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SAMPLE PAPER - 72

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

PHYSICS

01. $\int_0^{\pi/2}(\cos\theta+\sin\theta)\,d\theta =$

(1) zero (2) 1 (3) –1 (4) 2

02. $\frac{d}{dx}(5x^2+3x+\frac{2}{x}+e^{2x}-\sin x) =$

(1) $10x+3-\frac{2}{x^2}+2e^{2x}+\cos x$

(2) $10x+3+\frac{2}{x^2}+e^{2x}+\cos x$

(3) $10x+3-\frac{2}{x^2}+2e^{2x}-\cos x$

(4) $10x+3+\frac{2}{x^2}+2e^{2x}-\cos x$

03. $\int_0^1(3x^2-4x+5)\,dx =$

(1) 8 (2) 4 (3) 6 (4) 3

04. $\int_0^1\frac{1}{(2x+1)}dx =$

(1) 1.1 (2) 5.5 (3) 0.055 (4) 0.55

05. If $x^3y^4 = 5$, then $\frac{dy}{dx} =$

(1) $\frac{3y}{4x}$ (2) $-\frac{3y}{4x}$ (3) $\frac{3x}{4y}$ (4) $-\frac{3x}{4y}$

06. Starting from rest and moving with a constant acceleration, a body covers a certain distance in time t. It covers the second half of the distance in time.

(1) $\frac{t}{\sqrt{2}}$ (2) $\frac{t}{\sqrt{3}}$

(3) $t\left(1-\frac{1}{\sqrt{2}}\right)$ (4) $t\left(1-\frac{1}{\sqrt{3}}\right)$.

07. A body moving with uniform acceleration describes 40 m in the first 5 s and 70 m in the next 5 s. Its initial velocity will be

(1) 4 ms^{-1} (2) 2.5 ms^{-1}
(3) 5 ms^{-1} (4) 11 ms^{-1}

08. The average velocity of a body moving with uniform acceleration travelling a distance of 3.06 m is 0.34 ms^{-1}. If the change in velocity of the body is 0.18 ms^{-1} during this time, its uniform acceleration is

(1) 0.01 ms^{-2} (2) 0.02 ms^{-2}
(3) 0.03 ms^{-2} (4) 0.04 ms^{-2}

09. A car is standing 200 m behind a bus, which is also at rest. The two start moving at the same instant but with different forward accelerations. The bus has acceleration 2 ms^{-2} and the car has acceleration 4 ms^{-2}. The car will catch up with the bus after time

(1) $\sqrt{120}$ s (2) 15 s

(3) $\sqrt{110}$ s (4) $10\sqrt{2}$ s

10. A stone falls freely under gravity. It covers distances h_1, h_2 and h_3 in the first 5 seconds, the next 5 seconds and the next 5 seconds respectively. The relation between h_1, h_2 and h_3 is:

(1) $h_1 = 2h_2 = 3h_3$ (2) $h_1 = \frac{h_2}{3} = \frac{h_3}{5}$

(3) $h_2 = 3h_1$ and $h_3 = 3h_2$ (4) $h_1 = h_2 = h_3$

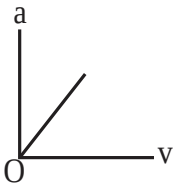
11. A boy walks on a straight road from his home to a school 5 km away with a speed of 10 km/h. Finding the school closed, he instantly turns and walks back home with a speed of 15 km/h. The average speed of the boy over the interval of time 0 to 40 min. is equal to

(1) 10 km/h (2) 12 km/h

(3) 15 km/h (4) $\frac{45}{4}$ km/h

12. A ball is dropped from height 45 m. If g = 10 ms^{-2}, the time taken in falling through last 5 m is nearly
(1) 1.0 s (2) 0.3 s
(3) 0.17 s (4) None of these

13. Acceleration velocity graph of a particle moving in a straight line is as shown in figure. The slope of velocity-displacement graph



(1) increases linearly
(2) decreases linearly
(3) is constant
(4) increases parabolically

14. A body moving in a straight line with constant acceleration covers distances a and b in successive equal time interval of t. The acceleration of the body is

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

(3) $\frac{2b-a}{2t^2}$ (4) $\frac{b-2a}{t^2}$

15. A particle is projected vertically upwards with a velocity u and from a point O. When it returns to the point of projection, which of the following is incorrect ?
(1) average velocity is zero
(2) displacement is zero
(3) average speed is u
(4) average speed is u/2

CHEMISTRY

16. What does ΔH represent in
$X(g) + e^- \longrightarrow X^-(g); \Delta H = -x$?
(1) Ionization energy
(2) Electron gain enthalpy
(3) Electronegativity
(4) None of these

17. Select the correct statement(s) out of the following:
(1) Radius of Mg^{2+} is smaller than that of Mg
(2) Radius of Al^{3+} is smaller than that of Al
(3) Mg being larger in size than Al, it has largest size among Mg, Al, Mg^{2+} and Al^{3+}
(4) All are correct

