Regn. No. 0920
SKD New Standard Coaching Institute
ESTD. 1985
37 YEARS OF TEACHING EXCELLENCE
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SAMPLE PAPER - 54

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

PHYSICS

01. A man walks on a straight road from his home to a market 2.5 km away with a speed of 5 km/h. Finding the market closed, he instantly turns and walks back home with a speed of 7.5 km/h. The average speed of the man over the interval of time 0 to 40 min. is equal to

(1) 5 km/h (2) $\frac{25}{4}$ km/h

(3) $\frac{30}{4}$ km/h (4) $\frac{45}{8}$ km/h

02. The motors of an electric train can give it an acceleration of 1 m/s^2 and the brakes can give it a negative acceleration of 3 m/s^2. The shortest time in which the train can make a trip between two stations 1215 m apart is :
(1) 14.2 s (2) 28.4 s
(3) 56.8 s (4) 113.6 s

03. For a particle moving along a straight line, the displacement x depends on time t as $x = \alpha t^3 + \beta t^2 + \gamma t + \delta$. The ratio of its initial acceleration to its initial velocity depends.
(1) only on α and β (2) only on β and γ
(3) only on α and γ (4) only on α.

04. A ball is thrown vertically downward with a velocity of 20 m/s from the top of a tower. It hits the ground after some time with a velocity of 80 m/s. The height of the tower is : (g = 10 m/s^2)
(1) 360 m (2) 340 m (3) 320 m (4) 300 m

05. Two cars P and Q start from a point at the some time in a straight line and their positions are represented by $x_p(t) = at + bt^2$ and $x_Q(t) = ft - t^2$. At what time do the cars have the same velocity?

(1) $\frac{a+f}{2(1+b)}$ (2) $\frac{f-a}{2(1+b)}$

(3) $\frac{a-f}{1+b}$ (4) $\frac{a+f}{2(b-1)}$

06. A boy goes 10 m towards north, then 20 m towards east, then its displacement is nearly
(1) 22 m (2) 25 m
(3) 30m (4) none of these

07. If the angle between two forces increases, the magnitude of their resultant
(1) decreases
(2) increases
(3) remains unchanged
(4) decreases and increases.

08. The resultant of two forces, one double the other in magnitude, is perpendicular to the smaller of the two forces. The angle between the two forces is :
(1) 120^0 (2) 60^0 (3) 90^0 (4) 150^0

09. A 120 m long train is moving west at a speed of 10 m/s. A small bird flying east at a speed of 5 m/s crosses the train. What is the time taken by the bird to cross the train?
(1) 4 s (2) 8 s (3) 12 s (4) 24 s.

10. Rain is falling verticaly 4 ms^{-1}. A man is moving due east with 3 ms^{-1}. The direction in which he shall hold the umbrella with the vertical is
(1) 53^0 east of vertical
(2) 37^0 east of vertical
(3) 53^0 west of vertical
(4) 37^0 west of vertical

11. Two projectiles A and B thrown with velocities v and $\frac{v}{2}$ have the same range. If B is thrown at an angle of 15^0 to the horizontal, A must have been thrown at an angle

(1) $\sin^{-1}\left(\frac{1}{16}\right)$ (2) $\sin^{-1}\left(\frac{1}{4}\right)$

(3) $2\sin^{-1}\left(\frac{1}{4}\right)$ (4) $\frac{1}{2}\sin^{-1}\left(\frac{1}{8}\right)$

12. A body of mass 2 kg tied to the end of string of length 1 metre is whirled in a horizontal circle, with a uniform angular velocity of 4 rad/s. Then, the tension of the string will be :
(1) 32 N (2) 16 N (3) 10 N (4) 8 N

13. The roadway bridge over a canal is in the form of an arc of a circle of radius 39.2 m. What is the maximum speed with which a car can move without leaving the ground at the highest point ? (Given : g= 9.8 m s^{-2})
(1) 9.8 m s^{-1} (2) 19.6 m s^{-1}
(3) 39.2 m s^{-1} (4) none of these

14. A particle moves in a circle of radius 5 cm with constant speed and time period 0.2π s. The acceleration of the particle is
(1) 25 m/s^2 (2) 36 m/s^2
(3) 5 m/s^2 (4) 15 m/s^2

15. A projectile is given an initial velocity of $\hat{i}+3\hat{j}$. The Cartesian equation of its path is : (g = 10 m/s^2)
(1) $y = 2x - 5x^2$ (2) $y = 3x - 5x^2$
(3) $4y = 2x - 5x^2$ (4) $y = 2x - 25x^2$

CHEMISTRY

16. In which of the following pairs of compounds the ratio of C, H and O is same
(1) Acetic acid and methyl alcohol
(2) Glucose and acetic acid
(3) Fructose and sucrose
(4) All of these

17. Under the same conditions, two gases have the same number of molecules. They must
(1) be noble gases
(2) have equal volume
(3) have a volume of 22.4 dm^3 each
(4) have an equal number of atoms

