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SKD New Standard Coaching Institute
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SAMPLE PAPER - 41

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

PHYSICS

01. Two equal forces (P each) act at a point inclined to each other at an angle of 120°. The magnitude of their resultant is
(1) P/2 (2) P/4
(3) P (4) 2P

02. A car completes its journey in a straight line in three equal parts with speeds v_1, v_2 and v_3 respectively. The average speed v is given by :
(1) $\frac{v_1 + v_2 + v_3}{3}$ (2) $3\sqrt{v_1 v_2 v_3}$
(3) $\frac{1}{v} = \frac{1}{v_1} + \frac{1}{v_2} + \frac{1}{v_3}$ (4) $\frac{3}{v} = \frac{1}{v_1} + \frac{1}{v_2} + \frac{1}{v_3}$

03. A ball is thrown upward with such a velocity v that it returns to the thrower after 3 s. Take g = 10 ms^{-2}. Find the value of v.
(1) 15 m/s (2) 20 m/s
(3) 10 m/s (4) 5 m/s

04. A person can throw a stone to a maximum distance of h metre. The greatest height to which he can throw the stone is :
(1) h (2) h/2
(3) 2h (4) 3h

05. A particle is moving on a circular path of radius r with uniform speed v. What is the displacement of the particle after it has described an angle of 60° ?
(1) $r\sqrt{2}$ (2) $r\sqrt{3}$
(3) r (4) 2r

06. In which of the following cases the net force acting on the body is not zero ?
(1) A drop of rain falling down with a constant speed
(2) A cork of mass 10 g floating on the surface of water
(3) A car moving with a constant speed of 20 km h^{-1} on a rough road
(4) A pebble of mass 0.05 kg is thrown vertically upwards

07. Two bodies of mass 3 kg and 4 kg are suspended at the ends of massless string passing over a frictionless pulley. The acceleration of the system is (g = 9.8 m/s^2)
(1) 4.9 m/s^2
(2) 2.45 m/s^2
(3) 1.4 m/s^2
(4) 9.5 m/s^2

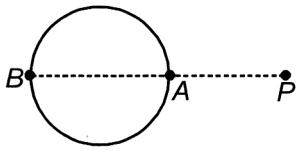
08. A positively charged ball hangs from a silk thread. We put a positive test charge q_0 at a point and measure F/q_0, then it can be predicted that the electric field strength E , is
(1) > F/q_0 (2) = F/q_0
(3) < F/q_0 (4) Cannot be estimated

09. A conducting sphere of radius 10 cm is charged with 10 μC. Another uncharged sphere of radius 20 cm is allowed to touch it for some time. After that if the spheres are separated, then surface density of charges, on the spheres will be in the ratio of
(1) 1 : 4 (2) 1 : 3
(3) 2 : 1 (4) 1 : 1

10. The particles A and B of mass m each are separated by a distance r. Another particl 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) $\frac{4GMm}{r}$

11. Consider a planet moving around a star in an elliptical orbit with period T. The area of the elliptical orbit is proportional to
(1) $T^{\frac{4}{3}}$ (2) T
(3) $T^{\frac{2}{3}}$ (4) $T^{\frac{1}{2}}$

12. A hollow conducting sphere is placed in an electric field produced by a point charge at P as shown in the figure. Let V_A and V_B be the electrostatic potential at point A and B respectively. then,



(1) $V_A > V_B$ (2) $V_B > V_A$
(3) $V_B = V_A$
(4) Relation cannot be determined with the given information

13. The ratio of the energy required to raise a satellite upto a height h above the earth to the kinetic energy of the satellite into the orbit there is : (R = radius of the earth)
(1) h : R (2) R : 2h
(3) 2h : R (4) R : h

14. Which of the following is not true ?
(1) For a point charge, the electrostatic potential varies as $\frac{1}{r}$
(2) For a dipole, the potential depends on the position vector and dipole moment vector
(3) The electric dipole potential varies as $\frac{1}{r}$ at large distance
(4) For a point charge, the electrostatic field varies as $\frac{1}{r^2}$

15. If vectors P, Q and R have magnitude 5, 12 and 13 units and $\vec{P}+\vec{Q}=\vec{R}$, the angle between Q and R is
(1) $\cos^{-1}\frac{5}{12}$ (2) $\cos^{-1}\frac{5}{13}$
(3) $\cos^{-1}\frac{12}{13}$ (4) $\cos^{-1}\frac{7}{13}$

CHEMISTRY

16. 20 g of an ideal gas contains only atoms of S and O occupies 5.6 L at 1 atm and 273 K. What is the mol. wt. of gas?
(1) 64 (2) 80
(3) 96 (4) None of these