18. Which of the following is correct w.r.t. $\Delta_{eg}H$?
(1) Cl > F > Br > I (2) S > Se > Te > O
(3) Both (1) and (2) (4) None is correct

19. Which of the following is the correct matching related to groups of p-block?

	Column–I		Column–II
A.	Group 16	P.	Halogens
B.	Group 17	Q.	Noble gases
C.	Group 18	R.	Chalcogens

(1) A–P; B–Q; C–R (2) A–R; B–P; C–Q
(3) A–Q; B–R; C–P (4) A–R; B–Q; C–P

20. Select the incorrect statement
(1) d-block is in the extreme right of periodic table
(2) elements of d-block are commonly referred to as transition metals
(3) Zn, Cd and Hg have electronic configuration $(n-1)\,d^{10}\,ns^2$
(4) Zn, Cd and Hg belong to 12^{th} group of periodic table.

21. After the discovery of element of atomic number 120, which group and period, respectively, will it belong to?
(1) 8, 9 (2) 1, 8 (3) 2, 8 (4) 2, 9

22. Select the correct statement out of the following w.r.t. elements of d-block.
(1) These are the elements of groups 3 to 12.
(2) These are characterised by the filling of inner d-orbitals by electrons.
(3) Their general electronic configuration is $(n-1)d^{1-10}\,ns^{0-2}$
(4) All are correct

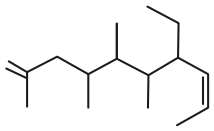
23. Diagonal relationship is between which of these second and third period elements?
(1) Be, Na (2) B, Mg
(3) C, Al (4) Li, Mg

24. An increase in both atomic and ionic radii with atomic number occurs in any group of the periodic table and in accordance with this the ionic radii of $_{22}Ti$ (IV) and $_{40}Zr$ (IV) ions are 0.68 and 0.74 Å respectively. But for $_{72}Hf$ (IV) ion, the ionic radius is 0.75 Å which is almost the same as that for Zr(IV) ion. This is due to
(1) greater degree of covalency in compounds of Hf (IV)
(2) lanthanide contraction
(3) difference in the coordination number of Zr(IV) and Hf (IV) in their compounds
(4) actinide contraction

25. The electron gain enthalpy of the boron family are such that
(1) B > Tl > Ga > Al > In (2) B > Al > Ga > In > Tl
(3) B > Al > Ga > Tl > In (4) B > Ga > Al > In > Tl

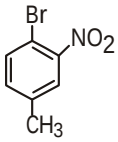
26. The order of covalent/ionic radii of I, I^+ and I^- will be
(1) $I^- > I > I^+$ (2) $I > I^+ > I^-$
(3) $I^+ > I > I^-$ (4) $I^+ = I > I^-$

27. The correct IUPAC name of the following compound is :



(1) 7-Ethyl-2, 4, 5, 6-tetramethyldeca-1, 8-diene
(2) 4-Ethyl-5, 6, 7, 9-tetramethyldeca-2, 9-diene
(3) 2, 4, 5, 6-tetramethy-7-ethyldeca-1, 7-diene
(4) None of these

28. The IUPAC name of



(1) 1-Bromo-2-nitro-4-methyl benzene
(2) 1-Bromo-4-methyl-2-nitrobenzene
(3) 2-Bromo-1-nitro-5-methyl benzene
(4) m-Nitro-p-chlorotoluene

29.

Element	Group No.	Period
A	14	III
B	2	II
C	2	III
D	1	III
E	15	III

The decreasing order of metallic character of elements
(1) D > C > B > A > E (2) B > C > D > E > A
(3) B > C > D > A > E (4) D > C > B > E > A

30. Match the column -I and column-II

	Column-I		Column-II
A.	Element with five 'e' in outermost shell	p.	Fe, Co, Ni
B.	Element tends to loose two electron	q.	O, S, Se
C.	Element tends to gain two electron	r.	As, Sb, Bi
D.	Element that have two shells incomplete	s.	Ca, Sr, Ba

(1) A–r, B–s, C–p, D–q (2) A–r, B–s, C–q, D–p
(3) A–p, B–q, C–s, D–r (4) A–q, B–r, C–s, D–p

BOTANY

31. A solution has water potential –20kpa. When some molecules of solvents are added to the solution then the water potential would be
(1) –10 Kpa
(2) zero
(3) –30 Kpa
(4) All the above conditions are possible

32. Over small distances substances are moved by
(1) Active transport
(2) Diffusion
(3) Cytoplasmic streaming
(4) All of the above

33. Movement of materials against concentration gradient is due to
(1) Active transport (2) Passive transport
(3) Diffusion (4) Osmosis

34. New cells generate from:
(1) Bacterial fermentation
(2) Regeneration of old cell
(3) Pre-existing cells
(4) Abiotic material

35. Which of the following structures is not found in prokaryotic cells?
(1) Plasma membrane
(2) Nuclear envelope
(3) Ribosome
(4) Mesosome

