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SAMPLE PAPER - 86

Time : 1 : 15 Hr. **Question : 60**

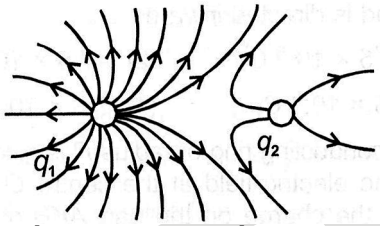
PHYSICS

01. Potential difference is given as $V(x) = -x^2 y$ volt. Find electric field at a point (1, 2).

(1) $\hat{i} + 4\hat{j} Vm^{-1}$ (2) $-4\hat{i} - \hat{j} Vm^{-1}$

(3) $4\hat{i} + \hat{j} Vm^{-1}$ (4) $4\hat{i} - \hat{j} Vm^{-1}$

02. Figure shows electric field lines due to a charge configuration, from this we conclude that



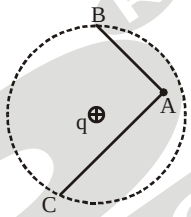
(1) q_1 and q_2 are positive and $q_2 > q_1$
(2) q_1 and q_2 are positive and $q_1 > q_2$
(3) q_1 and q_2 are negative and $|q_1| > |q_2|$
(4) q_1 and q_2 are negative and $|q_2| > |q_1|$

03. An electron having charge -e located at A, in the presence of a point charge +q located at O, is moved to the point B such that OAB forms an equilateral triangle. The work done in the process is equal to :
(1) q/AB (2) eq/AB (3) -eq/AB (4) zero

04. An electric field is spread uniformly in Y-axis. Consider a point A as origin point. The coordinates of point B are equal to (0, 2) m. The coordinates of point C are (2, 0) m. At points A, B and C, electric potentials are V_A, V_B and V_C, respectively. From the following options, which is correct?
(1) $V_A = V_C < V_B$ (2) $V_A = V_B = V_C$
(3) $V_A = V_B > V_C$ (4) $V_A = V_C > V_B$

05. The potential of a large liquid drop when eight liquid drops are combined is 20 V. Then the potential of each single drop was
(1) 2.5 V (2) 5 V (3) 7.5 V (4) 10 V

06. In the electric field on a point charge q shown, a charge is carried from A to B and from A to C. Compare the work done :



(1) work done is greater along the path AC than along AB
(2) work done is the same in both the cases
(3) work done is greater along the path AB than along AC
(4) work done is zero in both the cases.

07. A solid conducting sphere having a charge Q is surrounded by an uncharged concentric conducting hollow spherical shell. Let the potential difference between the surface of the solid sphere and that of the outer surface of the hollow shell be V. If the shell is now given a charge of –3Q, the new potential difference between the two surface is
(1) V (2) 2V (3) 4V (4) –2V

08. In uniform electric field $\vec{E} = E_0\hat{i} + 2E_0\hat{j}$, where E_0 is a constant, exists in a region of space and at (0, 0) the electric potential V is zero, then the potential at (x_0, 0) will be

(1) zero (2) $-E_0 x_0$ (3) $-2E_0 x_0$ (4) $-\sqrt{5} E_0 x_0$

09. Two insulating small spheres are rubbed against each other and placed 96 cm apart. If they attract each other with a force of 0.1 N, how many electrons were transferred from one sphere to the other during rubbing?
(1) 10^{11} (2) 2×10^{13}
(3) 3×10^{11} (4) 4×10^{11}

10. Which of the following is correct regarding electric charge?
(i) If a body is having positive charge i.e. shortage of electrons
(ii) If a body is having negative charge i.e. excess of electrons
(iii) Minimum possible charge = $\pm 1.6 \times 10^{-19}$ C

(iv) Charge is quantised i.e. Q = ±ne,
where n = 1, 2, 3, 4, ...
(1) (i) and (ii) (2) (ii) and (iii)
(3) (i), (ii), (iii) (4) All

11. A spherical conductor of radius 10 cm has a charge of 3.2×10^{-7} C distributed uniformly. What is the magnitude of electric field at a point 15 cm from the centre of the sphere?

