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SKD New Standard Coaching Institute
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39 YEARS OF TEACHING EXCELLENCE

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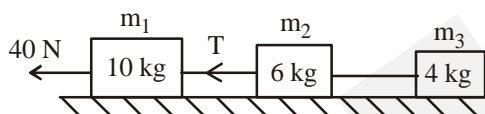
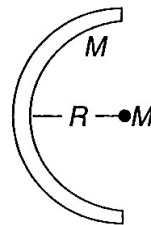# SAMPLE PAPER - 122

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

PHYSICS

01. Consider a car moving on a straight road with a speed of 100 m s^{-1}. The distance at which the car can be stopped is [$\mu_k = 0.5$]
    (1) 100 m (2) 1000 m
    (3) 800 m (4) 400 m

02. Three blocks of masses m_1, m_2 and m_3 are placed on a horizontal frictionless surface. A force of 40 N pulls the system then calculate the value of T. If $m_1 = 10$ kg, $m_2 = 6$ kg, $m_3 = 4$ kg.

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

03. A ball of mass 0.15 kg is dropped from a height 10 m, strikes the ground and rebounds to the same height. The magnitude of impulse imparted to the ball is ($g = 10$ m/s^2) nearly
    (1) 1.4 kg m/s (2) 0 kg m/s
    (3) 4.2 kg m/s (4) 2.1 kg m/s

04. A small sphere is suspended by a string from the ceiling of a car. If the car begins to move with a constant acceleration a, the inclination of the string to the vertical is -

    (1) $\tan^{-1}\left(\dfrac{a}{g}\right)$ in the direction of motion.

    (2) $\tan^{-1}\left(\dfrac{a}{g}\right)$ opposite to the direction of motion.

    (3) $\tan^{-1}\left(\dfrac{g}{a}\right)$ in the direction of motion.

    (4) $\tan^{-1}\left(\dfrac{g}{a}\right)$ opposite to the direction of motion.

05. A body of mass m rests on a horizontal floor with which it has a coefficient of static friction μ. It is desired to make the body move by applying the minimum possible force F. The magnitude of F is :

    (1) $\mu \, mg$ (2) $\dfrac{\sqrt{1+\mu^2}}{\mu} mg$

    (3) $\mu\sqrt{1+\mu^2} \, mg$ (4) $\dfrac{\mu mg}{\sqrt{1+\mu^2}}$

06. The figure shows elliptical orbit of a planet m about the sun S. The shaded area SCD is twice the shaded area SAB. If t_1 is the time for the planet to move from C to D and t_2 is the time to move from A to B, then

    (1) $t_1 > t_2$ (2) $t_1 = 4t_2$
    (3) $t_1 = 2t_2$ (4) $t_1 = t_2$

07. The potential energy of interaction between the semi-circular ring of mass M and radius R, and the particle of mass M placed at the centre of curvature of the semi-circular arc is:

    (1) $-\dfrac{GM^2}{R}$ (2) $-\dfrac{2GM^2}{R}$

    (3) $-\dfrac{GM^2}{\pi R}$ (4) none of these

08. At height h above the earth surface, weight of the person becomes 1/3, find height?
    (1) 4.68×10^6 m (2) 2.68×10^6 m
    (3) 3.50×10^6 m (4) 4.20×10^6 m

09. For the system of three concentric conducting shells. Find electric field at point P. (take OP = r)
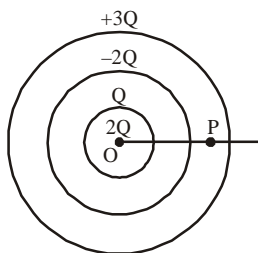
(1) $\dfrac{KQ}{r^2}$ away from centre

(2) $\dfrac{KQ}{r^2}$ towards the centre

(3) $\dfrac{2KQ}{r^2}$ away from centre

(4) $\dfrac{2KQ}{r^2}$ towards the centre

10. For the system of three large parallel conducting plates. Find ratio of magnitude of electric field at point P and S $\left(\dfrac{E_P}{E_S}\right)$.
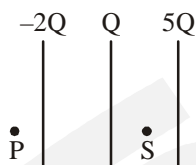
(1) 2/3   (2) 3/2
(3) 2   (4) 1/2

