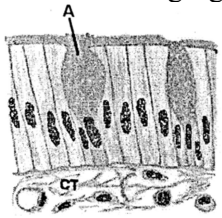
(C) Aschelminthes (roundworms) (D) Ctenophores

82. What is common to alveoli, Bowman's capsule and capillary endothelium?

(A) Glandular epithelium (B) Pavement epithelium

(C) Small sized cells with round, central nucleus (D) All of these

83. Identify 'A' in the following figure



(A) Endocrine gland (B) Unicellular gland

(C) Goblet cell (D) Both (B) and (C)

84. Cartilaginuous rings in trachea are incomplete at-

(A) Dorsal (B) Ventral

(C) Lateral (D) Ventrolateral

85. Which of the following statements is true for epithelia?

(A) They may be derived from any of the embryonic germ layers
(B) They are incapable of performing absorptive functions
(C) They demonstrate weak adhesion between cells
(D) They lack apical specializations

86. Simple epithelium is a tissue in which the cells are :
(A) hardened and provide support to the organs
(B) continuously dividing to provide to form an organ
(C) Cemented directly to one another to forms a single layer
(D) loosely connected to one another to form an irregular layer

87. If the thoracic wall but not the lungs are punctured:-
(A) The lungs get inflated
(B) The man dies as the lungs get collapsed
(C) The breathing rate decreases
(D) The breathing rate increases

88. Mast cells are associated with
(A) Exocrine glands
(B) Endocrine glands
(C) Areolar connective tissue
(D) Neural tissue

Answer Key

1. A
2. A
3. A
4. C
5. B
6. C
7. C
8. C
9. D
10. C
11. C
12. A
13. A
14. A
15. B
16. B
17. A
18. C
19. C
20. C
21. B
22. C
23. C
24. C
25. D
26. D
27. A
28. D
29. A
30. B
31. A
32. A
33. B
34. A
35. C
36. B
37. D
38. B
39. A
40. A

41. C
42. D
43. D
44. B
45. C
46. D
47. B
48. C
49. D
50. B
51. A
52. C
53. D
54. B
55. B
56. B
57. A
58. C
59. B
60. D
61. A
62. A
63. A
64. B
65. B
66. D
67. C
68. B
69. D
70. A
71. B
72. D
73. A
74. B
75. A
76. D
77. A
78. C
79. C
80. D
81. C
82. B
83. D
84. A
85. A
86. C
87. B
88. C