Regn. No. 0920
SKD New Standard Coaching Institute
ESTD. 1985
39 YEARS OF TEACHING EXCELLENCE
Ist Floor, Skylark Building,
Newal Kishore Road, Hazratganj, Lucknow.
Call : 7080111582, 7080111595

SAMPLE PAPER - 113

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

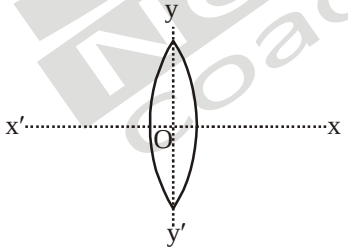
PHYSICS

01. In a plane electromagnetic wave, the electric field oscillates sinusoidally at a frequency of 2.5×10^{10} Hz and amplitude 480 V m^{-1}. The amplitude of the oscillating magnetic field will be
(1) 1.52×10^{-8} Wb m^{-2} (2) 1.52×10^{-7} Wb m^{-2}
(3) 1.6×10^{-6} Wb m^{-2} (4) 1.6×10^{-7} Wb m^{-2}

02. The central fringe shifts to the position of fifth bright fringe, if a thin film of refractive index 1.5 is introduced in the path of light of wavelength 5000 Å. The thickness of the glass plate is
(1) 1 μm (2) 5 μm (3) 3 μm (4) 4 μm

03. A convex lens is used to obtain a magnified image of an object on a screen. The object is at a distance 10 m from the lens. If the magnification is 19. The focal length of the lens is
(1) 9.5 cm (2) 0.95 cm (3) 9.5 m (4) 0.95 m

04. An equiconvex lens is cut into two halves along (i) XOX′ and (ii) YOY′, as shown in the figure. Let f, f′, f″ be the focal lengths of complete lens, of each in case (i) and of each half in case (ii), respectively



Choose the correct statement from the following
(1) f′ = f, f″ = f (2) f′ = 2f, f″ = 2f
(3) f′ = f, f″ = 2f (4) f′ = 2f, f″ = f

05. A piece of glass is placed on a paper having letters of different colours. The letters of which colour will be raised maximum is
(1) red (2) green
(3) yellow (4) violet

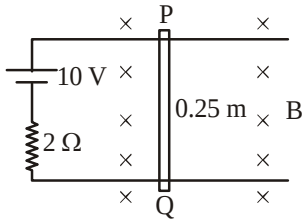
06. What is the maximum energy required to launch a satellite of mass m from earth's surface in a circular orbit at an altitude of 2R (R = radius of the earth)
(1) $\frac{2}{3}$mgR (2) mgR (3) $\frac{5}{6}$mgR (4) $\frac{1}{3}$mgR

07. If displacement x and velocity v are related as $4v^2 = 25 - x^2$ in a SHM Then time period of given SHM is (consider SI units)
(1) π (2) 2π (3) 4π (4) 6π

08. Two open organ pipes of length L_1 and L_2 ($L_2 > L_1$) produces x beats/second, then speed of sound in organ pipe is
(1) $2x\left(\frac{L_2 - L_1}{L_1L_2}\right)$ (2) $2x\left(\frac{L_1L_2}{L_1 + L_2}\right)$
(3) $2x\left(\frac{L_1L_2}{L_2 - L_1}\right)$ (4) $x\left(\frac{L_1L_2}{L_2 - L_1}\right)$

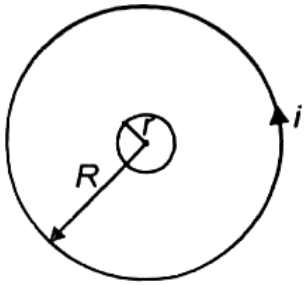
09. A current-carrying straight wire is kept along the axis of a circular loop carrying a current. The straight wire
(1) will exert an inward force on the circular loop
(2) will exert an outward force on the circular loop
(3) will not exert any force on the circular loop
(4) will exert a force on the circular loop parallel to itself

10. A metal rod PQ slides on parallel metallic rails as shown in figure. There is a uniform magnetic field of 0.5 T directed into the plane of paper. A force of 0.5 N to the left is required to keep the rod moving with constant speed. The speed with which the rod is moving is



(1) 4 m/s (2) 8 m/s
(3) 12 m/s (4) 16 m/s

11. Figure shows two concentric coplanar loops of radii R and r (R >>r). A current i varying with time t as i = 3t +5 is passed through the outer loop. The emf induced in the smaller loop of radius r is



