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SAMPLE PAPER - 74

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

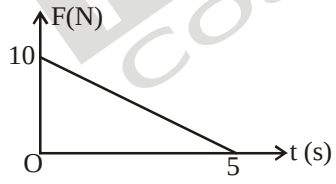
PHYSICS

01. A body is moving with velocity 4 m/s towards east. After 5 s its velocity becomes 3 m/s towards north. The average acceleration of the body is
(1) 7 m/s^2 (2) 1.7 m/s^2
(3) 5 m/s^2 (4) 1 m/s^2

02. The stream of a river is flowing with a speed of 2 km/h. A swimmer can swim at a speed of 4 km/h. What should be the direction of the swimmer with respect to the flow of the river to cross the river straight?
(1) 60° (2) 120°
(3) 90° (4) 150°

03. A particle is moving along a circular path with a constant speed of 10 ms^{-1}. What is the magnitude of the change in velocity of the particle, when it moves through an angle of 60° around the centre of the circle?
(1) $10\sqrt{2}$ m/s (2) 10 m/s
(3) $10\sqrt{3}$ m/s (4) Zero

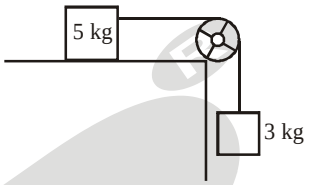
04. A body of mass 0.5 kg is acted upon by a variable force shown in graph. The impulse of force in time interval 1s ≤ t ≤ 4 s is



(1) 10 Ns (2) 20 Ns
(3) 15 Ns (4) None of these

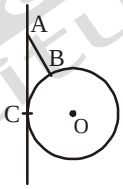
05. In previous question No. (4), if the body was inially at rest, its velocity at t = 5 s is
(1) 25 ms^{-1} (2) 50 ms^{-1}
(3) 40 ms^{-1} (4) 20 ms^{-1}

06. In adjacent diagram, the surface is frictionless.The tension in string is



(1) 15 g/8 N (2) 15 g/4 N
(3) 3 g/8 N (4) 3 g/4 N

07. A sphere of mass 2 kg having radius r is suspended from a point on smooth wall by a string of length r as shown in figure. If g = 10 ms^{-2}, the tension in string is



(1) 40 N (2) 2.3 N
(3) 23 N (4) none of these

08. A stone tied to the end of a string 100 cm long is whirled in a horizontal circle with a constant speed. If the stone makes 14 revolutions in 22s, then the acceleration of the stone is (Take π = 22/7)
(1) 16 m s^{-2} (2) 4 m s^{-2} (3) 12 m s^{-2} (4) 8 m s^{-2}

09. Essential characteristic of equilibrium is -
(1) momentum equals zero
(2) acceleration equals zero
(3) K.E.equals zero (4) velocity equals zero

10. Find the time after which the particle's initial velocity will be perpendicular to instantaneous velocity when it is projected with 40 m/s from horizontal ground by making an angle 37° with vertical.
(1) 3 second (2) 4 second
(3) 5 second (4) None of these

11. A ball is projected from the bottom of an inclined plane of Inclination 30°, with a velocity of 30 m s^{-1}, at an angle of 30° with the Inclined plane. If g = 10 ms^{-2}, then the range of the ball on given inclined plane is
(1) 12 m (2) 60 m (3) 120 m (4) 600 m

12. A particle is moving in a vertical circle with a constant speed of 10 ms^{-1}. What is the magnitude of the change in velocity of the particle, when it moves through an angle of 90° around the centre of the circle?

(1) $10\sqrt{2}$ m/s (2) 10 m/s (3) $10\sqrt{3}$ m/s (4) Zero

13. A particle is moving on a circular path of radius r with uniform speed u. What is the displacement of the particle after it has described an angle of 90^0:

(1) $r\sqrt{2}$ (2) $r\sqrt{3}$ (3) r (4) 2 r

14. A proton in a cyclotron changes its velocity from 40 km/s north to 30 km/s east in 20 s. What is the average acceleration during this time :
(1) 2.5 km/s^2 at 37^0 E of S
(2) 2.5 km/s^2 at 37^0 S of E
(3) 2.5 km/s^2 at 37^0 N of E
(4) 2.5 km/s^2 at 37^0 E of N

15. Rain is falling verticaly 15 ms^{-1}. A man is moving due east with 20 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

