Regn. No. 0920
SKD New Standard Coaching Institute
ESTD. 1985
37 YEARS OF TEACHING EXCELLENCE
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SAMPLE PAPER - 53

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

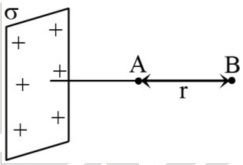
PHYSICS

01. A charged particle of mass m and charge q is released from rest in uniform electric field E. Neglecting the effect of gravity, the kinetic energy of the charged particle after t second is

(1) $\frac{Eq^2M}{2t^2}$ (2) $\frac{2E^2t^2}{mq}$ (3) $\frac{E^2q^2t^2}{2m}$ (4) $\frac{Eqm}{t}$

02. Two point charges of +2 micro-coulombs and +6 micro-coulombs repel each other with a force of 12 newtons. If a charge of –2 micro-coulombs is given to each of these charges, what will be the force now:
(1) zero (2) 4 N (attractive)
(3) 8 N (repulsive) (4) 4 N (repulsive)

03. An infinite sheet has surface charge density σ. The distance between two points is r. The potential difference $(V_A - V_B)$ between these points is



(1) $\frac{\sigma r}{2\varepsilon_0}$ (2) $\frac{\sigma r}{3\varepsilon_0}$ (3) $\frac{\sigma}{\varepsilon_0 r}$ (4) $\frac{\sigma}{2\varepsilon_0 r}$

04. In 1 g of a solid, there are 5×10^{21} atoms. If one electron is removed from everyone of 0.1% atoms of the solid, the charge gained by the solid is (given that electronic charge is 1.6×10^{-19} C) :
(1) +0.08 C (2) +0.8 C
(3) –0.08 C (4) –0.8 C

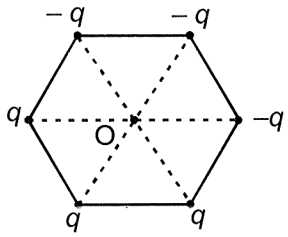
05. Two concentric spheres kept in air have radii R and r. They have similar charge and equal surface charge density σ. The electrical potential at their common centre is (ε_0 = permittivity of free space)

(1) $\frac{\sigma(R+r)}{\varepsilon_0}$ (2) $\frac{\sigma(R-r)}{\varepsilon_0}$
(3) $\frac{\sigma(R+r)}{2\varepsilon_0}$ (4) $\frac{\sigma(R+r)}{4\varepsilon_0}$

06. In a regular polygon of n sides, each corner is at a distance r from the centre. Identical charges of magnitude Q are placed at (n - 1) corners. The field at the centre is ($k = 9\times10^9$ N-m^2/C^2) :

(1) $k\frac{Q}{r^2}$ (2) $(n-1)k\frac{Q}{r^2}$
(3) $\frac{n}{(n-1)}k\frac{Q}{r^2}$ (4) $\frac{(n-1)}{n}k\frac{Q}{r^2}$

07. Six point charges are placed at the vertices of a hexagon of side 1 m as shown in figure. Net electric field at the centre of the hexagon is

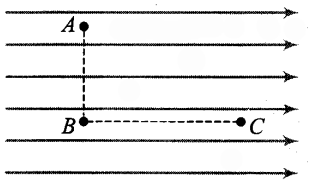


(1) Zero (2) $\frac{6q}{4\pi\varepsilon_0}$
(3) $\frac{q}{\pi\varepsilon_0}$ (4) $\frac{q}{4\pi\varepsilon_0}$

08. A uniform electric field exists in x–y plane. The potential of point A(+2 m, 2 m), B(–2 m, 2 m) and C (2m, 4m) are 4 V, 16 V and 12 V respectively. The electric field is

(1) $(4\hat{i}+5\hat{j})\frac{V}{m}$ (2) $(3\hat{i}+4\hat{j})\frac{V}{m}$
(3) $-(3\hat{i}+4\hat{j})\frac{V}{m}$ (4) $(3\hat{i}-4\hat{j})\frac{V}{m}$

09. Figure shows three points A, B and C in a region of uniform electric field $\vec{E}$. The line AB is perpendicular and BC is parallel to the field lines. Then which of the following holds good. Where V_A, V_B and V_C represent the electric potential at points A, B and C respectively.



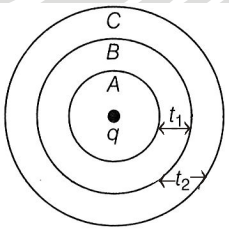
(1) $V_A = V_B = V_C$ (2) $V_A = V_B > V_C$
(3) $V_A = V_B < V_C$ (4) $V_A > V_B = V_C$

10. At a point in space, the electric field points towards north. In the region surrounding this point, the rate of change of potential will be zero along
(1) north (2) south
(3) north-south (4) east-west

11. The electric field due to an electric dipole at a distance r from its centre in axial position is E. If the dipole is rotated through an angle of 90° about its perpendicular axis, the electric field at the same point will be
(1) E (2) E/4 (3) E / 2 (4) 2E