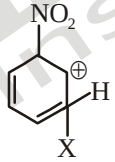
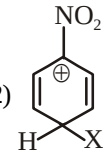
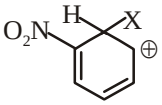
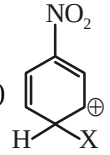
17. Calculate the molality of 1 L solution of 80% H_2SO_4 (w/V), given that the density of the solution is 1.80 g mL^{-1}.
(1) 8.16 (2) 8.6
(3) 1.02 (4) 10.8

18. A sample of pure sodium carbonate 0.318 g is dissolved in water and titrated with HCl solution. A volume of 60 mL is required to reach the methyl orange end point. Calculate the molarity of the acid.
(1) 0.1 M (2) 0.2 M
(3) 0.4 M (4) None of these

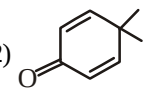
19. The cryoscopic constant of water is 1.86 K kg mol^{-1}. A 0.01 molal acetic acid solution produces a depression of 0.0194°C in the freezing point. The degree of dissociation of acetic acid is:
(1) zero (2) 0.043 (3) 0.43 (4) 1

20. According to Henry's law, the partial pressure of gas (P_g) is directly proportional to mole fraction of gas in liquid solution, $P_{gas} = K_H.X_{gas}$, where K_H is Henry's constant. Which is incorrect?
(1) K_H is characteristic constant for a given gas-solvent system
(2) Higher is the value of K_H, lower is solubility of gas for a given partial pressure of gas
(3) K_H has temperature dependence
(4) K_H decreases with increase of temperature

21. The correct order of decreasing acid strength of trichloroacetic acid (A), trifluoroacetic acid (B), acetic acid (C) and formic acid (D) is:
(1) B > A > D > C (2) B > D > C > A
(3) A > B > C > D (4) A > C > B > D

22. Which of the following carbocations is most stable?
(1) 
(2) 
(3) 
(4) 

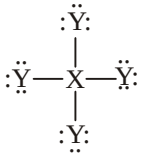
23. Hyperconjugation phenomenon is possible in:
(1) $H_2C = CH_2$ (2) $CH_3CH_2 - CH = CH_2$
(3) $C_6H_5CH = CH_2$ (4) $(CH_3)_3C - CH = CH_2$

24. Which of the following molecules is least resonance stablised?
(1) 
(2) 
(3) 
(4) 

25. Which of the following has maximum number of unpaired d–electrons?
(1) Fe^{2+} (2) Cu^+ (3) Zn (4) Ni^{3+}

26. Among the following compounds, which compound is polar as well as exhibits sp^2-hybridisation by the central atom
(1) H_2CO_3 (2) SiF_4 (3) BF_3 (4) $HClO_3$

27. For the dot structure shown, the most likely elements X = ... and Y = ... are



(1) carbon, fluorine (2) carbon, hydrogen
(3) carbon, oxygen (4) oxygen, carbon

28. Listed below are the electronic configuration of four elements. Arrange the elements in the increasing order of metallic character.
I. $[Ar]3d^{10}, 4s^2$ II. $[Ar]4s^2$
III. $[Ar]3d^{10}, 4s^2, 4p^6, 5s^2$ IV. $[Ar]3d^{10}, 4s^2, 4p^5$
(1) I < II < III < IV (2) II < I < III < IV
(3) III < II < I < IV (4) IV < I < II < III

29. Electronic configuration of some elements is given in Column I and their electron gain enthalpies are given in Column II. Match the electronic configuration with electron gain enthalpy.

	Column–I (Electronic configuration)		**Column–II (Electron gain enthalpy/kJ mol^{-1})**
A.	$1s^2 2s^2, 2p^6$	1.	–53
B.	$1s^2 2s^2, 2p^6 3s^1$	2.	–328
C.	$1s^2 2s^2, 2p^5$	3.	–141
D	$1s^2 2s^2, 2p^4$	4.	+48

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

30. Suppose two elements X and Y combine to form two compounds XY_2 and X_2Y_3 when 0.05 mole of XY_2 weighs 5 g while 3.011×10^{23} molecules of X_2Y_3 weighs 85 g. The atomic masses of X and Y are respectively:
(1) 20, 30 (2) 30, 40 (3) 40, 30 (4) 80, 60

BOTANY

31. Read the following statements and find out the incorrect statement.
(1) Second step of Calvin cycle (i.e., reduction) involve utilisation of 2 molecule of ATP for reduction and 2 of NADPH for phosphorylation per CO_2 molecule fixed
(2) The regeneration steps require one ATP for phosphorylation to form RuBP
(3) It is probably to meet the differences in number of ATP and NADPH used in dark reaction that the cyclic phosphorylation takes place
(4) Plants that are adapted to dry tropical regions have the C_4 pathway.

