

SAMPLE PAPER - 59

Time : 1 : 15 Hr.

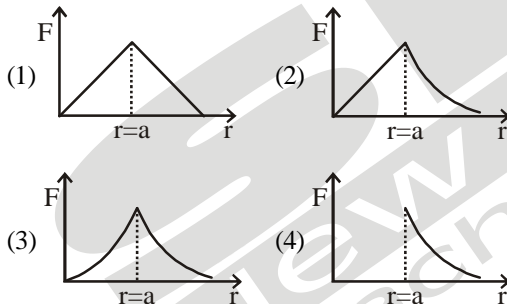
Question : 60

PHYSICS

01. Four particles of masses m , $2m$, $3m$ and $4m$ are kept in sequence at the corners of a square of side a . The magnitude of gravitational force acting on a particle of mass m placed at the centre of the square will be

- (1) $\frac{24m^2G}{a^2}$ (2) $\frac{6m^2G}{a^2}$
(3) $\frac{4\sqrt{2}Gm^2}{a^2}$ (4) Zero

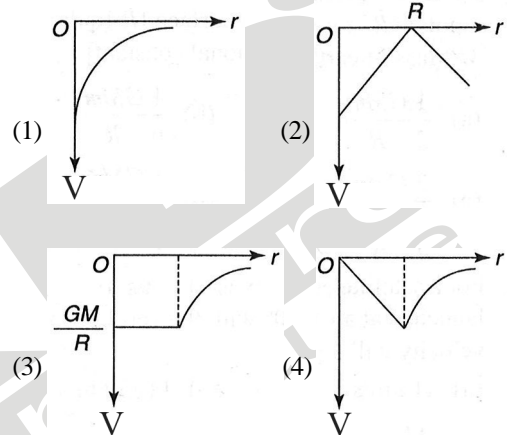
02. Which one of the following graphs represents correctly the variation of the gravitational field (F) with the distance (r) from the centre of a spherical shell of mass M and radius a



03. Acceleration due to gravity on moon is $1/6$ of the acceleration due to gravity on earth. If the ratio of densities of earth (ρ_e) and moon (ρ_m) is $\left(\frac{\rho_e}{\rho_m}\right) = \frac{5}{3}$ then radius of moon (R_m) in terms of R_e will be

- (1) $\frac{5}{18}R_e$ (2) $\frac{1}{6}R_e$
(3) $\frac{7}{18}R_e$ (4) $-\frac{1}{2\sqrt{3}}R_e$

04. For a shell of mass M and radius R correct plot for gravitational potential (V) at a distance r from its centre will be



05. A body weighs 1400 gram weight on the surface of earth. How much will it weigh on the surface of a planet whose

- mass is $\frac{2}{7}$ and radius is $\frac{1}{3}$ that of the earth ?
(1) 450 gram weight (2) 900 gram weight
(3) 1800 gram weight (4) 3600 gram weight

06. A body starts from rest with uniform acceleration. If its velocity after n seconds is v , then its displacement in the last two seconds is

- (1) $\frac{2v(n+1)}{n}$
(2) $\frac{v(n+1)}{n}$
(3) $\frac{v(n-1)}{n}$ (4) $\frac{2v(n-1)}{n}$

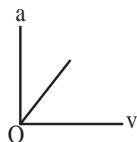
07. A body moving with uniform acceleration describes 40 m in the first 5 s and 70 m in the next 5 s. Its initial velocity will be

- (1) 4 ms^{-1} (2) 2.5 ms^{-1}
(3) 5 ms^{-1} (4) 11 ms^{-1}

08. Two bodies begin a free fall from rest from the same height 2 seconds apart. How long after the first body begins to fall, the two bodies will be 40 m apart? (Take $g=10 \text{ ms}^{-2}$)

- (1) 1 s (2) 2 s
(3) 3 s (4) 4 s

09. Acceleration velocity graph of a particle moving in a straight line is as shown in figure. The slope of velocity-displacement graph



- (1) increases linearly
(2) decreases linearly
(3) is constant
(4) increases parabolically

10. A ball released from the top of a tower travels $\frac{11}{36}$ of the height of the tower in the last second of its journey. The height of the tower is (Take $g = 10 \text{ m s}^{-2}$)
(1) 11 m (2) 36 m (3) 47 m (4) 180 m

