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 - 118

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

PHYSICS

01. Two kg of a monoatomic gas is at a pressure of 4×10^4 N/m^2. The density of the gas is 8 kg/m^3. What is the order of energy of the gas due to its thermal motion ?
(1) 10^3 J (2) 10^5 J (3) 10^6 J (4) 10^4 J

02. 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}

03. Which of the following statements is correct?
(1) When a lens is dipped in water, magnitude of its focal length increases.
(2) When a lens is dipped in water, magnitude of its focal length decreases.
(3) When a spherical mirror is dipped in water, magnitude of its focal length increases.
(4) None of these

04. Light of wavelength λ = 5000 Å falls normally on a narrow slit. A screen placed at a distance of 1m from the slit and perpendicular to the direction of light. First minima of the diffraction pattern is situated at 5 mm from the centre of central maximum. The width of the slit is:
(1) 0.1 mm (2) 1.0 mm (3) 0.5 mm (4) 0.2 mm

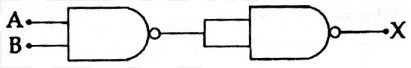
05. The wavelength of the de–Broglie wave associated with a thermal neutron of mass m at absolute temperature T is given by (Here, k is the Boltzmann constant)
(1) $\frac{h}{\sqrt{2mkT}}$ (2) $\frac{h}{\sqrt{mkT}}$ (3) $\frac{h}{\sqrt{3mkT}}$ (4) $\frac{h}{2\sqrt{mkT}}$

06. A photocell is receiving light from a source placed at a distance of 1 m. If the same source is to be placed at a distance of 2 m, then the ejected electrons
(1) moves with one–fourth energy as that of the initial energy
(2) moves with one–fourth of momentum as that of the initial momentum
(3) will be half in number
(4) will be one–fourth in number

07. An electron is at ground state of the H atom. The minimum energy required to excite the H atom into the second excited state is
(1) 13.6 eV (2) 12.1 eV (3) 10.2 eV (4) 3.4 eV

08. When $_3Li^7$ nuclei are bombarded by protons, and the resultant nuclei are $_4Be^8$, the emitted particles will be
(1) Neutrons (2) Alpha particles
(3) Beta particles (4) Gamma photons

09. The output (X) of the logic circuit shown in figure will be:



(1) $X = \overline{A.B}$ (2) X = A.B
(3) $X = \overline{A + B}$ (4) none of these

10. A particle is projected with velocity kv_e. In vertically upward direction from the ground into the space (v_e is escape velocity & k < 1) then the maximum height from the centre of earth to which it can go, will be
(1) $\frac{R}{k^2+1}$ (2) $\frac{R}{k^2-1}$
(3) $\frac{R}{1-k^2}$ (4) $\frac{R}{k+1}$

11. The total mechanical energy of a spring - mass system in simple harmonic motion is $e = \frac{1}{2}M\omega^2A^2$. Suppose the oscillating particle is replaced by another particle of double the mass while the amplitude A remains the same. The new mechanical energy will
(1) become 2E (2) become $\frac{E}{2}$
(3) become $\sqrt{2}$ E (4) remain E

12. In a resonance pipe the first and second resonance are obtained at depths 22.7 cm and 70.2 cm respectively. What will be the end correction?
(1) 1.05 cm (2) 115.5 cm
(3) 92.5 cm (4) 113.5 cm

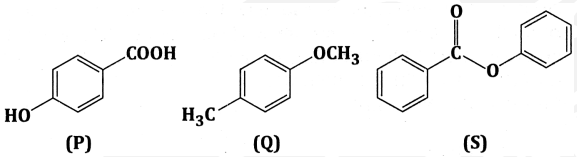
13. If $\alpha = \frac{F}{V^2}\sin\beta t$, then find dimensions of $\frac{\alpha}{\beta}$. (Here, F = force, v = velocity, t = time)
(1) $[ML^{-1}T^{-1}]$ (2) $[M^{-1}LT]$
(3) $[ML^{-1}T]$ (4) $[M^{-1}L^{-1}T^{-1}]$