32. Which one of the following statements about the events of non-cyclic photophosphorylation is not correct ?
(1) Photolysis of water takes place
(2) Only one photosystem participates
(3) ATP and NADPH are produced
(4) O_2 is released

33. Light harvesting complexes (LHC) are made up of hundreds of pigment molecules bound to proteins. In LHC, reaction centre of formed by
(1) A single chlorophyll a molecule
(2)All the pigments except one molecule of chlorophyll a
(3) Carotenoids and xanthophylls
(4) Both (2) and (3)

34. Asparagine and glutamine are two important amides which are formed from aspartic acid and glutamic acid, respectively, by replacing the ...a... by another ...b... radicle.
(1) a-hydroxyl part of acid ; b-NH_2^-
(2) a-NH_2^- group of amino acid ; b-OH^-
(3) a-amino group ; b–keto group
(4) a-keto group ; b-amino group

35. Microtubules are made of
(1) Actin (2) Keratin
(3) Tubulin (4) Dynein

36. Phospholipid molecules of cell membranee possess
(1) One polar head and one polar tail
(2) One non-polar head and one non-polar tail
(3) One polar head and two non-polar tails
(4) One non-polar head and two non-polar tails.

37. What is the role of cytoskeleton in the cell ?
(1) Motility
(2) Mechanical support
(3) Maintenance of the shape of the cell
(4) All of the above

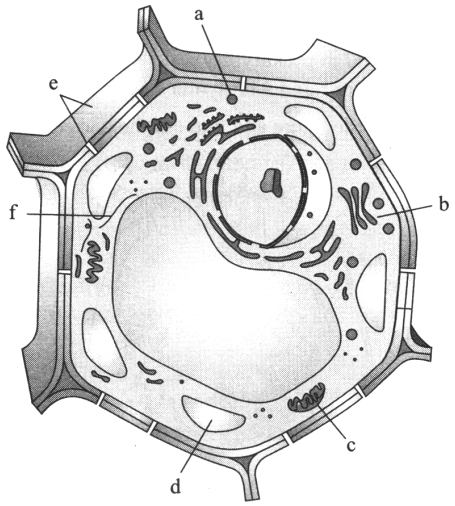
38. Water soluble pigment present in sap vacuole is
(1) Anthocyanin (2) Carotene
(3) Xanthophyll (4) Chlorophyll

39. Match the columns I and II and choose the correct combination from the options given

Column I		**Column II**	
(A)	Fungi	(i)	Asexual spores
(B)	Amoeba	(ii)	Binary fission
(C)	Hydra and Yeast	(iii)	True regeneration
(D)	Planaria	(iv)	Budding

(1) A-i, B-ii, C-iii, D-iv
(2) A-i, B-ii, C-iv, D-iii
(3) A-ii, B-i, C-iv, D-iii
(4) None are correct

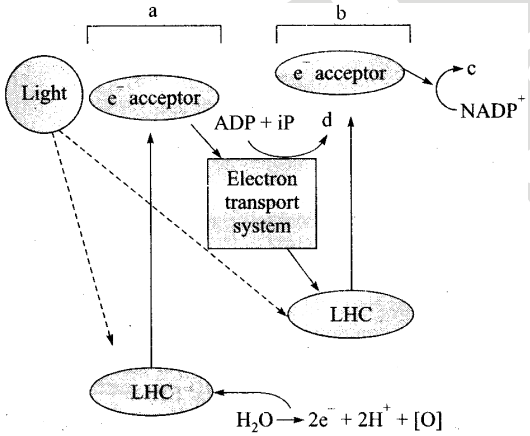
40. Recognise the figure and find out the correct matching.



(1) b-lysosome, d-mitochondrion, a-golgi apparatus, f-plasmodesmata, c-chloroplast, d-microtubule
(2) a-lysosome, c-mitochondrion, b-golgi apparatus, e-plasmodesmata, d-chloroplast, f-microtubule
(3) a-lysosome, d-mitochndrion, d-golgi apparatus, e-plasmodsmata, b-chloroplast, f-microtubule
(4) b-lysosome, c-mitrochondrion, a-golgi apparatus, e-plasmodesmata, d-chloroplast, f-microtubule