CHEMISTRY

16. Among the following substance the lowest vapour pressure is exerted by
(1) water (2) mercury
(3) kerosene (4) rectified spirit

17. An aqueous solution is 1.00 molal in KI. Which change will cause the vapour pressure of the solution to increase?
(1) addition of water
(2) addition of NaCl
(3) addition of Na_2SO_4
(4) addition of 100 molal KI

18. 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 solute in solution state.
(1) 0.20 (2) 0.50 (3) 0.60 (4) 0.80

19. Which of the following has the highest freezing point?
(1) 0.1 M Na_2SO_4
(2) 0.1 M $C_6H_{12}O_6$ (glucose)
(3) 0.1 M $MgCl_2$
(4) 0.1 M $Al(NO_3)_3$

20. The ratio of the values of colligative property of two equimolal solutions of $CaCl_2$ and KCl in water is approximately :
(1) 2 : 1 (2) 3 : 2
(3) 1 : 2 (4) 5 : 2.

21. 0.005 M Na_2SO_4 is isotonic with 0.01 M glucose. Degree of dissociation of Na_2SO_4 is :
(1) 75% (2) 50% (3) 25% (4) 85%

22. The solubility of common salt is 36.0 g in 100 g of water at 20ºC. If systems, I, II and III contain 40.0, 36.0 and 20.0 g of the salt added to 100.0 g of water in each case, the vapour pressures would be in the order
(1) I < II < III (2) I > II > III
(3) I = II > III (4) I = II < III

23. van't Hoff factors are x, y, z in the case of dissociation, association and no change respectively. Increasing order is
(1) x < y < z (2) x = y = z
(3) x > z > y (4) x < z < y

24. Sodium phosphate is 100% ionised in 0.01 molal aqueous solution. Hence, $\Delta T_b/K_b$ is
(1) 0.04 (2) 0.015
(3) 0.0175 (4) 0.02

25. The freezing point of water is depressed by 0.37ºC in a 0.01 molal NaCl solution. The freezing point of 0.02 molal solution of urea is depressed by
(1) 0.37ºC (2) 0ºC
(3) 0.56ºC (4) 0.187ºC

26. The boiling point of 0.2 mol kg^{-1} solution of X in water is greater than equimolal solution of Y in water. Which one of the following statements is true in this case ?
(1) Molecular mass of x is greater than the molecular mass of Y.
(2) Molecular mass of x is less than the molecular mass of Y.
(3) Y is undergoing dissociation in water while X undergoes no change
(4) X is undergoing dissociation is water

27. Which of the following is likely to have negative enthalpy of dissolution ?
(1) NaCl (2) KCl
(3) $CuSO_4$ (4) $FeSO_4.7H_2O$

28. The van't Hoff factor i for a compound which undergoes dissociation in one solvent and association in other solvent is respectively
(1) less than one and greater than one
(2) less than one and less than one
(3) greater than one and less than one
(4) greater than one and greater than one

29. The value of Henry's constant K_H is
(1) greater for gases with higher solubility
(2) greater for gases with lower solubility
(3) constant for all gases
(4) not related to the solubility of gases.

30. Which inorganic precipitate acts as semipermeable membrane ?
(1) Calcium sulphate (2) Barium oxalate
(3) Nickel phosphate (4) Copper ferrocyanide

BOTANY

31. Law of limiting factor is
(1) Law of maximum
(2) Law of minimum
(3) Law of optimum
(4) All of the above

32. Rate of photosynthesis is independent of
(1) Intensity of light
(2) Duration of light
(3) Quality of light
(4) Temperature

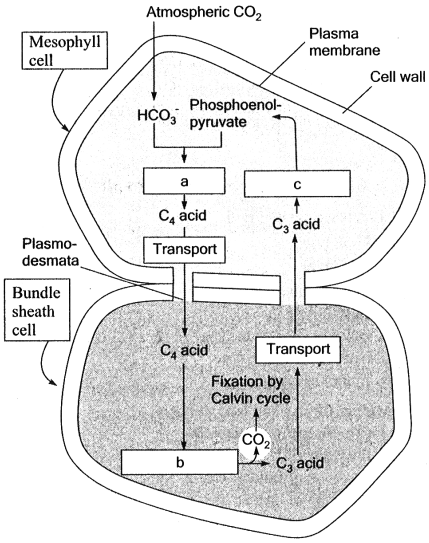
33. C_3 plants responds to higher CO_2 concentration by showing increased rates of photosynthesis leading to higher productivity has been used for some greenhouse crops such as
(1) Tomato and black pepper
(2) Tomato, lettuce and seedless cucumber
(3) Beet and black pepper
(4) Tomato and bell pepper