11. A point charge Q is placed at the centre of a spherical thick conducting shell. A total charge of –q is placed on the shell. The magnitude of the electric field at point P_1 at a distance R_1 from the centre is X. The magnitude of the electric field at point P_2, a distance R_2 from the centre is Y. The value of X and Y are respectively
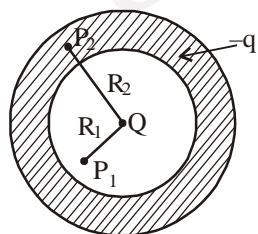
(1) 0, 0

(2) $\dfrac{KQ}{R_1^2}, 0$

(3) $\dfrac{K(Q-q)}{R_1^2}, 0$

(4) $\dfrac{KQ}{R_1^2}, \dfrac{KQ}{R_2^2}$

12. In a region, the intensity of an electric field is given by $\vec{E} = 2\hat{i} + 3\hat{j} + 2\hat{k}$ in NC^{-1}. The electric flux through surface $\vec{S} = 10\hat{i} - 3\hat{j} + 4\hat{k}$ m^2 in the region is

(1) $19\,Nm^2C^{-1}$ (2) $33\,Nm^2C^{-1}$
(3) $15\,Nm^2C^{-1}$ (4) $25\,Nm^2C^{-1}$

13. Two coherent sources of intensity ratio x^2 interfere. Then, in interference pattern,

(1) $\dfrac{I_{max} - I_{min}}{I_{max} + I_{min}} = \dfrac{1 + x^2}{2\sqrt{x}}$ (2) $\dfrac{I_{max} + I_{min}}{I_{max} - I_{min}} = \dfrac{1 + x}{2\sqrt{x}}$

(3) $\dfrac{I_{max} - I_{min}}{I_{max} + I_{min}} = \dfrac{2x}{1 + x^2}$ (4) $\dfrac{I_{max} + I_{min}}{I_{max} - I_{min}} = \dfrac{2x}{1 + x^2}$

14. The heat developed in a resistor H has a % error of x% if % error in i is 2%, R is 2%, t = 3%, find x.
(1) 9%   (2) 11%   (3) 6%   (4) 10%

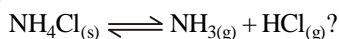15. After passing through lens, shape of wavefront will be
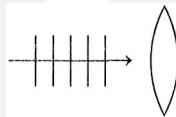
Converging lens

(1) ||| (2)))) (3) ((((4) None of these

CHEMISTRY

16. We know that the relationship between K_c and K_p is
$K_p = K_c(RT)^{\Delta n}$
What would be the value of Δn for the reaction:
$NH_4Cl_{(s)} \rightleftharpoons NH_{3(g)} + HCl_{(g)}$?
(1) 1   (2) 0.5
(3) 1.5   (4) 2

17. A reaction is said to be in equilibrium when
(1) the rate of transformation of reactants to products is equal to the rate of transformation of products to the reactants
(2) 50% of the reactants are converted to products
(3) the reaction is near completion and all the reactants are converted to products
(4) the volume of reactants is just equal to the volume of the products

18. If the value of equilibrium constant K_c for the reaction, $N_2 + 3H_2 \rightleftharpoons 2NH_3$ is 7. The equilibrium constant for the reaction, $2N_2 + 6H_2 \rightleftharpoons 4NH_3$ will be
(1) 49   (2) 7
(3) 14   (4) 28

19. The pH values 0.1 M solution of HCOONa (I), HCOOH (II), CH_3COONH_4 (III), NaOH (IV), HCl (V), will be in the order
(1) IV > III > I > II > V
(2) IV > I > III > II > V
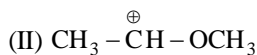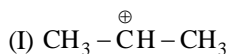(3) II > III > I > IV > V
(4) V > II > III > I > IV

