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SAMPLE PAPER - 77

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

PHYSICS

01. 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 4.86 km apart is :
(1) 14.2 s (2) 28.4 s
(3) 56.8 s (4) 113.6 s

02. The two ends of a train moving with a constant acceleration pass a certain point with velocities 1 ms^{-1} and 7 ms^{-1}. The velocity with which the middle point of the train passes the same point is :
(1) 4 ms^{-1} (2) 25 ms^{-1}
(3) 5 ms^{-1} (4) $5\sqrt{2}$ ms^{-1}

03. (a) If velocity V and acceleration a have opposite sign, the particle is slowing down.
(b) If position x and velocity v have opposite sign, the particle is going away from origin
(1) both (a) and (b) are true
(2) only (a) is true
(3) only (b) is true
(4) neither (a) nor (b) is true

04. The velocity of a particle varies with its displacement as $v = \left(\sqrt{9 - x^2}\right)$ ms^{-1}. Find the magnitude of the maximum acceleration of the particle.
(1) 3 ms^{-2} (2) 4 ms^{-2} (3) 3.5 ms^{-2} (4) 5 ms^{-2}

05. The relation between time t and distance x is $t = ax^2+bx$ where a and b be constants. The acceleration is
(1) $-2abv^2$ (2) $2bv^3$ (3) $-2av^3$ (4) $2av^3$

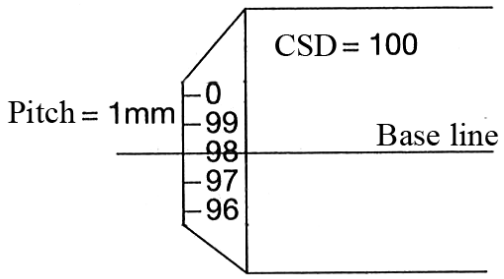
06. If the gravitational potential energy of two point masses infinitely away is taken to be zero then gravitational potential energy of a galaxy is
(1) Zero (2) Positive
(3) Negative (4) Can have any value

07. Whith what velocity should a particle be projected so that its height becomes equal to radius of earth ?
(1) $\left(\frac{GM}{R}\right)^{1/2}$ (2) $\left(\frac{8GM}{R}\right)^{1/2}$
(3) $\left(\frac{2GM}{R}\right)^{1/2}$ (4) $\left(\frac{4GM}{R}\right)^{1/2}$

08. If the zero error correction of a screw gauge with least count 0.01 mm is +0.05 mm,
(1) the number of C.S.D. is 100, and the zero of the circular scale is 5 divisions above the index line.
(2) the number of C.S.D. is 100, and the zero of the circular scale is 5 divisions below the index line.
(3) the number of C.S.D. is 50, and the zero of the circular scale is 5 divisions below the index line.
(4) Both (2) and (3)

09. A screw gauge gives the following readings when used to measure the diameter of a wire
Main scale reading : 0 mm
Circular scale reading : 52 divisions
Given that 1 mm on main scale corresponds to 100 divisions on the circular scale. The diameter of the wire from the above data is
(1) 0.052 cm (2) 0.52 cm
(3) 0.026 cm (4) 0.26 cm

10. When the studs of a screw gauge are in contact the position of the head of the screw is as shown below, Determine the zero error



(1) –0.01 mm (2) –0.01 cm
(3) +0.02 mm (4) – 0.02 mm

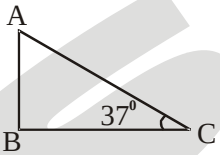
11. A ball is dropped from a high rise platform at t = 0 starting from rest. After 3 s another ball is thrown downwards from the same platform with a speed v. The two balls meet at t = 12 s. What is the value of v? (take g =10 ms^{-2})
(1) 35 ms^{-1} (2) 30 ms^{-1} (2) 25 ms^{-1} (4) 15 ms^{-1}

12. A particle has an initial velocity of 9 m/s due east and a constant acceleration of 2m/s^2 due west. The distance covered by the particle in the first six second of its motion is:
(1) 18 m (2) 22.5 m
(3) 27.5 m (4) none of these.