14. A string 2.0 m long and fixed at its ends is driven by a 240 Hz vibrator. The string vibrates in its third harmonic mode. The speed of the wave and its fundamental frequency is
(1) 320 m/s, 120 Hz (2) 180 m/s, 80 Hz
(3) 180 m/s, 120 Hz (4) 320 m/s, 80 Hz

15. **Statement 1:** Energy cannot be divided by volume.
Statement 2: Dimensions for energy and volume are different.
(1) Statement 1 is True, Statement 2 is True.
(2) Statement 1 is True, Statement 2 is False.
(3) Statement 1 is False, Statement 2 is True.
(4) Statement 1 is False, Statement 2 is False.

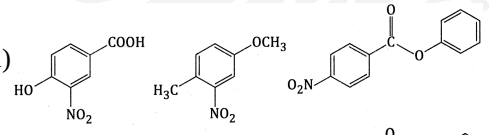
CHEMISTRY

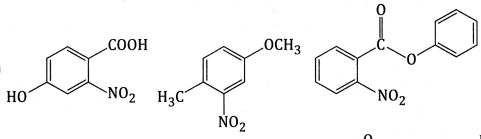
16. The compounds P, Q and S were separately subjected to nitration using HNO_3/H_2SO_4 mixture.

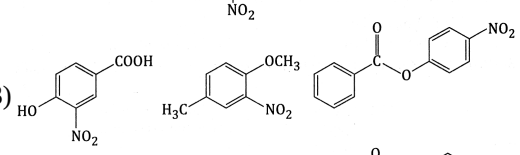


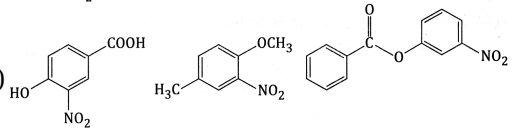
(P) (Q) (S)

The major product formed in each case respectively is:

(1) 

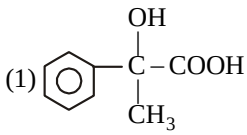
(2) 

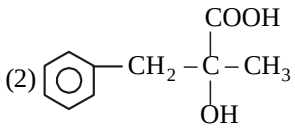
(3) 

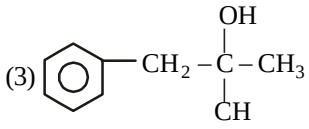
(4) 

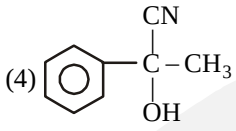
17. In a set of reactions, acetic acid yielded a product S. The structure of S would be:

$CH_3COOH \xrightarrow{SOCl_2} P \xrightarrow[\text{Anhy. } AlCl_3]{\text{Benzene}} Q \xrightarrow{HCN} R \xrightarrow{H_2O} S$

(1) 

(2) 

(3) 

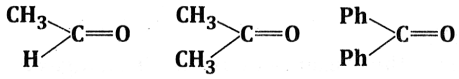
(4) 

18. In which of the following options, the order of arrangement does not agree with the variation of the property indicated against it?
(1) $Al^{3+} < Mg^{2+} < Na^+ < F^-$ (increasing ionic size)
(2) B < C < N< O (increasing first ionisation enthalpy)
(3) I < Br < F < Cl (increasing electron gain enthalpy)
(4) Li < Na < K < Rb (increasing metallic radius)

19. Select the species out of Li_2, He_2, O_2, N_2, Ne_2 which have equal bond orders?
(1) Li_2 and He_2 (2) O_2 and Ne_2
(3) O_2 and N_2 (4) He_2 and Ne_2