$\left(\frac{1}{4\pi\varepsilon_0} = 9\times10^9 \text{N m}^2/\text{C}^2\right)$

(1) 1.28×10^4 N/C (2) 1.28×10^5 N/C
(3) 1.28×10^6 N/C (4) 1.28×10^7 N/C

12. In a region with uniform electric field the number of lines of force for unit area is E. If a spherical metallic conductor is placed in this region, the number of lines of force per unit area inside the conductor will be :
(1) E (2) more than E
(3) less than E (4) zero.

13. A point Q lies on the perpendicular bisector of an electrical dipole of dipole moment p. If the distance of Q from the dipole is r (much larger than the size of the dipole), then the electric field at Q is proportional to
(1) p^2 & r^{-3} (2) p & r^{-2} (3) p^{-1} & r^{-2} (4) $p^2 \propto r^{-6}$

14. Two metallic spheres of radii 1 cm and 2 cm are given charges 10^{-2} C and 5×10^{-2} C respectively. If they are connected by a connecting wire, the final charge on bigger sphere is :
(1) 2×10^{-2} C (2) 4×10^{-2} C
(3) 1×10^{-2} C (4) 3×10^{-2} C.

15. Electric field on the axis of a small electric dipole at a distance r is $\vec{E}_1$ and $\vec{E}_2$ at a distance of 2r on a line of a perpendicular bisector then

(1) $\vec{E}_2 = -\frac{\vec{E}_1}{8}$ (2) $\vec{E}_2 = -\frac{\vec{E}_1}{16}$

(3) $\vec{E}_2 = -\frac{\vec{E}_1}{4}$ (4) $\vec{E}_2 = \frac{\vec{E}_1}{16}$

CHEMISTRY

16. In a gaseous reaction of the type $aA + bB \longrightarrow cC + dD$, which is wrong?
(1) a litre of A combines with b litre of B at same P & T to give C and D
(2) a mole of A combines with b mole of B to give C and D
(3) a g of A combines with b g of B to give C and D
(4) a molecules of A combines with b molecules of B to give C and D

17. One litre of CO_2 is passed over hot coke. The volume becomes 1.4 litre. The per cent composition of products is:
(1) 0.6 litre CO
(2) 0.8 litre CO_2
(3) 0.6 litre CO_2 and 0.8 litre CO
(4) None of these

18. The density of a solution prepared by dissolving 120 g of urea (mol. Mass = 60 u) in 1000 g of water is 1.15 g/mL. The molarity if this solution is
(1) 0.50 M (2) 1.78 M
(3) 1.02 M (4) 2.05 M

19. The mole fraction of a given sample of I_2 in C_6H_6 is 0.2. The molality of I_2 in C_6H_6 is
(1) 0.32 (2) 3.2 (3) 0.032 (4) 0.48

20. Number of mole in 1 m^3 gas at NTP are:
(1) 44.6 (2) 40.6 (3) 42.6 (4) 48.6

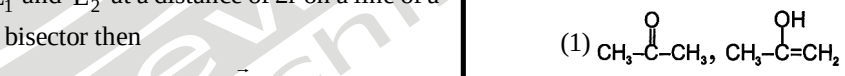
21. In ethane, ethene and ethyne molecules, carbon atoms are present in hybrid states of
(1) sp^3—sp^2, sp^2—sp^2, sp^2—sp
(2) sp^3—sp, sp^3—sp^2, sp^3—sp
(3) sp^3—sp^3, sp^2 sp^2, sp—sp
(4) sp^2—sp^3, sp^2—sp, sp^2—sp^3

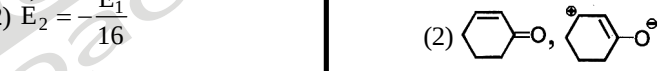
22. Rank the following in decreasing order of heat of hydrogenation :

(i)  (ii)  (iii) 

(1) i > ii > iii (2) ii > iii > i
(3) i > iii > ii (4) iii > i > ii

23. Which of the following pairs of structures do not represent resonating structures?

(1) 

(2) 

(3) 

(4) $CH_2 = C = O \quad \overset{\ominus}{C}H_2 - C \equiv \overset{\oplus}{O}$

24. Aromatic compounds are:

(1)  (2) 

(3)  (4) 

25. Which of the following is anti-aromatic species?

(1)  (2)  (3)  (4) 

26. Which of the following molecules represents the order of hybridisation sp^2, sp^2, sp, sp from left to right atoms?
(1) $CH_3 - CH = CH - CH_3$ (2) $CH_2 = CH - CH = CH_2$
(3) $CH_2 = CH - C \equiv CH$ (4) $HC \equiv C - C \equiv CH$