13. The velocity of a body at the end of 3 s is 22 ms^{-1}, at the end of 10 s is 50 ms^{-1}, and at the end of 15 s is 70 m s^{-1}. The body is moving with :
(1) uniform velocity
(2) uniform speed
(3) uniform acceleration
(4) non-uniform acceleration

14. A body is projected vertically upwards, If 3 s and 4 s be the times at which it is at height h above the point of projection while ascending and descending respectively, then h is : (g = 10 ms^{-2})
(1) 60 m (2) 120 m
(3) 240 m (4) none of these

15. One body falls down from A to B and second body slides down from A to C without friction. The ratio of times taken by them to reach the bottom of the inclined plane is (tan 37° = 3/4)



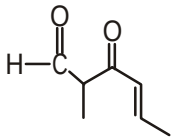
(1) 4 : 3 (2) 3 : 5 (3) 5 : 3 (4) 4 : 3

CHEMISTRY

16. The IUPAC name of the compound having the formula $CH_2 = CH - C \equiv CH$ is
(1) 1-butyne-3-ene
(2) but-1-yne-3-ene
(3) 1-butene-3-yne
(4) 3-butene-1-yne

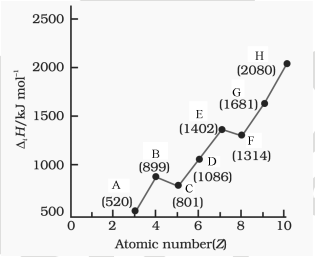
17. Which nomenclature is not according to IUPAC system?
(1) $Br-CH_2-CH=CH_2$
1-Bromoprop-2-ene
(2) $CH_3-CH_2-\underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-\underset{\underset{CH_3}{|}}{CH}CH_3$
4-Bromo-2,4-dimethylhexane
(3) $CH_3-CH_2-\underset{\bigcirc}{CH}-\underset{\underset{CH_3}{|}}{CH}CH_3$
2-Methyl-3phenylpentane
(4) $CH_3-\overset{\overset{O}{\|}}{C}-CH_2-CH_2-CH_2COOH$
5-oxohexanoic acid

18. The IUPAC name of the compound



is .....
(1) 3-keto-2-methylhex-4-enal
(2) 5-formylhex-2-en-3-one
(3) 5-methyl-4-oxohex-2-en-5-al
(4) 3-keto-2-methylhex-5-enal

19. Graph given below.

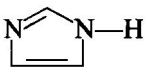
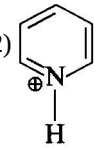
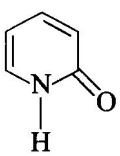


Match Column–I and Column–II. On the basis of graph.

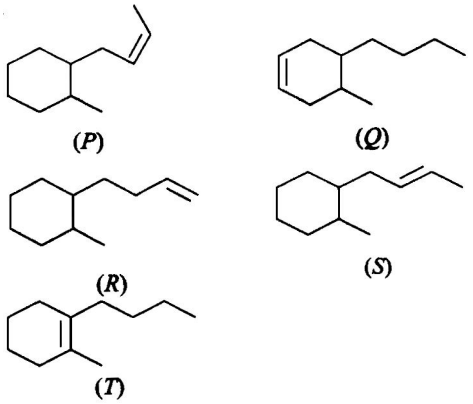
	Column-I		Column-II
(i)	Most reactive N.M.	(p)	C
(ii)	Least reactive N.M.	(q)	G
(iii)	More reactive metal	(r)	H
(iv)	non metal with least I.P.	(s)	A

(1) (i)–(s); (ii)–(r); (iii)–(q); (iv)–(p)
(2) (i)–(q); (ii)–(s); (iii)–(p); (iv)–(r)
(3) (i)–(q); (ii)–(r); (iii)–(s); (iv)–(p)
(4) (i)–(r); (ii)–(q); (iii)–(p); (iv)–(s)

20. Which of the following is the correct IUPAC name ?
(1) 3-Ethyl-4, 4-dimethylheptane
(2) 4, 4-Dimethyl-3-ethylheptane
(3) 5-Ethyl-4, 4-dimethylheptane
(4) 4, 4-Bis(methyl)-3-ethylheptane