20. Which of the following is most soluble in water?
(1) $Ba_3(PO_4)_2$ ($K_{sp} = 6 \times 10^{-39}$)
(2) ZnS ($K_{sp} = 7 \times 10^{-16}$)
(3) $Fe(OH)_3$ ($K_{sp} = 6 \times 10^{-38}$)
(4) $Ag_3(PO_4)$ ($K_{sp} = 1.8 \times 10^{-18}$)

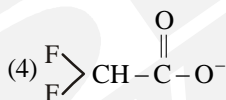21. The correct order of decreasing acid strength of trichloroacetic acid (A), trifluoroacetic acid (B), acetic acid (C) and formic acid (D) is:
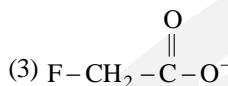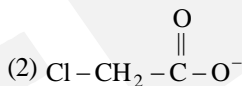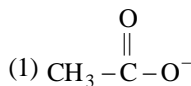(1) B > A > D > C
(2) B > D > C > A
(3) A > B > C > D
(4) A > C > B > D

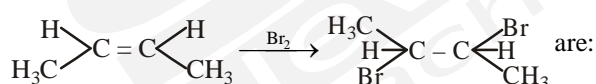22. What is the correct order of decreasing stability of the following cations?
(I) $CH_3 - \overset{\oplus}{C}H - CH_3$
(II) $CH_3 - \overset{\oplus}{C}H - OCH_3$
(III) $CH_3 - \overset{\oplus}{C}H - CH_2 - OCH_3$
(1) II > I > III
(2) II > III > I
(3) III > I > II
(4) I > II > III

23. Ionic species are stabilised by the dispersal of charge. Which of the following carboxylate ions is the most stable?
(1) $CH_3 - \overset{O}{\overset{||}{C}} - O^-$
(2) $Cl - CH_2 - \overset{O}{\overset{||}{C}} - O^-$
(3) $F - CH_2 - \overset{O}{\overset{||}{C}} - O^-$
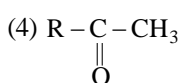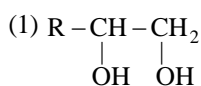(4) $\overset{F}{\underset{F}{>}}CH - \overset{O}{\overset{||}{C}} - O^-$

24. Products of the reaction
$\overset{H}{\underset{H_3C}{>}}C = C\overset{H}{\underset{CH_3}{<}} \xrightarrow{Br_2} \overset{H_3C}{\underset{Br}{>}}C - C\overset{Br}{\underset{CH_3}{<}}H$ are:
(1) mixture of racemic and meso compounds
(2) meso-compounds
(3) racemic mixtures
(4) none of the above

25. Alkene $R - CH = CH_2$ reacts readily with B_2H_6 and the product on oxidation with alkaline H_2O_2 produces:
(1) $R - \underset{OH}{CH} - \underset{OH}{CH_2}$
(2) $R - CH_2 - CHO$
(3) $R - CH_2CH_2OH$
(4) $R - \overset{}{\underset{O}{C}} - CH_3$

26. The intermediate during the addition of HCl to propene in the presence of peroxide is:

(1) $CH_3\dot{C}HCH_2Cl$
(2) $CH_3\overset{+}{C}HCH_3$
(3) $CH_3CH_2\dot{C}H_2$
(4) $CH_3CH_2\overset{+}{C}H_2$
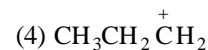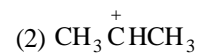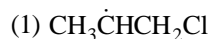
27. Propyne and propene can be distinguished by:
(1) conc. H_2SO_4
(2) Br_2 in CCl_4
(3) $AgNO_3$ in ammonia
(4) dil. $KMnO_4$

28. (I), (II), (III) structures shown.
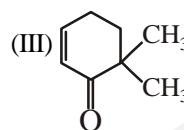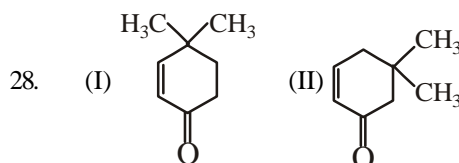
Which of the given compounds can exhibit tautomerism?
(1) II and III
(2) I, II and III
(3) I and II
(4) I and III