27. The electronegativity of the following elements increases in the order
(1) S < P < N < O (2) P < S < N < O
(3) N < O < P < S (4) N < P < S < O

28. Which of the following oxides is not expected to react with sodium hydroxide?
(1) B_2O_3 (2) CaO (3) SiO_2 (4) BeO

29. Atomic number of few elements are given. Which of these belong to d block of elements?
(1) 29 (2) 38 (3) 43 (4) 53
Select the correct answer using the codes given below:
(1) 1 and 2 (2) 1 and 3
(3) 1, 2 and 3 (4) 2, 3 and 4

30. The electronic configuration of outermost orbit of an element is $4s^2 4p^4$. In the long form of the periodic table, the place of this element would be in:
(1) 6 group, fourth period
(2) 2 group, fourth period
(3) 16 group, fourth period
(4) 16 group, 6 period

BOTANY

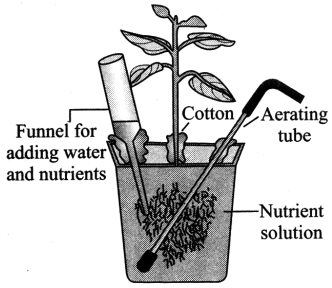
31. Force generated by transpiration can create pressure to lift water upto
(1) 130 feet (2) 130 metres
(3) 230 feet (4) 230 metres

32. Which one give the most valid and recent explanation for stomatal movements ?
(1) Starch hydrolysis
(2) Guard cell photosynthesis
(3) Transpiration
(4) Potassium influx and efflux

33. Root hair absorbs water from soil through
(1) Turgor pressure (2) Ion exchange
(3) Osmosis (4) None of the above

34. Swelling of wooden frames during rains is caused by
(1) Endosmosis (2) Imbibition
(3) Capillarity (4) osmosis

35. The following figure shows the typical set-up for



(1) Demostration of osmosis
(2) Thistle funnel experiment
(3) Nutrient solution culture
(4) Sachs technique for water less culture

36. The mineral associated with cytochrome is
(1) Cu (2) Mg
(3) Fe and Mg (4) Fe and Cu

37. A plant requires magnesium for
(1) protein synthesis
(2) chlorophyll synthesis
(3) cell wall development
(4) holding cells together

38. During plasmolysis,
(1) Cell membrane of a plant cell shrinks away from its cell wall
(2) Water is first lost from the cytoplasm and then from the vacuoles
(3) Area between cell wall and shrunken protoplast is occupied by outer solution
(4) All the above

39. Match Column-I with Column-II and selct the correct option from the codes given below.

	Column-I		Column-II
A.	Leeuwenhoek	i.	First saw and described a living cell
B.	Robert Brown	ii.	Presence of cell wall is unique to plant cells
C.	Schleiden	iii.	Discovered the nucleus
D.	Schwann	iv.	All plants are composed of different kind of cells

(1) A-(i), B-(iii), C-(iv), D-(ii)
(2) A-(i), B-(iii), C-(ii), D-(iv)
(3) A-(iii), B-(i), C-(iv), D-(ii)
(4) A-(i), B-(iv), C-(ii), D-(iii)

40. Omnis cellual a cellulae i.e., new cells arise from pre-existing cells; this statements was given by
(1) Schleiden and Schwann
(2) Rudolf Virchow
(3) Robert Brown
(4) Robert Hooke

41. Glycocalyx (mucilage sheath) of a bacterial cell may occur in the form of a loose sheath called .....or it may be thick and tough called.....
(1) capsule, slime layer (2) slime layer, capsule
(3) mesosome, capsule (4) mesosome, slime layer

42. The type of ribosomes found in prokaryotes is
(1) 80S type (2) 70S type
(3) 30S type (4) 50S type

43. Plant cells differ from animal cells in having
(1) cell wall
(2) plastids
(3) a large central vacuole
(4) all of these

44. Which organelle is not a part of the endomembrane system?
(1) ER (2) Golgi complex
(3) Lysosomes (4) Mitochondria

45. Smooth endoplasmic reticulum is well developed in the cells which synthesize
(1) steroids (2) proteins
(3) carbohydrates (4) all of these