21. Identify the compound which is not aromatic :
(1) 
(2) 
(3) 
(4) 

22. Among the following compounds which have cis form of geometrical isomerism.



(1) P, Q, S, T (2) P, Q, T
(3) P, Q, R, S (4) P, Q, R, T

23. Structure among the following give only four mono chloro derivatives:
(1) n-butane (2) Iso-pentane
(3) Neo-pentane (4) n-pentane

24. The outer electronic configuration of Gd (Atomic No. 64) is
(1) $4f^3\ 5d^5\ 6s^2$ (2) $4f^8\ 5d^0,\ 6s^2$
(2) $4f^4\ 5d^4,\ 6s^2$ (4) $4f^7\ 5d^1,\ 6s^2$

25. Screening effect is not observed in
(1) He^+ (2) Li^{2+}
(3) Be^{3+} (4) in all the three

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

27. 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

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

29. 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 $Al(NO_3)_3$

30. 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.

BOTANY

31. Middle lamella represents:
(1) Common wall between adjacent cells
(2) Common membrane covering of two adjacent cells
(3) Pore between adjacent cells
(4) Cementing material between two adjacent cells

32. Select the correct match in the following pairs:
(1) Rough ER – Oxidation of fatty acids
(2) Smooth ER – Oxidation of phospholipids
(3) Smooth ER – Synthesis of lipids
(4) Rough ER – Synthesis of glycogen

33. Mitochondria are semi-autonomous as they possess:
(1) DNA
(2) DNA + RNA
(3) DNA + RNA + ribosomes
(4) Proteins

34. Ribosomes of bacteria, mitochondria and chloroplasts are of:
(1) 50S type (2) 80S type
(3) 70S type (4) 30S type

35. Arrangement of ciliary microtubules is:
(1) 9 + 2 (2) 9 + 4
(3) 9 + 0 (4) 9 + 9

36. ..... is saprophytic, decomposers, parasitic or coprophilous, mycelium is branched and septet, mostly multicellular or rarely unicellular.
(1) Ascomycetes
(2) Basidiomycetes
(3) Phycomycetes
(4) Deuteromycetes

37. The common members of duteromycetes are:
(1) Albugo, Rhizopus and Mucar
(2) Agaricus, Ustilago and Puccinia
(3) Agaricus, Rhizopus and Alternaria
(4) Alternaria, Colletotrichum and Trichoderma

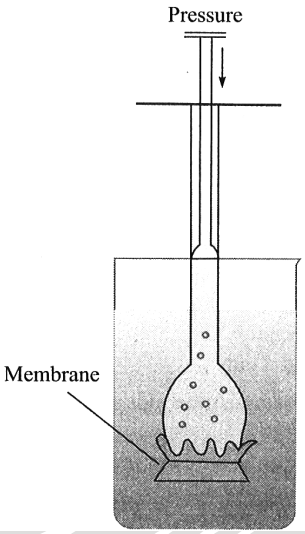
38. Which of the following responsible for death of large numbers of marine animals such as fishes?
(1) Chrysophytes
(2) Slime moulds
(3) Red dinoflagellates (Gonyaulax)
(4) Protozoans

39. ..... appear yellow, green, brown, blue or red depending on the main pigments present in their cells:
(1) Chrysophytes
(2) Dinoflagellates
(3) Slime moulds
(4) Protozoans

40. In mustard plant:
(1) Tap root present
(2) Adventitious root present
(3) Fibrous root present
(4) All above root present

41. Transpiration and root pressure cause water to rise in plants by
(1) Pushing it upward
(2) Pushing and pulling it, respectively
(3) Pulling it upward
(4) Pulling and pushing it, respectively

42. The pressure shown in the figure is called



(1) Osmotic potential (2) Osmotic pressure
(3) Turgor pressure (4) Suction pressure

43. Which pathway involves cell wall and intercellular spaces?
(1) Vascular pathway (2) Protoplast pathway
(3) Symplast pathway (4) Apoplast pathway

44. Diffusion of water through selectively permeable membrane is
(1) Diffusion (2) Imbibition
(3) Osmosis (4) Translocation