29. Predict the correct intermediate and product in the following reaction:
$H_3C - C \equiv CH \xrightarrow[HgSO_4]{H_2O, H_2SO_4}$ Intermediate (A) $\longrightarrow$ Product (B)
(1) (A): $H_3C - \underset{OH}{C} = CH_2$; (B): $H_3C - \underset{SO_4}{C} = CH_2$
(2) (A): $H_3C - \overset{}{\underset{O}{C}} - CH_3$; (B): $H_3C - C \equiv CH$
(3) (A): $H_3C - \underset{OH}{C} = CH_2$; (B): $H_3C - \overset{}{\underset{O}{C}} = CH_3$
(4) (A): $H_3C - \underset{SO_4}{C} = CH_2$; (B): $H_3C - \overset{}{\underset{O}{C}} - CH_3$

30. In the following reaction,
cyclopentane with CH_3 group $\xrightarrow[hv]{Br_2} X$
the major product 'X' is:
(1) CH_2Br substituted cyclopentane
(2) CH_3 cyclopentane with Br
(3) CH_3 cyclopentane with Br
(4) CH_3 cyclopentane with Br
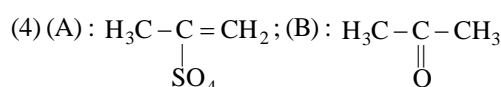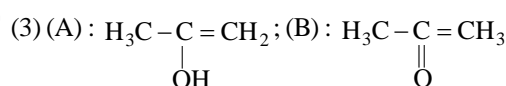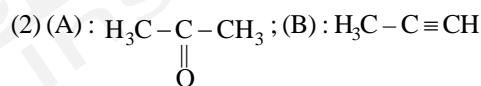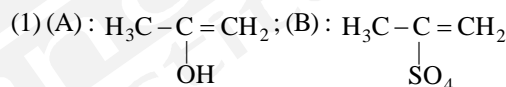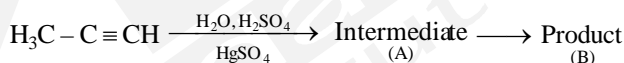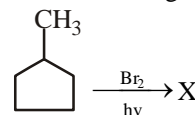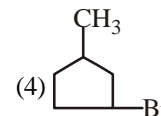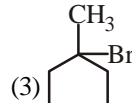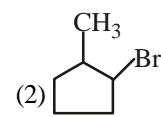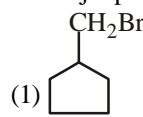
31. Which of the following have pits-
    (1) tracheids   (2) vessels
    (3) Xylem parenchyma   (4) both (1) and (2)

32. The elongated or tube-like cells, with thick, lignified walls and tapering ends are
    (1) Tracheids   (2) Vessels
    (3) Xylem fibre   (4) Xylem parenchyma

33. Identify the structures indicated in the drawing of root apex.
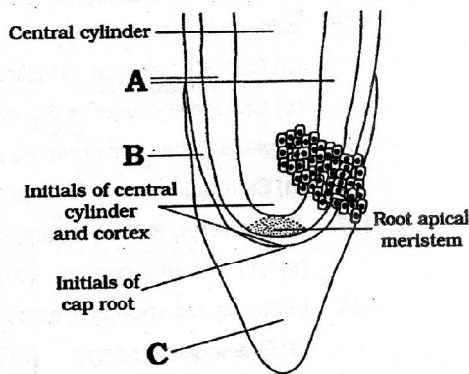
    (1) A-Vascular structure, B-Protoderm, C-Root cap
    (2) A-Cortex, B-Endodermis, C-Root cap
    (3) A-Cortex, B-Protoderm, C-Root cap
    (4) A-Tunica, B-Protoderm, C-Root cap

34. Find out the mismatch pair.
    (1) Tracheids–Elongated or tube like cells with thick and lignified walls. These are dead and without protoplast
    (2) Vessels–Tube like structure made up of many cells called vessel members, each with lignified walls and a large central cavity. These are devoid of protoplasm
    (3) Xylem fibres–Highly thickened walls and obliterated central lumens
    (4) Xylem parenchyma–Living and thin walled cellulosic cells. They store food materials in the form of resin, latex and mucilage