20. Which of the following is/are expected to have zero dipole moment?
(I) $BeCl_2$ (II) BCl_3 (III) H_2O (IV) CO_2
(1) (I) and (II) only (2) (II) and (III) only
(3) (I), (II) and (IV) only (4) All of these

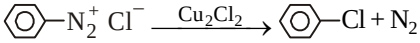
21. The order of reactivity of phenyl magnesium bromide (PhMgBr) with following compounds is:

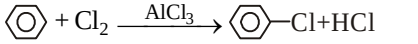


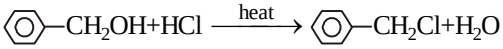
(I) (II) (III)

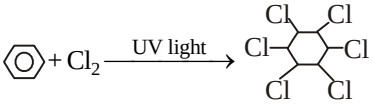
(1) III > II > I (2) II > I > III
(3) I > III > II (4) I > II > III

22. Among the following, the reaction that proceeds through an electrophilic substitution is

(1) 

(2) 

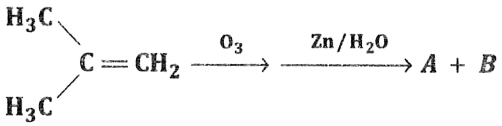
(3) 

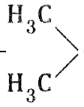
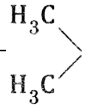
(4) 

23. A colourless odourless gas turns lime water milky in solid state used as refrigerant for ice cream and frozen food
(1) Solid NH_3 (2) Solid SO_2
(3) Solid CO_2 (4) Solid N_2

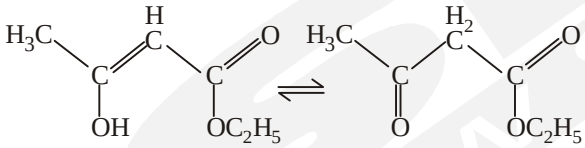
24. Which of the following is the correct increasing order of stability of carbocations (shown)?
(1) $\overset{\oplus}{C}H_3 < CH_3-\overset{\oplus}{C}H_2 < (CH_3)_2\overset{\oplus}{C}H < (CH_3)_3\overset{\oplus}{C}$
(2) $(CH_3)_3\overset{\oplus}{C} < (CH_3)_2\overset{\oplus}{C}H- < CH_3-\overset{\oplus}{C}H_2 < \overset{\oplus}{C}H_3$
(3) $CH_3-\overset{\oplus}{C}H_2 < \overset{\oplus}{C}H_3 < (CH_3)_3\overset{\oplus}{C} < (CH_3)_2\overset{\oplus}{C}H$
(4) $(CH_3)_2\overset{\oplus}{C}H < (CH_3)_3\overset{\oplus}{C} < CH_3-\overset{\oplus}{C}H_2 < CH_3$

25. Supply the major carbon containing products 'A' and 'B' in the following reaction.



(1) A–CH_3-CH_2COOH; B–HCOOH
(2) A–  ; B–HCHO
(3) CH_3-COOH; B–CH_3COOH
(4) A–  ; B–CO_2

26. The enolic form of ethylacetoacetate as shown below has



(1) 9 sigma bonds and 2 pi bonds
(2) 9 sigma bonds and 1 pi bond
(3) 18 sigma bonds and 2 pi bonds
(4) 16 sigma bonds and 1 pi bond

27. Which of the following is correct with respect to –I effect of the substituents ? (R = alkyl)
(1) $-NH_2 < -OR < -F$ (2) $-NO_2 < -OR < -F$
(3) $-NH_2 > -OR > -F$ (4) $-NR_2 < -OR > -F$

28. Match the complex species given in Column-I with the possible isomerism given in Column-II and assign the correct code:

	Column-I (Complex species)		Column-II (Isomerism)
(i)	$[CO(NH_3)_4Cl_2]^+$	(A)	Optical
(ii)	Cis-$[CoCl_2(en)_2]^+$	(B)	Ionisation
(iii)	$[Co(NH_3)_5(NO_2)]Cl_2$	(C)	Coordination
(iv)	$[Co(NH_3)_6][Cr(CN)_6]$	(D)	Geometrical
		(E)	Linkage