18. A hydrocarbon contains 84% carbon, 448 ml of the hydrocarbon weight 2 g at STP. Then the hydrocarbon is an
(1) Alkane (2) Alkene
(3) Alkyne (4) Arene

19. A compound was found to contain nitrogen and oxygen in the ratio 28 g and 80 g respectively. The formula of compound is
(1) NO (2) N_2O_3
(3) N_2O_5 (4) N_2O_4

20. A molal solution is one that contains one mole of a solute in
(1) 1000 g of the solvent
(2) one litre of the solvent
(3) one litre of the solution
(4) 22.4 litres of the solution

21. Which of the following changes with increase in temperature?
(1) Molality
(2) Weight fraction of solute
(3) Fraction of solute present in water
(4) Mole fraction

22. 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

23. 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

24. The molality of a urea solution in which 0.0100 g of urea, $[(NH_2)_2CO]$ is added to 0.3000 dm^3 of water at STP is
(1) 5.55×10^{-4} M (2) 33.3 M
(3) 3.33×10^{-2} M (4) 0.555 M

25. 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

26. 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

27. What volume of oxygen gas (O_2) measured at 0°C and 1 atm, is needed to bum completely 1 L of propane gas (C_3H_8) measured under the same conditions?
(1) 7 L (2) 6 L
(3) 5 L (4) 10 L

28. The vapour pressure of a liquid in pure state is 50 mm Hg while that in solution state is 40 mm Hg. Find the mole fraction of that liquid in solution state
(1) 0.40 (2) 0.50
(3) 0.60 (4) 0.80

29. Which of the following is not true about the Raoult's law?
(1) It is applicable to only very dilute solutions
(2) It is applicable to solution containing non-volatile solute
(3) It is applicable to solution containing electrolytic solute
(4) All of the above statements are true

30. Which of the following solution obey Raoult's law at almost all concentration ranges ?
(1) Ideal solution
(2) Non-ideal solution with positive deviation
(3) Non-ideal solution with negative deviation
(4) All of the above solution

BOTANY

31. ATP formation during photosynthesis is
(1) Phosphorylation
(2) Photophosphorylation
(3) Oxidative phosphorylation
(4) None of the above

32. Fill in the blanks:
1. All living organisms need ....a.... for carrying out daily life activities, be it absorption, transport, movement, reproduction or even breathing.
2. All the energy required for life processes is obtained by ....b.... some macromolecules that we call food.
3. Animals are heterotrophic, i.e they obtain food from plant directly (...c...) or indirectly (...d...).
4. ...e... like fungi are dependent on dead and decaying matter
(1) a—food, b oxidation, c—carnivores, d—herbivores, e—parasites
(2) a — energy, b — reduction, c — herbivores, d—carnivores, e—saprophytes
(3) a—energy, b—oxidation, c—herbivores, d—carnivores, e—saprophytes
(4) a—oxygen, b—reduction, c—carnivores, d—herbivores, e—saprophytes

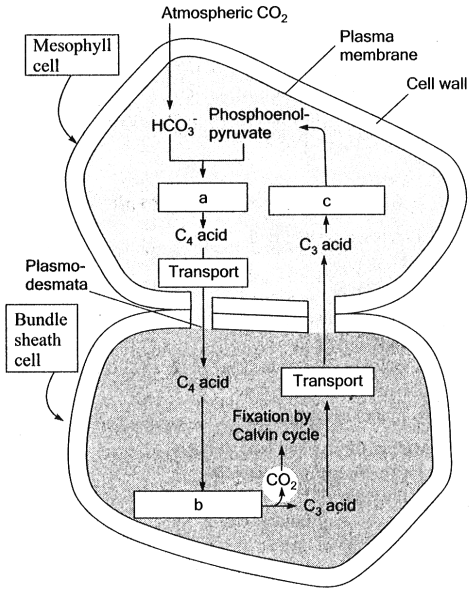
33. C_3 plants responds to higher CO_2 concentration by showing increased rates of photosynthesis leading to higher productivity has been used for some greenhouse crops such as
(1) Tomato and black pepper
(2) Tomato, lettuce and seedless cucumber
(3) Beet and black pepper
(4) Tomato and bell pepper

34. As compared to C_3 plants, how many additional molecules of ATP are needed for net production of one molecule of hexose sugar by C_4 plants?
(1) Two (2) Six
(3) Twelve (4) Zero

35. Primary carboxylation occurs in C_3 and C_4 plants with the help of
(1) PEP carboxylase and pyruvate carboxylase respectively
(2) PEP carboxylase and RuBP carboxylase respectively
(3) RuBP carboxylase and PEP carboxylase respectively
(4) RuBP carboxylase and pyruvate carboxylase respectively

36. ATP molecules required to synthesize one molecule of glucose by C_4, pathway are
(1) 12 (2) 18 (3) 24 (4) 30

37. Study the pathway given below: In which of the following options correct words for all the three blanks a, b and c are indicated.



