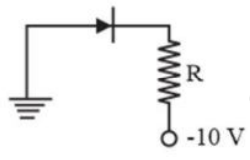
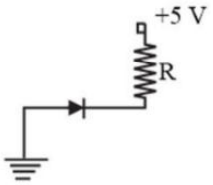
SAMPLE PAPER - 105

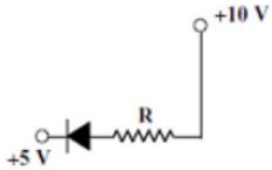
Time : 1 : 15 Hr. **Question : 60**

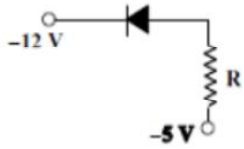
PHYSICS

01. In the following, which one of the diodes is reverse biased?

(1) 

(2) 

(3) 

(4) 

02. When a silicon p-n junction is in forward biased condition with a series resistance, it has a knee voltage of 0.6 V. If 5 mA of current flows in it when the p-n junction is connected with a 2.6 V battery, the value of the series resistance is
(1) 100 Ω (2) 200 Ω
(3) 400 Ω (4) 500 Ω

03. The electric and the magnetic field, associated with an EM wave propagating along the +z-axis, can be represented by
(1) $[\vec{E} = E_0\hat{i}, \vec{B} = B_0\hat{j}]$ (2) $[\vec{E} = E_0\hat{k}, \vec{B} = B_0\hat{i}]$
(3) $[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{i}]$ (4) $[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{k}]$

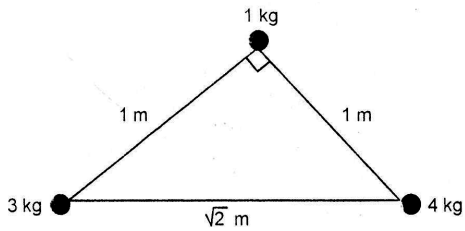
04. If yellow light emitted by sodium lamp in Young's double-slit experiment is replaced by a monochromatic blue light of the same intensity
(1) fringe width will decrease
(2) fringe width will increase
(3) fringe width will remain unchanged
(4) fringe width will become less intense

05. A clear sheet of polaroid is placed on the top of similar sheet so that their axes make an angle $\sin^{-1}\left(\frac{3}{5}\right)$ with each other. The ratio of intensity of the emergent light to that of unpolarised incident light is
(1) 16 : 25 (2) 9 : 25 (3) 4 : 5 (4) 8 : 25

06. The angle of a prism is 60° and its refractive index is $\sqrt{2}$. The angle of minimum deviation suffered by a ray of light in passing through it is
(1) About 20° (2) 30°
(3) 60° (4) 45°

07. A concave mirror for face viewing has a focal length of 0.4 m. The distance at which you hold the mirror from your face in order to see your image upright with a magnification of 5 is
(1) 1.60 m (2) 0.16 m (3) 0.32 m (4) 0.24 m

08. Three spherical ball of mass 1 kg, 3kg, and 4 kg are placed at the corners of a right angle triangle as shown in figure. The magnitude of gravitational force exerted by 3 kg and 4 kg masses on 1 kg mass is



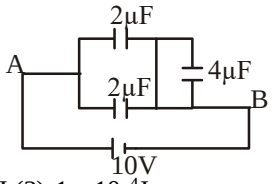
(1) 4 g (2) $3\sqrt{3}$ G (3) 5 G (4) $4\sqrt{2}$ G

09. If the escape velocity of a rocket from the surface of the earth is v_e, then the escape velocity of the same rocket from the surface of a planet whose acceleration due to gravity as well as radius are three times that of the earth is:
(1) $5v_e$ (2) $25\,v_e$ (3) $\frac{v_e}{5}$ (4) $3v_e$

10. The speed of a wave in a medium is 1500 m/s. If 3600 waves pass through a point in 1 minute in this medium, then the wavelenght of wave is:
(1) 25m (2) 50m (3) 0.41 m (4) 90000m

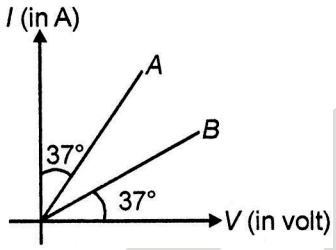
11. Two tuning forks of frequency 250 Hz and 254 Hz produce beats. If a minimum is produced just now, after how much time the next minimum will be produced?
(1) $\frac{1}{16}$ second (2) $\frac{1}{12}$ second
(3) $\frac{1}{8}$ second (4) $\frac{1}{4}$ second