(1) (i)–(A); (ii)–(B); (iii)–(D); (iv)–(E)
(2) (i)–(D); (ii)–(C); (iii)–(B); (iv)–(E)
(3) (i)–(D); (ii)–(A); (iii)–(E); (iv)–(C)
(4) (i)–(D); (ii)–(A); (iii)–(E); (iv)–(C)

29. Pick the correct statement out of the following:
(1) IUPAC name of DDT is 2, 2-bis (p-chloropheny1)-1, 1, 1-trichloroethane
(2) $CHCl_3$ used in the production of freon refrigerant
(3) CH_2Cl_2 used as solvant as a propellant in aerosolts
(4) All of the above are correct

30. Which of the following is most acidic?
(1) Benzyl alcohol (2) Cyclohexanol
(3) Phenol (4) m-chlorophenol

BOTANY

31. C_4 plants are adapted to
(1) Hot and dry climate (2) Temperate climate
(3) Cold and dry climate (4) Hot and humid climate

32. Intracellular factor for plant development includes _____.
(1) Chemical regulators (2) Genetics
(3) Light (4) Temperature

33. Occasionally, a single gene may express more than one effect. This is
(1) Polygenic inheritance (2) Pleiotropy
(3) Multiple allelism (4) Co-dominance

34. For a given character, a gamete is always
(1) Homozygous (2) Pure
(3) Hybrid (4) Heterozygous

35. Who used frequency of recombination between gene pairs on the same chromosome as a measure of distance between genes and mapped their position on chromosome?
(1) Alfred Sturtevant (2) Gregor Mendel
(3) Correns (4) Tschermak

36. Codon with dual function is
(1) UGA (2) UUU
(3) AUG (4) AAA

37. Many non-humans model organisms have also been sequenced along with the human genome, these are
(1) Bacteria and yeast
(2) Plants (rice and Arabidopsis)
(3) Fruitfly and Coenohabditis (nematode)
(4) All of the above

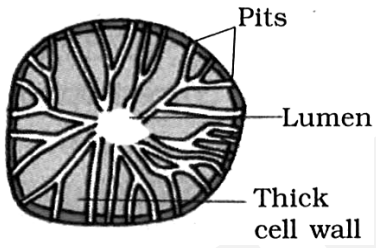
38. Who argued that pairing and separation of chromosomes would lead to the segregation of a pair of factor they carried?
(1) Sutton (2) Boveri
(3) Both (1) and (2) (4) Morgan

39. D ⟲ DNA $\underset{C}{\overset{B}{\rightleftharpoons}}$ mRNA $\xrightarrow{A}$ Proteins

Choose the correct option for A, B, C and D.
(1) A–Translation; B–Transcription; C–Reverse transcription; D–Replication
(2) A–Translation; B–Transcription; C–Reverse transcription; D–Translation
(3) A–Translation; B–Transcription; C–Replication; D–Reverse transcription
(4) A–Transcription; B–Translation; C–Replication; D–Reverse transcription

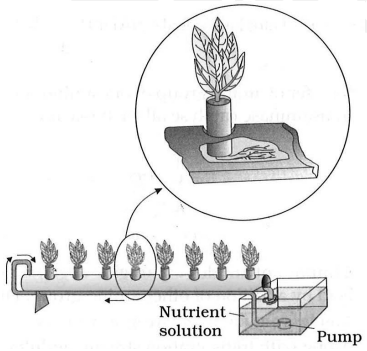
40. In prokaryotes (such as E.coli) ...A... nucleus is not present the DNA is not scattered throughout the cell. DNA is ...B... charged and holded by the ...C... charged proteins. This structure in prokaryotes is called ...D...
Choose the correct option for A, B, C and D.
(1) A–undefined; B–negatively; C–positively; D–nucleoid
(2) A–undefined; B–negatively; C–positively; D–nucleus
(3) A–defined; B–negatively; C–positively; D–nucleoid
(4) A–defined; B–positively; C–negatively; D–nucleoid