(1) a—Decarboxylation, b—Reduction, c--Regeneration
(2) a—Fixation, b—Transamination, c—Regeneration
(3) a—Fixation, b—Decarboxylation, c—Regeneration
(4) a—Carboxylation, b—Decarboxylation, c—Reduction

38. Kranz anatomy occurs in
(1) Leaves (2) Stem
(3) Flower (4) Seed

39. 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)

40. Leaf pigments of any green plants can be separated by
(1) X-ray diffraction
(2) Sedimentation
(3) Paper chromatography
(4) Centrifugation

41. Water splitting complex is associated with
(1) PS I (2) PS II
(3) Both (1) and (2) (4) None of these

42. Stroma lamellae lacks all except
(1) PS II
(2) NADP reductase
(3) PS I
(4) Water splitting complex

43. $NADPH_2$ generated through
(1) Glycolysis (2) Photosystem I
(3) Photosystem II (4) Anaerobic respiration

44. Pigment system I conducts
(1) Cyclic photophosphorylation
(2) Non-cyclic photophosphorylation
(3) Both (1) and (2)
(4) None of these

45. The similarity between C_3 and C_4 pathway is
(1) Both are equally efficient
(2) organic acid is formed as the first product of CO_2 fixation
(3) Both requires one type of cell to occur
(4) Both takes place in all the plants

ZOOLOGY

46. Animal belonging to phylum Chordata shows
(1) Bilateral symmetry, triploblastic and coelom
(2) Organ system level of organization
(3) Closed circulatory system
(4) All of these

47. Select the total number of organisms which possess two-chambered heart and are poikilothermal.
Scoliodon, Pristis, Clarias, Betta, Pterophyllum, Salamandra, chelone, tortoise, calotes, Hyla, Labeo, Torpedo, Trygon, Catla.
(1) 7 (2) 9 (3) 11 (4) 13

48. Males possess claspers in pelvic fins in class_____.
(1) Cyclostomata (2) Chondrichthyes
(3) Osteichthyes (4) Amphibia

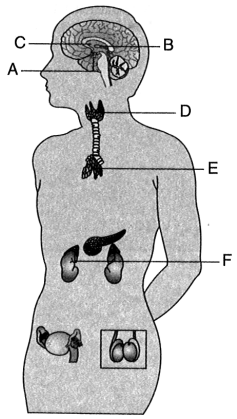
49. Limbless amphibia is
(1) Frog (2) Tree frog
(3) Ichthyophis (4) Bufo

50. Find out the incorrect matching.
(1) Reptiles – Chelone, Testudo, Chameleon
(2) Aves – Psittacula, Aptenodytes, Neophron
(3) Mammals – Elephas, Rattus, Delphinus
(4) Amphibians – Naja, Bangarus, Calotes

51. Choose the correct statement from the following.
(1) All cyclostomes possess jaws and paired fins
(2) All mammals have a four-chambered heart
(3) All pisces have gills covered by an operculum
(4) All mammals are viviparous

52. Which of the following statement is incorrect?
(1) Insulin and glucagon are peptide hormones
(2) Insulin acts mainly on hepatocyte and adipocytes and enhance glucose uptake and utilization
(3) Insulin stimulates glycogenesis
(4) Glucagon inhibits the process of gluconeogenesis

53. Identify A, B, C, D, E and F in the given figure.



(1) A–Hypothalamus, B–Pineal, C–Thymus, D–Adrenal, E–Pituitary, F–Thyroid and parathyroid
(2) A–Pituitary, B–Pineal, C–Hypothalamus, D–Thyroid and parathyroid, E–Thymus, F–Adrenal
(3) A–Thymus, B–Pituitary, C–Thyroid and parathyroid, D–Pineal, E–Hypothalamus, F–Adrenal
(4) A–Pineal, B–Thyroid and parathyroid, C–Pituitary, D–Hypothalamus, E–Adrenal, F–Pineal

54. Hypothalamus is
(1) Roof of diencephalon
(2) Basal part of diencephalon
(3) Lateral wall of diencephalon
(4) All of the above

55. Over secretion of growth hormone in young one leads to
(1) Dwarfism (2) Cretinism
(3) Gigantism (4) Tetany

56. Leydig cells or interstitial cells secrete
(1) Oestrogens (2) Progesterone
(3) Testosterone (4) Relaxin

57. Down syndrome and Turner syndrome occur in human beings due to:
(1) nullisomic and monosomic conditions respectively
(2) monosomic and nullisomic conditions respectively
(3) trisomic and monosomic conditions respectively
(4) monosomic and trisomic conditions respectively

58. The sex determination pattern in honeybee is called:
(1) XO male and XX female type
(2) Haploid-diploid type
(3) ZZ male and ZW female type
(4) XY male and XX female type

59. In Drosophila, the sex is determined by:
(1) The ratio of pairs of X-chromosomes to the pairs of autosomes
(2) Whether the egg is fertilized or develops parthenogenetically
(3) The ratio of number of X-chromosomes to the sets of autosomes
(4) X and Y-chromosomes

60. Which of the following symbols are used for representing sex chromosomes of birds?
(1) ZZ – ZW (2) XX – XY
(3) XO – XX (4) ZZ – WW