12. In the circuit shown is figure, the electrostatic P.E stored in all the condensers is :



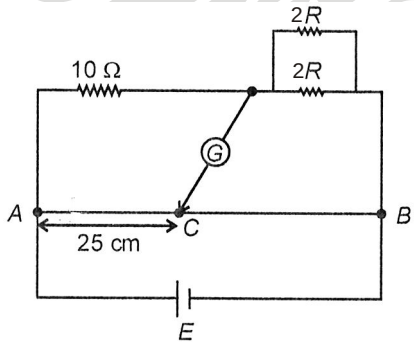
(1) 2×10^{-4}J (2) 1×10^{-4}J
(3) 2.5×10^{-4}J (4) 4×10^{-4}J

13. Figure shows graph between *I* and *V* for two conductors A and B. Their respective conductances are in ratio



(1) 3 : 4 (2) 4 : 3
(3) 9 : 16 (4) 16 : 9

14. If the Galvanometer shows no deflection, then the value of R for the circuit shown in the figure is (length AB = 100 cm)



(1) 30 Ω (2) 60 Ω
(3) 10 Ω (4) 120 Ω

15. When a magnetic needle placed in non uniform magnetic field the needle may experience a :-
(1) Force
(2) Torque
(3) Force and torque
(4) No force and no torque

CHEMISTRY

16. If the pressure of H_2 gas is increased from 1 atm to 100 atm keeping H^+ concentration constatn at 1 M, the change in reduction potential of hydrogen half cell at 25ºC will be:
(1) 0.059 V (2) 0.59 V (3) 0.0295 V (4) 0.118 V

17. The EMF of given cell $Pt–H_2 \mid H^+ \mid H_2–Pt$ is
(1) $\frac{RT}{F}\log\frac{P_1}{P_2}$ (2) $\frac{RT}{2F}\log e\frac{P_1}{P_2}$
(3) $\frac{RT}{F}\log_e\frac{P_2}{P_1}$ (4) None of these

18. If 99% of first order reaction was completed in 32 min, when will 99.9% of the reaction will get complete?
(1) 50 min (2) 46 min
(3) 48 min (4) 49 min

19. When $FeCl_3$ solution is added to NaOH a negatively charged sol is obtained. It is due to the
(1) presence of basic group
(2) preferential adsorption of OH^- ions
(3) self-dissociation
(4) electron capture by sol particles

20. How is lime stone used in Fe extraction?
(1) Oxidation of Fe ore
(2) Reduction of Fe ore
(3) Formation of slag
(4) Purification of Fe formed

21. Which of the following statement regarding NH_3 and NF_3 is correct-
(1) NH_3 has pyramidal and NF_3 has trigonal planer shape
(2) bond angle in NH_3 is smaller than NF_3
(3) resultant dipole moment of NH_3 is (4.90×10^{-30} cm) and that of NF_3 is (0.8×10^{-30} cm)
(4) they both are sp^2 hybridised

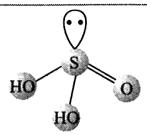
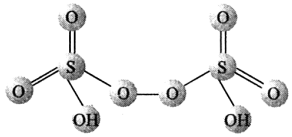
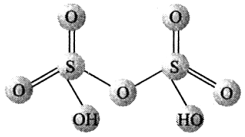
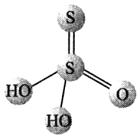
22. Total number of shared and unshared electron pair present in SF_6 is respectively
(1) 12, 0 (2) 12, 9 (3) 6, 18 (4) 6, 9

23. The chemical formula of calgon is
(1) $NaPO_{12}$ (2) $Na_6P_6O_{18}$
(3) $Na_6P_6O_{12}$ (4) $Na_3P_3O_6$

24. Which of the following configuration belongs s-block elements
(1) $1s^22s^22p^63s^23p^63d^{10}4s^1$
(2) $1s^22s^22p^63s^23p^64s^1$
(3) $[Xe]4f^{14}5d^16s^2$
(4) All of above

25. BiH_3 is strongest reducing agent among hydride of 15th group element due to
(1) Most ionic hydride
(2) least bond dissociation enthalpy
(3) smallest bond angle
(4) Highest boiling point

26. Match the Column I with Column II and choose the correct option from the codes given below.

	Column I (Structure)	Column II (Oxoacid of sulphur)
A		1. Peroxodisulphuric acid
B.		2. Thio Sulphuric acid
C.		3. Sulphurous acid
D		4. Pyrosulphuric acid