(1) $\frac{\mu_0 \pi r^2}{R}$ (2) $\frac{3}{2}\frac{\mu_0 \pi r^2}{R}$

(3) $\frac{1}{2}\frac{\mu_0 \pi r^2}{R}$ (4) Zero

12. A circular flexible loop of wire of radius r carrying a current I is placed in a uniform magnetic field B. If B is doubled, tension in the loop
(1) remain unchanged (2) is double
(3) is halved (4) becomes four times

13. A current of 5 A passes through a copper conductor (resistivity = $1.7 \times 10^{-8}\ \Omega$ m) of radius of cross-section 5 mm. Find the mobility of the charges if their drift velocity is 1.1×10^{-3} m/s.
(1) 1.3 m^2/Vs (2) 1.5 m^2/Vs
(3) 1.8 m^2/Vs (4) 1.0 m^2/Vs

14. A particle is projected with velocity 20 ms^{-1} at angle 60° with horizontal. The radius of curvature of trajectory, at the instant when velocity of projectile becomes perpendicular to velocity of projection, is ($g=10\ ms^{-1}$)

(1) $60\sqrt{3}$ m (2) $\frac{80}{\sqrt{3}}$ m

(3) $40\sqrt{3}$ m (4) $\frac{80}{3\sqrt{3}}$ m

15. A particle of mass m_1 makes a head-on elastic collision with another particle of mass m_2 at rest. m_1 rebounds straight back with $\frac{4}{9}$ of its initial kinetic energy. Then $\frac{m_1}{m_2}$ is;
(1) 2/3 (2) 1/5
(3) 3/2 (4) 2/5

CHEMISTRY

16. Match the following:

(A) Pure nitrogen	(i) Chlorine
(B) Haber process	(ii) Sulphuric acid
(C) Contact process	(iii) Ammonia
(D) Deacon's process	(iv) Sodium azide or Barium azide

Which of the following is the correct option?
(1) [A] (iii) [B] (iv) [C] (ii) [D] (i)
(2) [A] (iv) [B] (iii) [C] (ii) [D] (i)
(3) [A] (i) [B] (ii) [C] (iii) [D] (iv)
(4) [A] (ii) [B] (iv) [C] (i) [D] (iii)

17. Which of the following lanthanoids shows +4 oxidation state to acquire noble gas configuration? (Atomic number : La = 57, Ce = 58, Eu = 63 and Yb = 70)
(1) Eu (2) Ce (3) Yb (4) La

18. Which one given below is a non-reducing sugar?
(1) Lactose (2) Glucose
(3) Sucrose (4) Maltose

19. Structures of some common polymers are given. Which one is not correctly presented?
(1) Nylon-6, 6: $\left[NH(CH_2)_6NHCO(CH_2)_4-CO\right]_2$
(2) Teflon : $\left[CH_2-CH_2\right]_n$
(3) Neoprene : $\left[CH_2-\underset{Cl}{\underset{|}{C}}=CH-CH_2-CH_2\right]_n$
(4) Terylene: $\left[OC-C_6H_4-COOCH_2-CH_2-O\right]_n$

20. Mixture of chloroxylenol and terpineol acts as :-
(1) analgesic (2) antiseptic
(3) antipyretic (4) antibiotic

21. If excluded volume is taken zero, compressibility factor Z is

(1) $\left(1-\frac{a}{RTV}\right)$ (2) $\left(1+\frac{pb}{RT}\right)$

(3) $\frac{pV}{RT}$ (4) $\frac{RT}{pV}$

22. For a sample of perfect gas when its pressure is changed isothermally from p_i to p_f the entropy change is given by

(1) $\Delta S = nR\ln\left(\frac{p_f}{p_i}\right)$ (2) $\Delta S = nR\ln\left(\frac{p_i}{p_f}\right)$

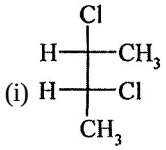
(3) $\Delta S = nRT\ln\left(\frac{p_f}{p_i}\right)$ (4) $\Delta S = RT\ln\left(\frac{p_i}{p_f}\right)$

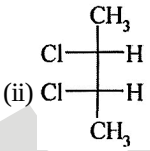
23. Some chemists at ISRO wished to prepare a saturated solution of a silver compound and they wanted it to have the highest concentration of silver ion possible. Which of the following compounds would they use?
$K_{sp}(AgCl) = 1.8 \times 10^{-10}$, $K_{sp}(AgBr) = 5.0 \times 10^{-13}$
$K_{sp}(Ag_2CrO_4) = 2.4 \times 10^{-12}$
(1) AgCl (2) AgBr
(3) Ag_2CrO_4 (4) Any of them