ZOOLOGY

46. Which one of the following hormone stimulates the 'let-down' (release) of milk from the mother's breasts when the baby is sucking?
(1) Progesterone (2) Oxytocin
(3) Prolactin (4) Relaxin

47. According to the accepted concept of hormone action, if receptor molecules are removed from target organs, then the target organs will
(1) not respond to the hormone
(2) continue to respond to hormone without any difference
(3) continue to respond to the hormone but in the opposite direction
(4) continue to respond to the hormone but will require higher concentration

48. Which of the following are features of chordate?
(1) Notochord is present.
(2) CNS is dorsal, hollow and single.
(3) Pharynx perforated by gill slits.
(4) Heart is ventral.
(5) A post-anal is present.
(1) All except (4) (2) All except (2)
(3) All of these (4) All except (5)

49. How many of the following belongs to subphylum urochordate?
Ascidia, Salpa, Doliolum, Branchiostoma, Petromyzon, Myxine
(1) 1 (2) 2 (3) 3 (4) 4

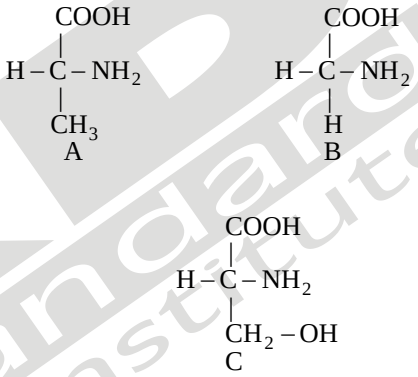
50. Vertebrates have:
(1) Ventral muscular heart with 2, 3 or 4 chambers.
(2) Kidneys for excretion and osmoregulation.
(3) Paired appendages which may be fins or limbs.
(4) All of these

51. Which of the following fish possess electric organs?
(1) Scoliodon (Dogfish)
(2) Trygon (3) Torpedo
(4) Pristis (Sawfish)

52. (1) Streamlined body
(2) Both marine and fresh water
(3) Mouth is terminal
(4) Air bladder present
(5) 4 pairs of gills with operculum
The above, characters belong to class
(1) Cyclostomata (2) Chondrichthyes
(3) Osteichthyes (4) Amphibia

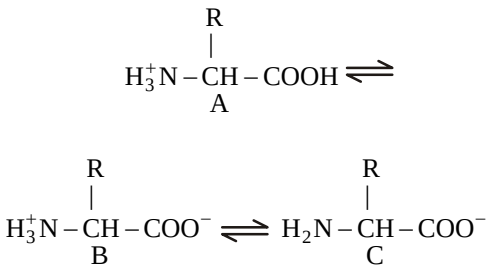
53. Identify, in which of the following carbon compounds, heterocyclic rings can be found ?
(1) Proteins (2) Amino acids
(3) Nitrogen bases (4) Lipids

54. Name the amino acids A-C correctly.



(1) A-Glycine, B-serine, C-Alanine
(2) A-Alanine, b-Glycine, C-Serine
(3) A-Serine, B-Glycine, C-Alanine
(4) A-Serine, B-Alanine, C-Glycine

55. Identify the zwitter ionic form in the given reversible reaction.



Choose the correct option.
(1) A (2) C
(3) B (4) None of the above

56. Which of the following secondary metabolites ar used as drugs?
(1) Vinblastin and curcumin
(2) Anthocyanin
(3) Gums and cellulose
(4) Abrin and ricin

57. Compounds found in acid soluble pool have molecular weight ranging form
(1) 18-800 deltons
(2) 100-800 daltons
(3) more than 800 daltons
(4) None of the above

58. Lipids are found in acid insoluble fraction during the analysis of chemcal composition of tissues. Give the reason.
(1) It has very high molecular weight
(2) It is polymer
(3) It has low molecular weight
(4) On grinding, the biomembranes are broken into pieces and from insoluble vesicles.

59. Identify the correct statement from those given below.
(1) Lipids with molecular weight not exceeding 800 Da. comes under acid soluble fraction
(2) The acid soluble fraction have four types of organic compounds, i.e. proteins, nucleic acid.
(3) The macromolecules from cytoplasm and organelles become the acid insoluble fraction
(4) The acid insoluble pool represents roughly the cytoplamic composition of cells

60. Which of the following is an essential amino acids?
(1) Valine (2) Leucine
(3) Tryptophan (4) All of these

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