(1) A-1, B-2, C-3, D-4 (2) A-3, B-1, C-4, D-2
(3) A-2, B-4, C-3, D-1 (4) A-4, B-3, C-1, D-2

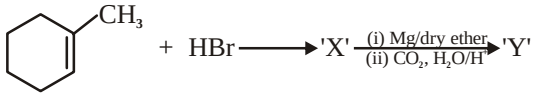
27. The correct order of stability of the following carbocations is

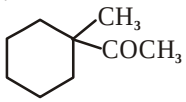

(I)

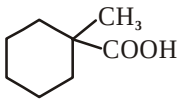
$(C_6H_6)_3C^{\oplus}$ (II) $C_6H_5\overset{\oplus}{C}H_2$ (III) $CH_3-\overset{\oplus}{C}H-CH_2OH$ (IV)

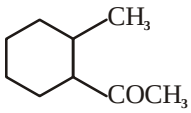
(1) (II) > (I) > (III) > (IV)
(2) (I) > (IV) > (III) > (II)
(3) (I) > (II) > (III) > (IV)
(4) (IV) > (III) > (II) > (I)

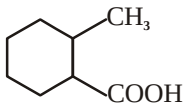
28. The final product 'Y' in the following reaction is :



(1) 

(2) 

(3) 

(4) 

29. The pollutants which come directly in the air from sources are called primary pollutants. Primary pollutants are sometimes converted into secondary pollutants. Which of the following belongs to secondary air pollutants ?
(1) CO
(2) Hydrocarbon
(3) Peroxyacetyl nitrate
(4) NO

30. When sodium is dissolved in liquid ammonia, a solution of deep blue colour is obtained. The colour of the solution is due to:
(1) ammoniated electron
(2) sodium ion
(3) sodium amide
(4) ammoniated sodium ion

BOTANY

31. Choose the correct option.
(a) Thread-like cytoplasmic strands, running from one cell to other are known as plasmodesmata
(b) The xylem and phloem constitute the vascular bundle of the stem
(c) First formed xylem elements are described as metaxylem
(d) Radial bundles are mainly found in leaves
(1) a, b–true; c, d–wrong
(2) d–true; a, b, c–wrong
(3) c–true; a, b, d–wrong
(4) b–true; a, c, d–wrong

32. Pumps are related to
(1) Simple diffusion (2) Facilitated diffusion
(3) Active transport (4) Osmosis

33. A sulphur containing amino acid is
(1) Methionine (2) Asparagine
(3) Cysteine (4) Both (1) and (3)

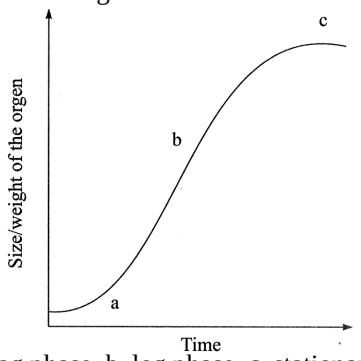
34. Nitrogen-fixation in root nodules of Alnus is brought about by the
(1) Rhizobium (2) Frankia
(3) Glomus (4) Both (2) and (3)

35. A photosynthesizing plant is releasing ^{18}O more than the normal. The plant must have been supplied with
(1) O_3 (2) H_2O with ^{18}O
(3) CO_2 with ^{18}O (4) $C_6H_{12}O_6$ with ^{18}O

36. In photosynthesis, photolysis of water is used in
(1) Reduction of NADP (2) Oxidation of NADP
(3) Oxidation of FAD (4) None of the above

37. Apparatus use to measure rate of respiration and R.Q. is
(1) Auxanometer (2) Potometer
(3) Respirometer (4) Manometer

38. Recognise the figure and find out the correct labelling:



(1) a–lag phase, b–log phase, c–stationary phase
(2) a–log phase, b–lag phase, c–stationary phase
(3) a–lag phase, b–exponential phase, c–stationary phase
(4) Both (1) and (3)

39. Which of the following is a defining characteristic of living organisms?
(1) Growth
(2) Ability to make sound
(3) Reproduction
(4) Response to external stimuli

40. Sexual reproduction in fungus occurs in the following sequential event, choose the correct option that is properly arranged.
(A) Fusion of two nuclei called karyogamy.
(B) Fusion of protoplasm between two motile or non-motile gametes.
(C) Meiosis in zygote resulting in haploid spores.
(1) $A \rightarrow B \rightarrow C$ (2) $B \rightarrow A \rightarrow C$
(3) $C \rightarrow B \rightarrow A$ (4) $C \rightarrow A \rightarrow B$

41. The plasmids present in the bacterial cells are
(1) Circular double helical DNA molecules
(2) Circular double helical RNA molecules
(3) Linear double helical DNA molecules
(4) Linear double helical RNA molecules