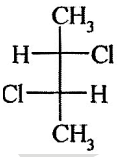
24. Select the correct statements(s)
(1) In lead-storage battery, galvanic cells are linked in series
(2) Cathode and anode compartments are not separated in a battery as oxidising agents and reducing agents both are solids
(3) Recharging of a storage battery is a non-spontaneous process
(4) All the above are correct

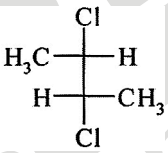
25. In a first order reaction, $A \longrightarrow P$, the ratio of $a/(a-x)$ was found to be 8 after 60 min. If the concentration is 0.1 M then the rate of reaction is
(1) 2.226×10^{-3} mol L^{-1} min^{-1}
(2) 3.466×10^{-3} mol L^{-1} min^{-1}
(3) 4.455×10^{-3} mol L^{-1} min^{-1}
(4) 5.532×10^{-3} mol L^{-1} min^{-1}statements

26. Which of the following pair is diastereomers ?


(i)


(ii)


(iii)


(iv)

(1) i, ii (2) i, iii
(3) i, iv (4) iii, iv

27. 0.2595 g of an organic substance in a quantitative analysis yielded 0.35 g of the barium sulphate. The percentage of sulphur in the substance is
(1) 18.52 g (2) 182.2 g
(3) 17.5 g (4) 175.2 g

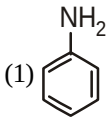
28. In the following compounds, the order of 1 strength are:

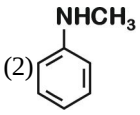

I. II. III. IV.

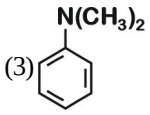
(1) I > II > III > IV
(2) I > II > IV > III
(3) I > IV > II > III
(4) I > IV > II > III

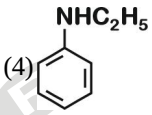
29. The correct order of increasing thermal stability of K_2CO_3, $MgCO_3$, $CaCO_3$ and $BeCO_3$ is
(1) $K_2CO_3 < MgCO_3 < CaCO_3 < BeCO_3$
(2) $BeCO_3 < MgCO_3 < K2CO_3 < CaCO_3$
(3) $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$
(4) $MgCO_3 < BeCO_3 < CaCO_3 < K_2CO_3$

30. Which of the following amine will give the carbylamine test?


(1)


(2)


(3)


(4)

BOTANY

31. Mycorrhiza helps in
(1) Nutrition uptake
(2) Food manufacturing
(3) Disease resistance
(4) Disease prevention

32. Bread becomes porous due to release of CO_2 by the action of
(1) Yeast (2) Bacteria
(3) Virus (4) Protozoans

33. Flavour of cheese is enhanced by
(1) Penicillium roqueforti
(2) Gibberella fujikuroi
(3) Aspergillus niger
(4) Ashby gossypii

34. Hay fever is due to
(1) Insect transmitted pollen
(2) Water borne pollen and pathogens
(3) Wind borne pollen
(4) Virus infected pollen

35. Intine of pollen grain is made of
(1) Callose
(2) Pectocellulose
(3) Cellulose
(4) Fat-like sporopollenin

36. Root-like, leaf-like and stem-like structures are present in
(1) Bryophytes
(2) Pteridophytes
(3) Gymnosperms
(4) Both (1) and (2)

37. Which of the following statements is/are true?
(a) Uneven thickening of cell wall is characteristic of sclerenchyma.
(b) Periblem forms cortex of the stem and the root.
(c) Tracheids are the chief water transporting elements in gymnosperms.
(d) Companion cell is devoid of nucleus at maturity.
(e) The commercial cork is obtained from Quercus suber.
(1) (a) and (d) only (2) (b) and (e) only
(3) (c) and (d) only (4) (b), (c) and (e) only

38. Which one of the following statements is wrong?
(1) Water potential is the chemical potential of the water
(2) Solute potential is always negative
(3) Pressure potential is zero in a flaccid cell
(4) Water potential equals solute potentials in a fully turgid cell

39. Select the mismatch.
(1) Rhodospirillum – Mycorrhiza
(2) Anabaena – Nitrogen fixer
(3) Rhizobium – Alfalfa
(4) Frankia – Alnus

40. Photorespiration in C_3 plants starts from
(1) phosphoglycerate (2) phosphoglycolate
(3) glycerate (4) glycine

41. Match the Column–I with Column–II, and choose the correct combination from the options given below.

	Column–I		Column–II
A.	NADH production	1.	$CO_2 + H_2O$
B.	Product of aerobic respiration	2.	ATP
C.	Oxidative phosphoryiation	3.	Glycolysis
D.	Fermentation	4.	Alcohol and lactic acid