11. A satellite is moving around the earth in a circular orbit. The force acting on the satellite is:
(1) centripetal only, provided by gravitational pull
(2) centrifugal only, due to the orbital motion
(3) zero because centripetal and centrifugal forces balance out
(4) tangential to orbit, provided by a machine fitted to the satellite

12. For a planet moving around the sun in an elliptical orbit:
(1) The torque acting on planet about the sun is non-zero
(2) The angular momentum of planet about the sun is constant
(3) The areal velocity of planet about the sun is not constant
(4) Planet moves with a constant speed around the sun

13. The density of a planet is twice that of earth and acceleration due to gravity at the surface of planet is equal to that at the surface of earth. If the radius of earth is R, then the radius of planet would be:

- (1) 2R (2) 4R (3) $\frac{1}{4}$ R (4) $\frac{1}{2}$ R

14. If acceleration due to gravity at distance $d[< R]$ from the centre of earth is β , then its value at distance d above the surface of earth will be [where R is radius of earth]

- (1) $\frac{\beta R^2}{(R+d)^3}$ (2) $\frac{\beta R}{2d}$

- (3) $\frac{\beta R}{(R+d)^2}$ (4) $\frac{\beta R^3}{d(R+d)^2}$

15. The particles A and B of mass m each are separated by a distance r . Another particle C of mass M is placed at the mid point of A and B. Find the work done in taking C to a point equidistant r from A and B without acceleration ($G =$ Gravitational constant and only gravitational interaction between A, B and C is considered)

- (1) $\frac{GMm}{r}$ (2) $\frac{2GMm}{r}$
(3) $\frac{3GMm}{r}$ (4) $\frac{4GMm}{r}$

CHEMISTRY

16. Which set of atomic number represent representative elements.

- (1) 25, 30, 45, 42 (2) 8, 15, 18, 13
(3) 102, 92, 96, 100 (4) 78, 16, 63, 12

17. Which of the following elements will gain one electron more readily in comparison to other elements of their group

- (1) S (2) B
(3) Bi (4) All

18. The first ionisation enthalpy values of the III period elements Na, Mg, Si are respectively 496, 737 and 786 KJ/mole. The first ΔH_i value for Al will be more close to

- (1) 496 (2) 760
(3) 786 (4) 575

19. Which of the following has maximum number of unpaired d-electrons?

- (1) Fe^{2+} (2) Cu^+
(3) Zn (4) Ni^{3+}

20. Which of the following is an amphoteric hydroxide?

- (1) $\text{Sr}(\text{OH})_2$ (2) $\text{Ca}(\text{OH})_2$
(3) $\text{Mg}(\text{OH})_2$ (4) $\text{Be}(\text{OH})_2$

21. 1 amu is equal to

- (1) $\frac{1}{12}$ of C-12 (2) $\frac{1}{14}$ of O-16
(3) 1 g of H_2 (4) 1.6×10^{-23} kg

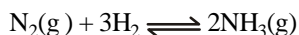
22. The simplest formula of a compound containing 50% of element X (atomic mass 10) and 50% of element Y (atomic mass 20) is

- (1) XY (2) X_2Y
(3) XY_3 (4) X_2Y_3

23. One litre N_2 , $\frac{7}{8}$ litre O_2 and 1 litre CO are taken in a mixture under identical conditions of P and T. The amount of gases present in mixture is given by:

- (1) $w_{N_2} = w_{O_2} > w_{CO}$ (2) $w_{N_2} = w_{CO} > w_{O_2}$
 (3) $w_{N_2} = w_{O_2} = w_{CO}$ (4) $w_{CO} > w_{N_2} > w_{O_2}$

24. In the synthesis of ammonia



If the quantity of N_2 reacted is 100 mL, the quantity of H_2 and NH_3 would be

- (1) 300 mL H_2 and 200 mL NH_3
 (2) 300 mL H_2 and 300 mL NH_3
 (3) 300 mL H_2 and 100 mL NH_3
 (4) 100 mL H_2 and 200 mL NH_3

25. 10 g of hydrogen and 64 g of oxygen were filled in a steel vessel and exploded. Amount of water produced in this reaction will be

- (1) 3 mol (2) 4 mol (3) 1 mol (4) 2 mol

26. The atomic weights of two elements A and B are 40 and 80 respectively. If x g of A contains y atoms, how many atoms are present in 2x g of B?