42. Tegmen develops from
(1) Funiculus
(2) Chalaza
(3) Inner integument
(4) Outer integument

43. A thin, filamentous extension of cell wall required for a bacteria motility is called _____.
(1) Hook (2) Flagella
(3) Tail (4) Mesosome

44. Microtubules absent in
(1) Mitochondria (2) Centriole
(3) Flagella (4) Spindle fibres

45. The stain used to visualize mitochondria is
(1) Fast green (2) Safranin
(3) Acetocarmine (4) Janus green

ZOOLOGY

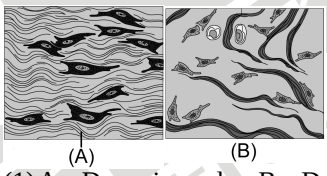
46. Match the following diseases with the causative organism and select the correct option.

Column-I	**Column-II**
(a) Typhoid	(i) *Wuchereria*
(b) Pneumonia	(ii) *Plasmodium*
(c) Filariasis	(iii) *Salmonella*
(d) Malaria	(iv) *Haemophilus*

(1) (a)–(i); (b)–(iii); (c)–(ii); (d)–(iv)
(2) (a)–(iii); (b)–(iv); (c)–(i); (d)–(ii)
(3) (a)–(ii); (b)–(i); (c)–(iii); (d)–(iv)
(4) (a)–(iv); (b)–(i); (c)–(ii); (d)–(iii)

47. Choose the correct statement from the following.
(1) Widal test is the test used for detecting cholera
(2) HIV is single strand DNA virus containing two identical fregment of DNA
(3) Malaria is spread by female anopheles mosquito
(4) Adult humans possess 26 cervical vertebrae

48. Identify A and B



(1) A = Dense irregular; B = Dense regular C.T.
(2) A = Dense regular; B = Dense irregular
(3) A = Loose C.T.; B = Dense C.T.
(4) None

49. Match List I with List II and choose the correct option:

List-I	**List-II**
A. Salivary amylase	1. Proteins
B. Bile salts	2. Milk proteins
C. Rennin	3. Starch
D. Pepsin	4. Lipids
E. Steapsin	5. Emulsification of fats

(1) A = 5, B = 4, C = 1, D = 2, E = 3
(2) A = 2, B = 3, C = 4, D = 5, E = 1
(3) A = 2, B = 4, C = 3, D = 1, E = 5
(4) A = 3, B = 5, C = 2, D = 1, E = 4

50. Zymogen cells of gastric glands secrete-
(1) Pepsin (2) Pepsinogen
(3) Transferases (4) Chymotrypsin

51. Which of the following is not a X–linked recessive disease?
(1) Haemophilia
(2) Thalassemia
(3) Colour blindness
(4) Glucose–6–phosphate dehydrogenase deficiency

52. The offspring produced from a marriage have only O or A blood groups. Of the gentypes given below, the possible genotypes of the parents would be
(1) I^AI^A and I^AI^o (2) I^oI^o and I^oI^o
(3) I^AI^A and I^oI^o (4) I^AI^o and I^oI^o

53. Which of the following is known as Portuguese Man of War?
(1) Gorgonia (2) Aurelia
(3) Physalia (4) Obelia

54. How many oothecae are produced by female cockroach?
(1) 9–10 (2) 14–16
(3) 13 (4) 1–2

55. At each step of ascent in B-DNA double helical structure, the strand turns _____.
(1) 36° (2) 72°
(3) 90° (4) 18°

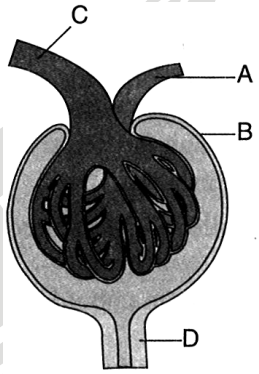
56. The basic unit of nucleic acid is
(1) Pentose sugar (2) Nucleoid
(3) Nucleoside (4) Nucleotide

57. Reptiles, birds and mammals respire through
(1) Buccopharyngeal cavity
(2) Gills
(3) Skin
(4) Lungs

58. The controlling centre of normal breathing in mammals lies in
(1) Cerebrum (2) Cerebellum
(3) Midbrain (4) Medulla oblongata

59. Blood vessel draining the glomerulus in a mammalian nephron is called
(1) Afferent arteriole and is narrower than the vessel entering it
(2) Efferent venule and is narrower than the vessel entering it
(3) Efferent arteriole and is narrower than the vessel entering it
(4) Renal artery and is wider than the vessel entering it

60. Which of the following diagram is lined with podocytes?



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