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. RuBisCO is enzyme for
(1) Regeneration of RuBP
(2) Photolysis of water
(3) CO_2 fixation
(4) All of the above

40. Which of the following is not a product of light reaction of photosynthesis?
(1) ATP (2) NADH
(3) NADPH (4) Oxygen

41. Wavelength of visible light/PAR is
(1) 200-400 nm (2) 400-700 nm
(3) 700-900 nm (4) 100-200 nm

42. Photorespiration produces
(1) Sugar but not ATP
(2) ATP but no sugar
(3) Both ATP and sugar
(4) Neither ATP nor sugar

43. Which is false about C_4 pathway?
(1) The primary CO_2 acceptor is PEP
(2) Bundle sheath cells contain PEP case
(3) Enzyme for CO_2 Fixation is PEP case
(4) Mesophyll Cells lack RuBisco

44. Which of the following is an incorrect match?
(1) First product in C_3 cycle : 3– Phosphoglyceric acid.
(2) Ribulose -1, 5 – biphosphate (RuBP) : 5 carbon aldose sugar.
(3) Kranz anatomy in leaves : C_4 plants
(4) Non-cyclic photophosphorylation : Grana

45. In photosynthesis, 12 molecules of water are utilized and 6 molecules of water are released while the formation of one molecule of glucose.The oxygen atom present in glucose came form.
(1) the fixed carbon dioxide
(2) the water released
(3) the water utilised
(4) Both (1) & (3)

ZOOLOGY

46. The sperm formed in the testes are delivered through the
(1) Seminal vesicle (2) Epididymus
(3) Vas deferens (4) Prostate

47. The formation of erythrocytes in foetus takes place in
(1) liver and spleen
(2) red bone marrow
(3) Placenta
(4) All of the above

48. Consider the properties of leucocytes.
I. They are nucleated.
II. They are non-nucleated like RBC.
III. They are 6000 - 8000 mm^{-3} of blood.
IV. They are long lived.
V. They are short-lived.
Choose the appropriate option with correct properties.
(1) I, III and V (2) II, IV andV
(3) I, IV and V (4) I, III and IV

49. Lymph contains large number of
(1) monocyte (2) erythrocyte
(3) lymphocyte (4) neutrophil

50. The heart is covered by
(1) epicardium (2) pericardium
(3) supracardium (4) endocardium

51. Which one has the thickest wall?
(1) Right auricle (2) Right ventricle
(3) Left auricle (4) Left ventricle

52. The difference between systolic and diastolic pressure in human in
(1) 120 mm Hg (2) 80 mm Hg
(3) 40 mm Hg (4) 200 mm Hg

53. Invertebrates possess very ...A... endocrine sytems with ...B... hormones whereas in vertebrates, ...C... number of chemicals act as hormones and provide coordination. Here A, B and C refers to
(1) A-complex, B-many, C-Few
(2) A- Complex, B-many, C-large
(3) A-simple, B-few, C-large
(4) A-complex, B-few, C-large

54. Gonadotropin releasing hormone is transferred to anterior pituitary by
(1) left coronary artery
(2) hypophyseal portal veins
(3) axons of neurosecretory cells
(4) nuclei of hypothalamus

55. Pituitary gland is divided into
(1) adenohypophysis and neurohypophysis
(2) adenohypophysis and pars distalis
(3) adenohypophysis and pars intermedia
(4) adenohypophysis and anterior pituitary

56. Diurnal rhythm of our body is maintained by
(1) thyroid gland (2) pineal gland
(3) pituitary gland (4) hypothalamus

57. Demineralisation of bones is caused by the oversecretion of
(1) prolactin (2) epinephrine
(3) thyroxine (4) parathormone

58. Which hormone possesses anti-insulin effect?
(1) Cortisol (2) Calcitonin
(3) Oxytocin (4) Aldosterone

59. Islets of Langerhans in a normal human pancreas comprise only
(1) 30-40% of pancreatic tissue
(2) 1-2% of pancreatic tissue
(3) 50% of pancreatic tissue
(4) 90% of pancreatic tissue

60. Testis in humans function as
(1) the primary sex organ
(2) a secondary sex organ
(3) an endocrine gland
(4) Both (1) and (3)