- (1) $\frac{y}{2}$ (2) $\frac{y}{4}$ (3) y (4) 2y

27. Mole fraction of the solute in a 1.00 molal aqueous solution is

- (1) 1.7700 (2) 0.1770
 (3) 0.0177 (4) 0.0344

28. The first (ΔH_1) and the second (ΔH_2) ionisation enthalpy in $KJ\ mole^{-1}$ and the (ΔH_{eg}) electron gain enthalpy in $KJ\ mole^{-1}$ of few elements are given below

Elements	ΔH_1	ΔH_2	ΔH_{eg}
A	520	7300	-60
B	419	3051	-48
C	738	1451	-40
D	2372	5251	+48

Determine the correct matching between column I & II.

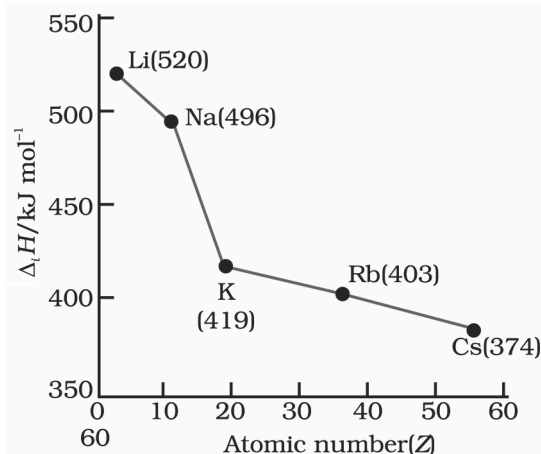
- I** **-II**
 A - p-least reactive non metal
 B - q-most reactive metal
 C - r-metal form MX type covalent halide
 D - s- Metal form MX_2 type halide

- (1) A-r, B-q, C-s, D-p
 (2) A-p, B-q, C-r, D-s
 (3) A-q, B-r, C-s, D-p
 (4) A-r, B-q, C-p, D-s

29. Energy of an electron in ground state of hydrogen atom is $-2.18 \times 10^{-18} J$ its ionisation enthalpy in $J\ mole^{-1}$ is

- (1) $3.6 \times 10^6 J\ mole^{-1}$ (2) $1.31 \times 10^6 J\ mole^{-1}$
 (3) $2.7 \times 10^6 J\ mole^{-1}$ (4) None of these

30. The below graph represent



- (1) IP_2 (2) ΔH_{eg_1}
 (3) IP_1 (4) Electronegativity

31.

Element	Group No.	Period
A	14	III
B	2	II
C	2	III
D	1	III
E	15	III

The decreasing order of metallic character of elements

- (1) $D > C > B > A > E$
 (2) $B > C > D > E > A$
 (3) $B > C > D > A > E$
 (4) $D > C > B > E > A$

BOTANY

32. Hydrolytic enzymes are activated at pH.

- (1) Acidic (2) Neutral
 (3) Basic (4) All of these

33. Select the incorrect pair from the following.

- (1) Leucoplast - Carotene
 (2) Amyloplast - Starch
 (3) Elaioplast - Oils
 (4) Aleuroplasts - Proteins

34. Mitochondria contains all except

- (1) 70S ribosomes (2) Cristae
 (3) Few RNA molecules (4) Single linear DNA

35. The number of chloroplasts in alga chlamydomonas is

- (1) 2 (2) 1
 (3) 20 - 40 (4) 5 - 10

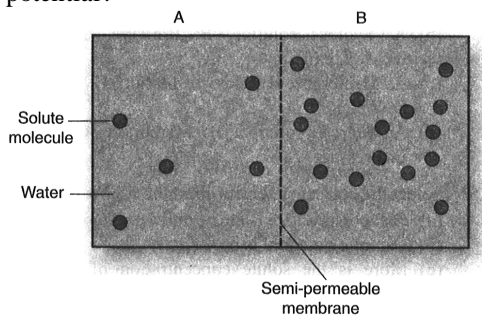
36. Chlorophyll pigments are present in

- (1) Thylakoid
 (2) Stroma
 (3) Outer membrane
 (4) Inner membrane

37. Choose the total number of correct statements from the following
- (1) Some channels in membrane are always open
 - (2) Porins allow the passage of molecule of size up to small protein
 - (3) Water channel is made up of eight different types of aquaporins
 - (4) Facilitated diffusion is very specific
- (1) 1 (2) 2 (3) 3 (4) 4

38. Which of the following has maximum water potential?
- (1) 1 M of NaCl
 - (2) 0.5 M of glucose
 - (3) Pure water
 - (4) 0.001 M of HCl

39. The solution of which chamber has a lower water potential?



Answer the above question with respect to the diagram.