41. The given figure is present in Fig.



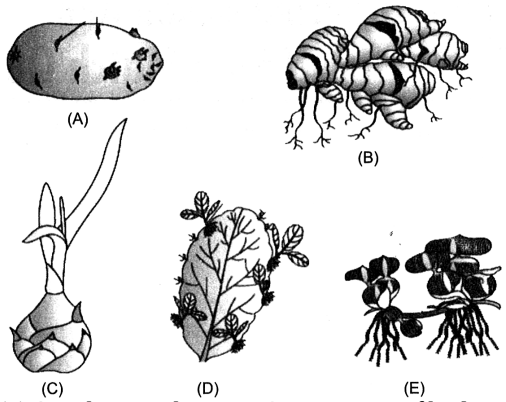
(1) fruit walls of nuts
(2) grit of guava and pear
(3) seed coats of legumes
(4) all of these

42. Refer to the given figure and select the incorrect option regarding it.



(1) It shows hydroponic plant production.
(2) Plants are grown in a tube or trough placed on a slight incline.
(3) The solution flows down the tube and returns to the reservoir due to the suction pressure created by pump.
(4) The roots in this setup, are continuously bathed in aerated nutrient solution.

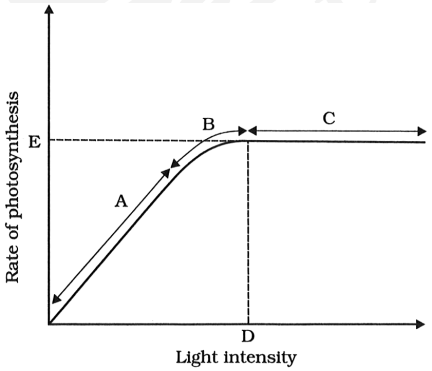
43. Choose the option with correct identification of A, B, C, D and E given below:



(1) A-Tuber, B-Rhizome, C-Eyes, D-Leaf bud, E-Offset
(2) A-Offset, B-Eyes, C-Leaf bud, D-Stolon, E-Sucker
(3) A-Offset, B-Leaf bud, C-Eyes, D-Stolon, E-Sucker
(4) A-Tuber, B-Rhizome, C-Bulbil, D-Leaf bud, E-Offset

44. In a pollen grain, larger cell is:
(1) Generative cell (2) Male gamete
(3) Vegetative cell (4) All of these

45. Study the given graph showing the effect of light intensity on the rate of photosynthesis. Which of the following statements regarding this is correct?



(1) Light is a limiting factor in the region A.
(2) Region C represents that rate of photosynthesis is not increased further by increasing light intensity because some other factor became limiting.
(3) Point D represents the intensity of light at which some other factor became limiting.
(4) All of these

ZOOLOGY

46. Read the following statements w.r.t. heart and circulatory system:
(i) Birds, mammals and crocodiles have a four chambered heart.
(ii) In amphibians and reptiles the left atrium receives deoxygenated blood.
(iii) Annelids have an open circulatory system.
(iv) In amphibians oxygenated and deoxygenated blood may get mixed in the ventricle but usually do not mix.

(v) Closed circulatory system is more advantageous than open one as the flow of fluid can be more precisely regulated.

Which of the above statements are correct?