(1) A–3; B–4; C–2; D–1 (2) A–4; B–3; C–2; D–1
(3) A–3; B–1; C–2; D–4 (4) A–2; B–3; C–1; D–4

42. Match the Column–I with Column–II, and choose the correct combination from the options given below.

	Column–I		Column–II
a.	Natural auxin	1.	ABA
b.	Synthetic auxin	2.	IBA
c.	Stress hormone	3.	NAA
d.	Zeatin	4.	Cytokinin

(1) A–2; B–1; C–3; D–4 (2) A–2; B–3; C–4; D–1
(3) A–3; B–2; C–1; D–4 (4) A–2; B–3; C–1; D–4

43. Strength of the linkage between the two genes is
(1) proportionate to the distance between them
(2) inversely proportionate to the distance between them
(3) depend on the chromosomes
(4) depend upon the size of chromosomes

44. Na^+/K^+ pump is associated with
(1) Passive transport (2) Active transport
(3) Osmosis (4) Imbibition

45. Mitosis without asters is known as _____
(1) Astral (2) Anastral
(3) Amitois (4) None of these

ZOOLOGY

46. Homozygous purelines in cattle can be obtained by:
(1) mating of unrelated individuals of same breed
(2) mating of individuals of different breed
(3) mating of individuals of different species
(4) mating of related individuals of same breed

47. A gene whose expression helps to indentify transformed cell is knows as:
(1) Vector
(2) Plasmid
(3) Structural gene
(4) Selectable marker

48. The DNA fragments separated on an agarose gel can be visualized after staining with:
(1) Acetocarmine (2) Aniline blue
(3) Ethidium bromide (4) Bromophenol blue

49. Which of the following is commonly used as a vector for introducing a DNA fragment in human lymphocytes?
(1) Retrovirus (2) λ phage
(3) Ti plasmid (4) pBR 322

50. Use of bioresources by multinational companies and organizations without authorization from the concerned country and its people is called
(1) Bio-infringement (2) Biodegradation
(3) Biopiracy (4) Bio exploitation

51. Which statements is wrong ?
(1) After death artery become empty
(2) At rest stage of the cardiac output is maximum
(3) Heart, and liver receive both oxygenated and deoxygenated blood.
(4) Hepatic portal vein carry deoxygenated blood from gut to liver

52. Which of the following statement is false?
(1) Insulin stimulates cellular glucose uptake and utilisation and glycogenesis.
(2) Insulin deficiency result in a disease called diabetes mellitus.
(3)Glucagon inhibits glycogenolysis and gluconeogenesis.
(4) Thymosin increases the production of antibodies to provide humoral imunity.

53. Eustachian tube connects A with the B. choose the correct option w.r.t. blanks labelled as A and B.
(1) A–Internal ear; B–Larynx
(2) A–Middle ear; B–Pharynx
(3) A–External ear; B–pharynx
(4) A–Middle ear; B–Larynx

54. Select the correct match from the following options.
(1) Nissl's granules – Found in axon
(2) Non–myelinated neurons of peripheral nervous system – Schwann cells present but do not secrete myelin sheath
(3) Unipolar neuron – Possess 1 dendrite only
(4) Sodium – potassium pump – Transports $2K^+$ into the extracellular fluid

55. Which of the given option in incorrect about spleen?
(1) It is the graveyard of erythrocytes
(2) It receives only oxygenated blood
(3) It helps in filteration of blood
(4) It is a primary lymphoid organ

56. MALT constitutes about ..... percent of the lymphoid tissue in human body .
(1) 50% (2) 20% (3) 70% (4) 10%

57. Which one of the following pairs is an example of an autosomal recessive disorder?
(1) Phenylketonuria and haemophilia
(2) Colour blindness and haemophilia
(3) Phenylketonuria and thalassemia
(4) Colour blindness and sickle cell anaemia

58. Which of the following glucose transporters is insulin-independent?
(1) GLUT II (2) GLUT III
(3) GLUT IV (4) GLUT I

59. Reduction in pH of blood will:
(1) Reduce the rate of heart beat
(2) Reduce the blood supply to the brain
(3) Decrease the affinity of haemoglobin with oxygen
(4) None of these

60.

Substance	Glomerular Filtrate	Reabsorbed	Urine
Proteins	2.g.	1.9 g	0.1 g
Glucose	162 g	162 g	0 g
Urea	54 g	24 g	30 g
Creatinine	1.6 g	0 g	1.7 g

(1) Glucose is completely reabsorbed
(2) Urea is partially reabsorbed
(3) Proteins are secreted into urine
(4) Creatinine is secreted into urine
Which of the following options, in view of above statements is correct?
(1) (1), (3) and (4)
(2) (1), (2) and (3)
(3) (2), (3) and (4)
(4) (1), (2) and (4)