- (1) A
 - (2) B
 - (3) Both have same
 - (4) Cannot predict
40. Water moves across a selectively permeable membrane in which of the following order?
- (1) From–Region of higher water potential; To–Region of lower water potential
 - (2) From–Lower water concentration; To–Higher water concentration
 - (3) From–Higher solute concentration; To–Lower solute concentration
 - (4) From–Region of higher osmotic potential; To–Region of lower osmotic potential
41. Water is often a limiting factor for plant growth and _____ in both _____ and _____ environments.
- (1) Productivity, agricultural, natural
 - (2) Movement, agricultural, artificial
 - (3) Photosynthesis, aquatic, terrestrial
 - (4) Senescence, agricultural, natural
42. How can we get egg membrane?
- (1) Remove yolk and albumin through a small hole at one end of the egg
 - (2) Place the shell in dilute HCl for few hours
 - (3) Both (1) and (2)
 - (4) None of these
43. The movement of water is correctly represented by
- (1) Cortex → Root hair (Epidermis) → Xylem → Endodermis → Pericycle
 - (2) Root hair (Epidermis) → Endodermis → Xylem → Pericycle → Cortex

- (3) Root hair (Epidermis) → Cortex → Endodermis → Pericycle → Xylem
- (4) Xylem → Cortex → Endodermis → Pericycle → Root hair (Epidermis)

44. Which plant seeds cannot germinate and established without the presence of mycorrhiza?
- (1) Mango
 - (2) Pulses
 - (3) Pinus
 - (4) Selaginella
45. The diameter of an RBC is
- (1) 7µm
 - (2) 700 µm
 - (3) 6µm
 - (4) 6000 µm
46. Select the incorrect statement from the following.
- (1) Glycocalyx differs in composition and thickness among different bacteria.
 - (2) All organisms are made of cells or aggregates of cells.
 - (3) ER helps in synthesis of proteins, lipoproteins and glycogen.
 - (4) Cells of all living organisms have nucleus.

ZOOLOGY

47. How many species named on earth is Arthropoda?
- (1) $\frac{1}{2}$
 - (2) $\frac{2}{3}$
 - (3) $\frac{1}{4}$
 - (4) $\frac{3}{4}$
48. Respiration occurs through organs, like gills, book gills, book lungs or tracheal system found in phylum
- (1) Mollusca
 - (2) Annelida
 - (3) Arthropoda
 - (4) Echinodermata
49. Which of the following is gregarious pest?
- (1) Laccifer
 - (2) Locusta
 - (3) King crab
 - (4) Both (1) and (2)
50. The mouth containing file-like rasping organ for feeding called radula is found in
- (1) Mollusca
 - (2) Hemichordata
 - (3) Echinodermata
 - (4) Arthropoda
51. The excretory organ and proboscis gland is present in
- (1) Ascidia
 - (2) Salpa
 - (3) Doliolum
 - (4) Saccoglossus
52. What amount of haemoglobin is present in 100 mL of human blood ?
- (1) 10 g
 - (2) 15 g
 - (3) 25 g
 - (4) 45 g
53. Which type of white blood cells are concerned with the release of histamine and the natural anticoagulant heparin?
- (1) Basophils
 - (2) Monocytes
 - (3) Neutrophils
 - (4) Eosinophils

54. Megakaryocytes :
(1) produce leucocytes
(2) are called bone cells
(3) are carriers of oxygen
(4) produce blood platelets
55. Heart is covered by
(1) Peritoneum (2) Pleural membrane
(3) Pericardium (4) Visceral membrane
56. Human heart is
(1) Neurogenic (2) Myogenic
(3) Cardiogenic (4) Digenic
57. The impulse of heartbeat originates from
(1) SA node (2) Vagus nerve
(3) AV node (4) Cardiac nerve
58. Systemic heart refers to
(1) entire heart in higher vertebrates
(2) the two ventricles together in humans
(3) left auricle and left ventricle in higher vertebrates
(4) the heart that contracts under stimulation from nervous system
59. The following are coelomates except (true coelom)
(1) Annelida (2) Platyhelminthes
(3) Mollusca (4) Chordata
60. The unique character of sponges is
(1) Choanocytes or collar cells that line the spongocoel and the canals.
(2) They are hermaphrodites.
(3) They live in marine water.
(4) It reproduces by asexual means only

SKD
New Standard
Coaching Institute