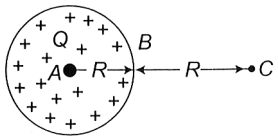
12. Consider a uniform electric field in the $\hat{z}$ direction. The potential is a constant
(1) for any x for a given z.
(2) for any y for a given z.
(3) on the x-y plane for a given z.
(4) All of the above

13. Figure shows three spherical and equipotential surfaces A, B and C round a point charge q. The potential difference $V_A - V_B = V_B - V_C$. If t_1 and t_2 be the distances between them, then



(1) $t_1 = t_1$ (2) $t_1 > t_2$ (3) $t_1 < t_2$ (4) $t_1 \le t_2$

14. Find the ratio of electric work done in bringing a charge q from A to B (W_{AB}) and that from B to C (W_{BC}) in a sphere of charge Q distributed uniformly throughout its volume



(1) 1 (2) 1.5
(3) 0.75 (4) None of these

15. An electric dipole is placed at the origin O and is directed along the x-axis. At a point P, far away from the dipole, the electric field is parallel to y-axis. OP makes an angle θ with the x-axis then
(1) $\tan\theta = \sqrt{3}$ (2) $\tan\theta = \sqrt{2}$
(3) $\theta = 45^\circ$ (4) $\tan\theta = \frac{1}{\sqrt{2}}$

CHEMISTRY

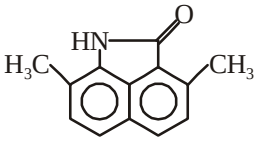
16. Which one of the following arrangement represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species?
(1) S < O < Cl < F (2) Cl < F < S < O
(3) F < Cl < O < S (4) O < S < F < Cl

17. The element having greatest difference between its first and second ionization energies, is :
(1) Ca (2) K
(3) Ba (4) Sc

18. The correct order of the first ionization enthalpies is:
(1) K < Li < Be < Mg (2) Cl > I > Br > F
(3) Li < Be < C < N (4) B < C < N < O

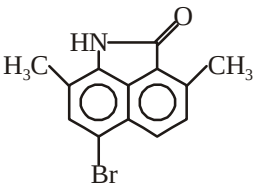
19. The size of the iso-electronic species
(1) $C^{-4} > N^{-3} > O^{2-} > Na^{+} > Mg^{++}$
(2) $C^{-4} > N^{-3} > O^{2-} > Mg^{++} > Na^{+}$
(3) $O^{2-} > N^{-3} > C^{-4} > Na^{+} > Mg^{++}$
(4) $N^{-3} > C^{-4} > O^{2-} > Na^{+} > Mg^{++}$

20. The major product obtained when Br_2/Fe is treated with

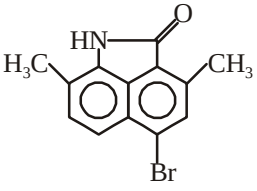


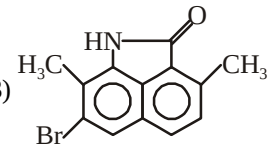
is

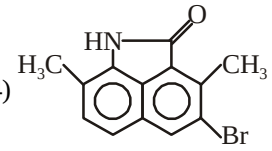
(1)



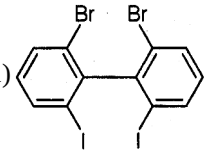
(2)

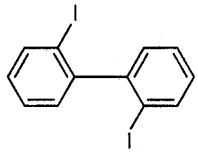


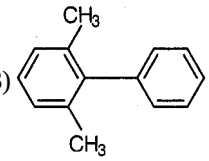
(3) 

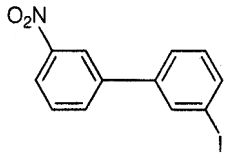
(4) 

21. Which of the following biphenyls is optically active?

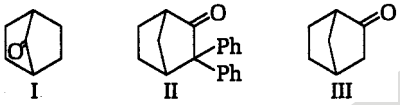
(1) 

(2) 

(3) 

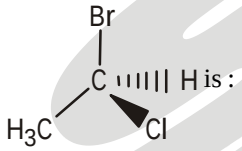
(4) 

22. Which among the given molecules can exhibit tautomerism?



(1) III only (2) Both I and III
(3) Both I and II (4) Both II and III

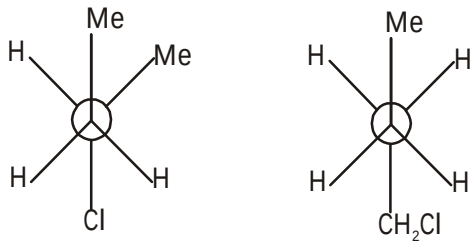
23. The absolute configuration of the compound



(1) R (2) S (3) E (4) Z

24. The number of structural isomers possible from the molecular formula C_3H_9N is:
(1) 2 (2) 3
(3) 4 (4) 5

25. The pair of structures represents :-

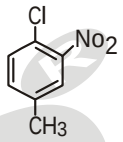


(1) Enantiomers (2) Position isomers
(3) Conformers (4) None

26. Which of the following compounds will exhibit cis-trans (geometrical) isomerism?
(1) 1-Butanol (2) 2-Butene
(3) 2-Butanol (4) 2-Butyne