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

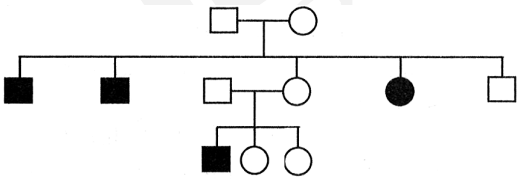
47. Reduction in pH of blood will:
(1) Reduce the rate of heart beat
(2) Reduce the blood supply to the brain
(3) Decrease the affinity of haemoglobin with oxygen
(4) None of these

48. In Hardy – Weinberg equation, the frequency of heterozygous individual is represented by
(1) 2pq (2) pq
(3) q^2 (4) p^2

49. The thyroid gland:
(1) Is composed of four lobes located on the either side of trachea
(2) Is composed of two pairs of lobes located on the either side of oesophagus
(3) Is composed of follicles and stromal tissues
(4) Is located in the lower trachea

50. Find out which of the following statements are true (T)/ false (F) and choose the correct option:
I. Adrenal cortex hormones play a role in the growth of axial hair, pubic hair and facial hair during puberty.
II. Aldosterone acts mainly at the renal tubules and stimulates the reabsorption of Na^+ and water and excretion of K^+ and phosphate ions.
III. Cortisol increases the WBC count in blood.
IV. Cortisol stimulates high immune response.
(1) I–T; II–F; III–F; IV–T
(2) I–F; II–F; III–T; IV–T
(3) I–T; II–T; III–F; IV–F
(4) I–T; II–T; III–T; IV–T

51. Study the pedigree chart given below :



What does it show?
(1) The pedigree chart is wrong as this is not possible
(2) Inheritance of recessive sex-linked disease like haemophilia
(3) Inheritance of a condition like phenyl ketonuria as an autosomal recessive trait
(4) Inheritance of a sex-linked inborn error of metabolism like phenylketonuria

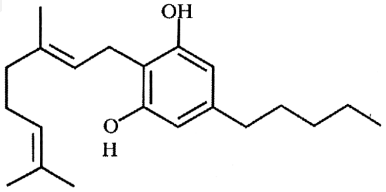
52. Which of the following is true?
(1) The mutant haemoglobin of sickle cell anaemic individual undergo polymerisation under low oxygen tension causing sickling of RBC
(2) Sickle cell anaemia occur due to the single base substitution (GAG → GUG) at the sixth codon of β-globin gene
(3) Individuals heterozygous for sickle cell anaemia (Hb^AHb^S) are resistant towards malaria
(4) All of the above

53. A normal visioned man whose father was colourblind marries a woman whose father was also colourblind. They have their first child as a daughter. What are the chances that this child would be colourblind?
(1) 100% (2) Zero percent
(3) 25% (4) 50%

54. Which state of Plasmodium is infective for mosquito?
(1) Gametocyte (2) Sporozoite
(3) Trophozoite (4) Ookinete

55. The B-lymphocytes and T-lymphocytes provide which type(s) of acquired immunity:
(1) Humoral immunity/antibody mediated immunity and cell mediated immunity respectively
(2) Humoral immunity
(3) Cell mediated immunity
(4) Antibody mediated immunity

56. Which of the following is correct for the chemical structure shown?



(1) It is generally taken by snorting and injection
(2) It is obtained from Datura and Erythroxylon coca
(3) It is generally taken by inhalation and oral ingestion
(4) It is always taken by injection

57. Which one of the following techniques is safest for the detection of cancers?
(1) Radiography (X-ray)
(2) computed tomography (CT)
(3) Histopathological studies
(4) Magnetic resonance imaging (MRI)

58. The chitinous exoskeleton of arthropods is formed by the polymerization of
(1) D–glucosamine
(2) N–acetyl glucosamine
(3) Lipoglycans
(4) Keratin sulphate and chondroitin sulphate

59. In a population of 1000 individuals, 360 belong to genotype AA, 480 to Aa and the remaining 160 to aa. Based on this data, the frequency of allele A in the population is:
(1) 0.4 (2) 0.5
(3) 0.6 (4) 0.7

60. Which of the following had the smallest brain capacity?
(1) Homo erectus
(2) Homo sapiens
(3) Homo neanderthalensis
(4) Homo habilis