35. In stems, the protoxylem lies towards the center (pith) and the metaxylem lies towards the periphery of the organ. This type of primary xylem is called
    (1) Exarch   (2) Endarch
    (3) Both (1) and (2)   (4) None of these

36. During unfavourable conditions, slime moulds forms fruiting body after the differentation of
    (1) Ascocarp
    (2) Basidiocarp
    (3) Plasmodium
    (4) Gemmule

37. Select the wrong statement.
    (1) W.M. Stanley showed that viruses could be crystallised
    (2) The term `contagium vivum fluidium' was coined by M.W. Beijerinek
    (3) Mosaic disease in tobacco and AIDS in human being are caused by viruses
    (4) The viroids were discovered by D.J. lvanowsky.

38. A loccation with luxuriant growth of lichens on the trees indicates that the
    (1) Location is not polluted
    (2) Trees are very healthy
    (3) Trees are heavily infested
    (4) Location is highly polluted

39. On the basis of inputs given, one can put the given organism, in which of the following kingdom? (as per understandings of Linnaeus)
    (A) Cell type-Eukaryotic
    (B) Cell wall-Present (without cellulose)
    (C) Nuclear membrane-Present
    (D) Body organisation-Multicellular/loose tissue
    (E) Mode of nutrition-Heterotrophic (Saprophytic/Parasitic)
    (1) Plantae   (2) Fungi
    (3) Animalia   (4) Protista

40. _____ bacteria oxidise various inorganic substances such as nitrates, nitrites and ammonia and use the released energy for ATP production. They play an important role in recycling of nutrients (N, P, Fe, S etc.).
    (1) Photosynthetic autotrophic
    (2) Chemosynthetic autotrophic
    (3) Parasitic
    (4) Saprophytic

41. Refer to the accompanying figure and identify the structure indicated in the drawing
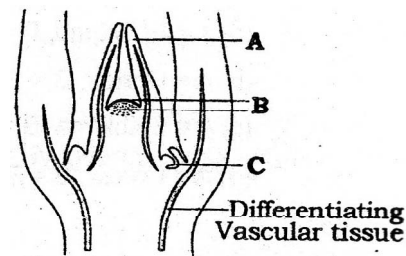
    (1) A-Leaf primordium, B-Shoot apical meristem, C-Axillary bud
    (2) A- Leaf primordium, B-Shoot apical meristem, C-Apical bud
    (3) A-Root hair primordium, B-Root apical meristem, C-Axillary bud
    (4) A-Root hair primordium, B-Root apical meristem, C-Terminal bud

42. Fill in the blanks:
a. The meristems which occur at the tips of roots and shoots and produce primary tissues are called ...1... meristems.
b. The meristem which occurs between mature tissues is known as ...2... meristem.
c. During the formation of leaves and elongation of stem, some cells 'left behind' from shoot apical meristem, constitute the ...3...
d. ...4... occurs in grasses and regenerates parts removed by the grazing herbivores.
(1) 1–lateral, 2–apical, 3–intercalary meristem, 4–secondary meristem
(2) 1–apical, 2–lateral, 3–apical bud, 4–lateral meristem
(3) 1–intercalary, 2–lateral, 3–axillary bud, 4–intercalary meristem
(4) 1–apical, 2–intercalary, 3–axillary bud, 4–intercalary meristem

43. Consider the following matched-
(a) hypodermis of monocot stem - sclerenchyma
(b) pericycle of root - parenchyma
(c) xylem fiber - sclerenchyma
(d) hypodermis of dicot stem - collenchyma
How many are correctly matched-
(1) one   (2) two   (3) three (4) four

44. Which of the following statements is not correct regarding the Class Ascomycetes?
(1) Conidia are the asexual spores produced endogenously on conidiophores.
(2) Ascospores are the sexual spores produced endogenously in asci.
(3) Aspergillus, Neurospora and Claviceps are ascomycetes fungi.
(4) Mycelium is generally branched and septate in ascomycetes.