27. $CH_3 - O - CH_2 - CH_2 - CH_3$;
(A)
$CH_3 - CH_2 - O - CH_2 - CH_3$
(B)
Relations between (A) and (B) is:
(1) chain isomers (2) positional isomers
(3) functional isomers (4) metamers

28. The IUPAC name of

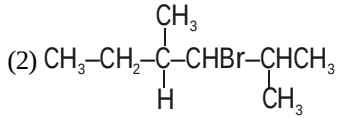


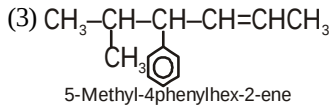
(1) 1-Chloro-2-nitro-4-methyl benzene
(2) 1-Chloro-4-methyl-2-nitrobenzene
(3) 2-Chloro-1-nitro-5-methyl benzene
(4) m-Nitro-p-chlorotoluene

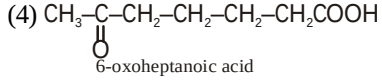
29. Which is the correct IUPAC name of this compound?

(1) 3-Ethyl-3-penty1-1,4-pentadiene
(2) 6-Ethyl-3-(1-inethylbuly1)-4,6-octadien-1-yne
(3) 6-Ethyl-2-methyl-5-octen-3-yne
(4) 1-(1-MethylcyclopropyI)-2-(2-methylcyclopropyl) cyclopropene

30. Which nomenclature is not according to IUPAC system?
(1) $Br-CH_2-CH=CHNH_2$
1-Bromoprop-2-enamine

(2) 
3-Bromo-2,4-dimethylhexane

(3) 
5-Methyl-4phenylhex-2-ene

(4) 
6-oxoheptanoic acid

BOTANY

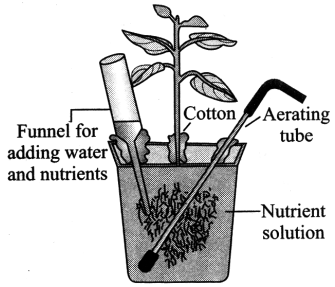
31. Force generated by transpiration can create pressure to lift water upto
(1) 130 feet (2) 130 metres
(3) 230 feet (4) 230 metres

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. Birth canal is formed by
(i) Uterus (ii) Cervix
(iii) Vagina
(1) i and ii (2) i and iii
(3) ii and iii (4) iii only

47. A natural method of contraception, periodic abstinence is
(1) Abstaining from coitus from day 1 to 5 of the menstrual cycle
(2) Abstaining from coitus from day 17 to 22 of the menstrual cycle
(3) Abstaining from coitus from day 10 to 17 of the menstrual cycle
(4) Abstaining from coitus from day 5 to 10 of the menstrual cycle

48. If yellow body, white eyed drosophila is crossed with wild brown body red eyes drosophila. Then what would be the frequency of recombinants in F_1 generation?
(1) 100% (2) 1.3%
(3) 98.7% (4) 0%

49. The fitness referred to in Darwin's theory is
(1) Physical fitness (2) Mental fitness
(3) Reproductive fitness (4) All of these

50. When readymade antibodies are given to protect the body against foreign agents, it is called .....immunity
(1) Passive (2) Active
(3) Innate (4) Humoral

51. 30 cycle of PCR amplified DNA approximately is how many times
(1) 1 billion times (2) 1 million times
(3) 100 times (4) 1000 times

52. RNAi stands for
(1) RNA infection (2) RNA induction
(3) RNA interference (4) RNA inhibition

53. A muscular sphincter that regulates the opening of stomach into duodenum is
(1) Pyloric sphincter
(2) Gastroesophageal sphincter
(3) Sphincter of Oddi
(4) Cervical sphincter

54. Glottis is an opening in the floor of
(1) Mouth (2) Trachea
(3) Pharynx (4) Diaphragm

55. Following are the points of mechanism of JGA, arrange them accordingly
(A) Activation of JG cells
(B) Activated JG cells release renin
(C) Fall in GFR
(D) Increase of glomerular blood flow
(E) GFR back to normal
(1) E, A, D, C, B (2) C, A, B, D, E
(3) A, B, C, D, E (4) C, A, D, B, E

56. Select the incorrect pair
(1) Cell wall - Structural support
(2) Central vacuole - Storage
(3) Amyloplast - Starch storage
(4) Plasmodesmata - Protection

57. ..... is the single membrane bound organelle
(1) Sphaerosome (2) Lysosome
(3) Glyxysome (4) All of these

58. Cell organelle responsible for autolysis is
(1) dictyosome (2) lysosome
(3) peroxisome (4) glyoxysome

59. Arrangement of microtubules in a flagellum and a centriole is respectively
(1) 9 + 2 and 9 + 1 (2) 9 + 1 and 9 + 0
(3) 9 + 0 and 9 + 2 (4) 9 + 2 and 9 + 0

60. The best material for the study of structure of cell membrane is
(1) RBC of human (2) liver cell
(3) kidney cell (4) muscle cell