45. Stomatal opening is under the control of
(1) Epidermal cells
(2) Palisade cells
(3) Spongy parenchyma cells
(4) Guard cells

ZOOLOGY

46. How many species named on earth is Arthropoda?
(1) $\frac{1}{2}$ (2) $\frac{2}{3}$ (3) $\frac{1}{4}$ (4) $\frac{3}{4}$

47. Select the total number of organisms from the following belonging to the phylum Arthropoda.
Locust, Butterfly, Scorpion, Prawn, Salpa, Doliolum, Pila, Chiton, Antedon, Catla, Hyla, Myxine, Limulus, Loligo, Culex, Cucumaria, Cuttlefish.
(1) 4 (2) 6 (3) 8 (4) 12

48. The mouth containing file-like rasping organ for feeding called radula is found in
(1) Mollusca (2) Hemichordata
(3) Echinodermata (4) Arthropoda

49. (A) A soft and spongy layer of skin forms a__(i)__ over the visceral hump.
(B) A__(ii)__ cavity contain __(iii)__ like gills.
(C) A anterior head region has sensory __(iv)__.
Fill in the blank statements with the following options, respectively.
(1) (i) Mantle, (ii) Mantle, (iii) Comb, (iv) Papilla
(2) (i) Mantle, (ii) Mesoglea, (iii) Feather, (iv) Papilla
(3) (i) Mantle, (ii) Mantle, (iii) Feather, (iv) Tentacles
(4) (i) Mantle, (ii) Mantle, (iii) Comb, (iv) Tentacles

50. The most distinctive feature of echinoderm is
(1) Gastrovascular cavity
(2) Choanocytes
(3) Water vascular system/Ambulacral system
(4) Canal system

51. Which of the following is not a correct difference between white and red muscles fibre?

	White muscle fibre		Red muscle fibre
1.	Less myoglobin	1.	More myoglobin
2.	Number of mitochondria is less.	2.	Number of mitochondria is more.
3.	Amount of sarcoplasmic reticulum is low	3.	Amount of sarcoplasmic reticulum is high.
4.	Aerobic muscle	4.	Anaerobic muscle

(1) 1 (2) 2
(3) 3 (4) 4

52. Arrange the following statements in correct sequence to describe muscle contraction.
1. Signal sent by CNS through motor neuron.
2. Generation of action potential in the sarcolemma.
3. Release of Ca^{+2} from sarcoplasmic reticulum.

4. The neurotransmitter acetylcholine is released from motor end plate.
5. Sarcomere is shortened.

(1) 1→2→4→3→5 (2) 1→4→2→3→5
(3) 1→4→3→2→5 (4) 5→4→3→2→1

53. Following is the figure of actin (thin) filaments. Identify the parts A, B and C in the given diagram.

(1) A–Tropomyosin, B–Troponin, C–F-actin.
(2) A–Tropomyosin, B–Myosin, C–F-tropomyosin.
(3) A–Troponin, B–Tropomyosin, C–Myosin.
(4) A–Troponin, B–Tropomyosin, C–F-actin.

54. The centre of I band is characterized by which of the following line?

(1) H-line (2) M-line
(3) Z-line (4) H-zone

55. Which of the following cells exhibit amoeboid movement?

(1) Macrophages (2) Leucocytes
(3) RBC (4) Both (1) and (2)

56. Which of the below statements are correct and incorrect?
I. Plasma constitutes 45% of the human blood.
II. Albumin is a plasma protein that helps in osmotic balance.
III. Factors of blood clotting are present in the blood
IV. Plasma without clotting factors is serum.
V. Minerals are not generally found in the blood.
Choose the appropriate option.

	Correct	Incorrect
(1)	IV, III and V	I and II
(2)	I, III and IV	II and V
(3)	I and V	II, III and IV
(4)	II, III and IV	I and V

57. 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

58. Lymph contains large number of

(1) monocyte (2) erythrocyte
(3) lymphocyte (4) neutrophil

59. The heart is covered by

(1) epicardium (2) pericardium
(3) supracardium (4) endocardium

60. 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

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