45. Which of the following combinations of characters is true for slime moulds?
(1) Parasitic, plasmodium without walls, spores dispersed by air currents
(2) Saprophytic, plasmodium with walls, spores dispersed by water
(3) Parasitic, plasmodium without walls, spores dispersed by water
(4) Saprophytic, plasmodium without walls, spores dispersed by air currents

ZOOLOGY

46. The following features belong to which phylum?
(A) Exclusively marine
(B) Radial symmetry
(C) Diploblastic
(D) Tissue level organization
(1) Coelenterata   (2) Porifera
(3) Ctenophora   (4) Platyhelminthes

47. Match the following columns.

	Column I		Column II
(A)	Physalia	(1)	Brain coral
(B)	Adamsia	(2)	Sea fan
(C)	Pennatula	(3)	Sea pen
(D)	Gorgonia	(4)	Sea anemone
(E)	Meandrina	(5)	Portuguese Man of War
(F)	Aurelia	(6)	Jellyfish

(1) A:5, B:4, C:2, D:3, E:1, F:6
(2) A:5, B:4, C:3, D:2, E:1, F:6
(3) A:5, B:4, C:2, D:1, E:2, F:6
(4) A:5, B:3, C:4, D:2, E:1, F:6

48. Sensory organ which is present in arthropoda are
(1) Antennae   (2) Eyes
(3) Statocyst   (4) All of these

49. A rudimentary structure found in the collar region of hemichordata is
(1) Stomochord   (2) vertivral column
(3) Alimentary canal   (4) Ganglia

50. Identify the incorrect statement:
(1) All the carbon compounds obtained from a living tissue are termed as biomolecules
(2) In human body, S is less abundant than Ca
(3) In a cell, carbohydrates are more abundant than proteins
(4) Lipids are found in acid insoluble fraction

51. Which of the following is polymeric compound?
(1) Lemon grass oil   (2) Rubber
(3) Cholesterol   (4) Concanavalin A

52. Which of the following polysaccharide is wrongly matched with its monomer?
(1) Starch   – Glucose
(2) Chitin   – N-Acetyl glucosamine (NAG)
(3) Inulin   – Mannose
(4) Glycogen – Glucose

53. The living state is a/an _____ steady-state to be able to perform work.
(1) Equilibrium
(2) Spontaneous
(3) Non-equilibrium
(4) Irreversible

54. During tissue extraction, the tissue can be grind in
(1) Difluoroacetic acid
(2) Tribromoacetic acid
(3) Trichloroacetic acid
(4) Trifluoroacetic acid

55. Which one of the following statements is correct, with reference to enzymes?
(1) Apoenzyme = Holoenzyme + Coenzyme
(2) Holoenzyme = Apoenzyme + Coenzyme
(3) Coenzyme = Apoenzyme + Holoenzyme
(4) Holoenzyme = Coenzyme + Cofactor

56. Which of the following sugars have the same number of carbon as present in glucose?
(1) Fructose   (2) Erythrose
(3) Ribulose   (4) Ribose

57. The flame cells help in excretion and osmoregulation in
(1) Earthworm   (2) Hookworm
(3) Roundworm   (4) Tapeworm

58. In some animals, the body cavity is not lined by mesoderm. Instead, the mesoderm is present as scattered pouches in between the ectoderm and endoderm. Such a body cavity is called
(1) Eucoelom   (2) Pseudocoelom
(3) Acoelom   (4) Any of these

59. When the body of animal can be divided into equal left and right halves by one plane symmetry, then it is known as
(1) Bilateral   (2) Radial
(3) Biradial   (4) Asymmetric

60. Read the following statements (A-F):
A. Lecithin is found in cell membrane
B. Collagen is most abundant protein in the whole of the biosphere
C. Chitin is found in cell wall of fungi
D. Fats have higher melting point than oils
E. Zwitter ionic form can be observed in amino acids
F. Protein is a homopolymer
How many of the above statements are true?
(1) 0   (2) 1   (3) 4   (4) 2