36. The three layers of the cell envelope arranged from outer to inner are:
(1) Glycocalyx, plasma membrane, cell wall
(2) Glycocalyx, cell wall, plasma membrane
(3) Cell wall, glycocalyx, plasma membrane
(4) Plasma membrane, glycocalyx, cell wall

37. The longest portion of the flagella is the:
(1) Basal body (2) Hook
(3) Filament (4) None of these

38. Which one occurs in both prokaryotic and plant cells?
(1) Nucleus (2) Chloroplast
(3) Cell wall (4) Mitochondria

39. Cell organelle present in both prokaryotic and eukaryotic cells is:
(1) Ribosome (2) E.R.
(3) Mitochondria (4) Nucleus

40. Prokaryotic ribosomes are:
(1) 50S (2) 60S
(3) 70S (4) 80C

41. Which of the following is an example of active transport across the plasma membrane?
(1) Water
(2) Na^+/K^+ pump
(3) Neutral solutes
(4) None of the above

42. Lysosomes are called suicidal bags because they have:
(1) Hydrolytic enzymes
(2) Parasitic activity
(3) Food vacuole
(4) Catabolic enzymes

43. Hydrolytic enzymes of lysosome function at:
(1) Acidic pH
(2) Alkaline pH
(3) Neutral pH
(4) Both (2) and (3)

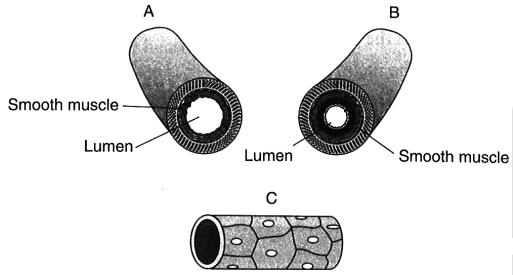
44. Foldings of inner mitochondrial membrane are called:
(1) Grana (2) Thylakoids
(3) Cristae (4) $F_0 - F_1$ structures

45. Number of membranes separating intra thylakoid space from cytoplasm is:
(1) 4 (2) 3 (3) 2 (4) 1

ZOOLOGY

46. Which of the following is correct about human heart?
(1) Volume of both atria > Volume of both ventricles
(2) Volume of both ventricles > Volume of both atria
(3) Volume of both atria = Volume of both ventricles
(4) Ventricles are upper chambers and atria are lower chambers in our heart.

47. Identify the follwing bllod vessels.



(1) A: Capillary, B: Artery, C: Vein
(2) A: Vein, B: Capillary, C: Artery
(3) A: Vein, B: Artery, C: Capillary
(4) A: Artery, B: Vein, C: Capillary

48. The first triploblastic animal is
(1) Coelenterates
(2) Platyhelminthes
(3) Aschelminthes
(4) Annelids

49. The unique character of sponges is
(1) Choanocytes or collar cells line the spongocoel and the canals.
(2) They are hermaphrodites.
(3) It reproduces by asexual means only.
(4) They live in marine water.

50. The another name for sycon is
(1) Scypha (2) Euspongia
(3) Spongilla (4) Hyalonema

51. Cnidoblast is a characteristic feature of
(1) Porifera (2) Coelenterata
(3) Ctenophora (4) Arthropoda

52. The corals have a skeleton composed of
(1) Spongin fibres (2) Silica
(3) Calcium carbonate (4) Any of these

53. Select from the following total number of organisms that contains the word 'Sea' in their common names.
Physalia, Adamsia, Pennatula, Gorgonia, Meandrina, Hydra, Aurelia, Obelia.
(1) 2 (2) 3 (3) 4 (4) 5

54. Gastrovascular cavity with single opening is found in
(1) Porifera
(2) Coelenterate
(3) Aschelminthes
(4) Annelida

55. Which of the following Platyhelminthes possess high power of regeneration?
(1) Planaria/Dugesia
(2) Taenia
(3) Fasciola
(4) Liver fluke

56. (1) Fertilization _____.
(2) Development _____.
(3) Excretion and osmoregulation by _____.

Fill in the blanks for the organism given in figure.
(1) (1) Internal, (2) Direct, (3) Rennet cells
(2) (1) Internal, (2) Indirect, (3) Flame cells
(3) (1) External, (2) Direct, (3) Nephridia
(4) (1) External, (2) Indirect, (3) Protonephridia

57. Closed circulatory system is present in
(1) Nereis (2) Pheretima
(3) Ascaris (4) Both (1) and (2)

58. Which of the following are monoecious?
Ascaris, Wuchereria, Ancylostoma, Nereis, Pheretima, Hirudinaria.
(1) 3 (2) 2 (3) 5 (4) 4

59. The first true coelomates are
(1) Nereis (2) Centipede
(3) Crab (4) Wuchereria

60. The presence of joint appendages is the speciality of phylum_____.
(1) Mollusca (2) Echinodermata
(3) Arthropoda (4) Annelida