41. Which taxonomical aid contain information on any one taxon ?
(1) Catalogues (2) Manuals
(3) Flora (4) Monograph

42. Recognise the figure and find out the correct matching.



(1) a-PS I, b-PS II, c-ATP, d-NADH
(2) a-PS II, b-PS I, c-NADPH, d-ATP
(3) a-PS I, b-PS II, c-NADPH, d-ATP
(4) a-PS II, b-PS I, c-NADPH, d-ATP

43. Fill in the blanks :
1. Light saturation occurs at ...a... per cent of full sunlight.
2. There is a ...b... relationship between incident light and CO_2 fixation rates at low light intensities.
3. C_3 plants show saturation at about ...c... $\mu l\ L^{-1}$ while C_4 corresponds to saturation at about ....d.... $\mu 1\ L^{-1}$.
(1) a–2-5%, b–sigmoid, c–350, d-460
(2) a–50%, b–linear, c–460, d–350
(3) a–10%, b–sigmoid, c–360, d–450
(4) a–10%, b–linear, c–450, d–360

44. The specis (man, housefly, mango, wheat, dog, cat, lion, tiger, potato, brinjal and leopard) given here belong to how many differeent families ?
(1) 4 (2) 7 (3) 5 (4) 6

45. Animal cells do not possess
(1) Plasmodesmata (2) Centriole
(3) 80s ribosome (4) all of the above

ZOOLOGY

46. Which one of the following is not a second messenger in hormone action
(1) Sodium (2) cAMP
(3) IP_3 (4) Calcium

47. Grave's disease is caused due to
(1) Hypofunction of the thyroid
(2) Hyperfunction of the thyroid
(3) Hypofunction of the parathyroid
(4) Hyperfunction of the parathyroid

48. Goiter can occur as a consequence of all the following except
(1) Iodine dficiency
(2) Pituitary adenoma
(3) Grave's disase
(4) Excessive intake of exogenous thyroxin

49. A pregnant woman having prolonged labour pains, if child birth has to be hastened i.e. to aid parturition, it is advisable to administer a hormone that can
(1) Activate smooth muscle
(2) Increase the metabolic rate
(3) Release glucose into blood
(4) Stimulate the ovary

50. The urine of a man is very dilute and the quantity of urine is too much and dehydration has started in his body and he is very thirsty by the cause of
(1) Hypersecretion of ADH
(2) Hyposecretion of ADH
(3) Both (1) and (2)
(4) None of the above

51. Which of the following is right about blood coagulation?
I. Vitamin-B is necessary for the formation of prothrombinase.
II. Conversion of fibrinogen into fibrin
III. Convrsion of prothrombin into thrombin.
The option with corrct combination is
(1) I and II (2) II and III
(3) III and I (4) None of these

52. In amphibians and reptiles, the ....A.... atrium receives oxygenated blood from the gills/lung/skin and ....B.... atrium gets the ....C.... blood from other body parts. Choose the correct option for A, B and C.
(1) A-right, B-left, C-deoxygenated
(2) A-right, B-left, C-oxygenated
(3) A-left, B-right, C-deoxygenated
(4) A-left, B-right, C-oxygnated

53. How many animals in the list given below have closed mixed double circulation ?
Frog, Rabbit, Fish, Snake, Human, Pigeon
(1) One (2) Two (3) Three (4) Four

54. Which of the folloing sentences is correct ?
I. ECG is of a great clinical significance.
II. Electrocardiograph is the recording of electrical changes during the cardiac cycle.
III. To obtain a standard ECG, a patient is connected to the machine with 3 electrical electrodes (one to each wrist and to the left ankle).
IV. Normal activities of the heart are regulated intrinsically.
V. Electrocardiogram is recording of the electrical activity of cardiac muscle
The option with correct statements is
(1) I, II, III and V (2) I, III, IV and V
(3) II, III, IV and V (4) I, II, IV and V

55. Which of the following is not an autoimmune disease
(1) Vitiligo (2) Alzheimer's disease
(3) Rheumatoid arthritis (4) Psoriases

56. Malpighian corpuscles are present in
(1) Cortex (2) Medulla
(3) Germinal cells (4) None of them

57. Difference between glomerular filtrate and plasma is of
(1) Proteins
(2) Potassium
(3) First is white whereas later is yellow
(4) First is yellow whreas later is white

58. The total filtrate formed in 24 h in human kidney is
(1) 1.8 L (2) 8.0 L
(3) 18 L (4) 180 L

59. Which one the following is a movement but not locomotion?
(1) Hydra using tentacles for capturing its prey
(2) Flying insect
(3) Starfish chasing its prey
(4) Crocodile performing swimming

60. Which body cells perform amoeboid movement?
(1) Neurons and gametes
(2) Gametes and RBCs
(3) WBCs and macrophages
(4) Osteocytes and platelets