

SAMPLE PAPER - 106

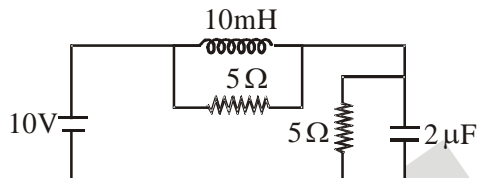
Time : 1 : 15 Hr.

Question : 60

PHYSICS

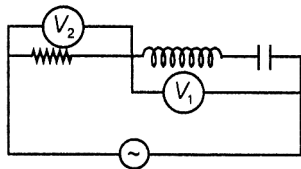
01. Dip angle is 90° at
 (1) Magnetic equator (2) Magnetic poles
 (3) Geographic equator (4) Geographic poles

02. In circuit shown in figure, after long time, the current drawn from the source is :



- (1) 0.5 A (2) 1 A (3) 2 A
 (4) 0 A

03. If the reading of voltmeter V_1 is 80 V, then the reading of voltmeter V_2 is



$$V = (100\sqrt{2} \sin \omega t) \text{ V}$$

- (1) 30 V (2) 40 V
 (3) 60 V (4) 80 V

04. In bringing an electron towards a proton, the electrostatic potential energy of the system :

- (1) decreases (2) increases
 (3) remains same (4) becomes zero

05. Two wires of same dimensions but different resistivity ρ_1 and ρ_2 are connected in series. The equivalent resistivity of the combination is

- (1) $\frac{\rho_1 + \rho_2}{2}$ (2) $\sqrt{\rho_1 \rho_2}$
 (3) $\rho_1 + \rho_2$ (4) $(\rho_1 + \rho_2)^2$

06. When equal current is passed through two coils, equal magnetic field is produced at their centres. If the ratio of number of turns in the coil is 1 : 9, then the ratio of their respective radii will be

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

07. A metallic rod of Young's modulus $0.4 \times 10^{11} \text{ Nm}^{-2}$ undergoes a strain of 0.5%. Then the energy stored per unit volume in the rod will be :

- (1) $0.5 \times 10^6 \text{ Jm}^{-3}$ (2) $5 \times 10^8 \text{ Jm}^{-3}$
 (3) $2.5 \times 10^8 \text{ Jm}^{-3}$ (4) $0.5 \times 10^{11} \text{ Jm}^{-3}$

08. Percentage error in the measurement of mass and speed are 4% and 3% respectively. The error in the estimation of kinetic energy obtained by measuring mass and speed will be

- (1) 12% (2) 10% (3) 2% (4) 8%

09. If an AC produces same heat as that produced by a steady current of 1 A, then peak value of current is

- (1) 4 A (2) 1.56 A
 (3) 5.6 A (4) 1.41 A

10. Water rises to a height 'h' in capillary tube. If the length of capillary tube above the surface of water is made less than 'h', then :

- (1) water does not rise at all
 (2) water rises upto the tip of capillary tube and then starts overflowing like a fountain
 (3) water rises upto the top of capillary tube and stays there without overflowing
 (4) water rises upto a point a little below the top and stays there

11. A particle moves in a straight line with retardation proportional to its displacement. The loss of kinetic energy during a displacement x is proportional to

- (1) x^2 (2) e^2
 (3) x (4) $\log e^x$

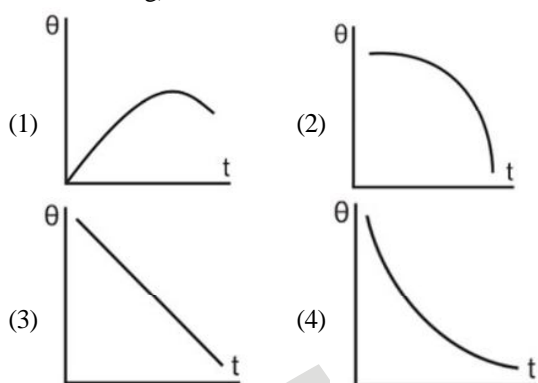
12. A particle is projected in the X-Y plane. 2 s after projection, the velocity of the particle makes an angle 45° with the X-axis. 4 s after projection, it moves horizontally. Find the velocity of projection (use $g = 10 \text{ m s}^{-2}$)

- (1) $20\sqrt{5} \text{ ms}^{-1}$ (2) $10\sqrt{5} \text{ ms}^{-1}$
 (3) $5\sqrt{5} \text{ ms}^{-1}$ (4) $2\sqrt{5} \text{ ms}^{-1}$

13. 1 kg of water, at 20°C is heated in an electric kettle whose heating element has a mean (temperature averaged) resistance of 20Ω . The rms voltage in the mains is 200V. Ignoring heat loss from the kettle, time taken for water to evaporate fully is close to [Specific heat of water = $4200 \text{ J kg}^{-1} \text{ }^\circ\text{C}$, Latent heat of water = 2260 kJ kg^{-1}]

- (1) 3 min (2) 16 min
 (3) 22 min (4) 10 min

14. The correct graph between the temperature of a hot body kept in cooler surrounding and time is (Assume Newton's law of cooling)



15. One mole of a monoatomic gas behaving as per $PV = nRT$ at 27°C is subjected to reversible adiabatic compression until the final temperature reaches 327°C . If the initial pressure was 1.0 atm then the value of $\ln(P_{\text{final}}/P_{\text{initial}})$ is (given $\ln 2 = 0.7$)

- (1) 1.75 (2) 0.176
 (3) 1.0395 (4) 2.0

CHEMISTRY

16. For the same metal, and same ligands, the relation in between Δ_t and Δ_0 is-

- (1) $\Delta_t = \frac{9}{4}\Delta_0$ (2) $\Delta_t = \frac{3}{5}\Delta_0$
 (3) $\Delta_t = 0.45\Delta_0$ (4) $\Delta_t = 0.6\Delta_0$

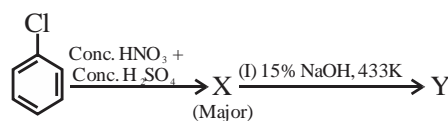
17. Pick out the incorrect match among the following

- (1) Vitamin B_{12} – the antipernicious anaemia factor
 (2) $[\text{RhCl}(\text{PPh}_3)_3]$ – Hydrogenation of alkenes
 (3) $[\text{Ag}(\text{CN})_2]$ – Photography
 (4) D – penicillamine & desferrioxime B – To remove excess of Cu and Fe from plant/animal system

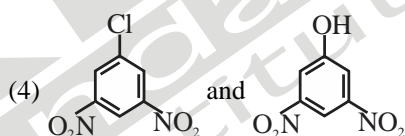
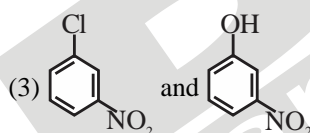
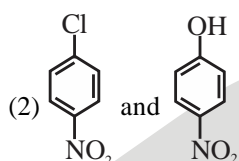
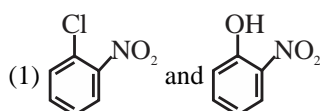
18. Which of the following gas is responsible for damages the ozone layer ?

- (1) CH_4 (2) SO_2
 (3) H_2O (4) CFCs

19. Consider the following sequence of reactions



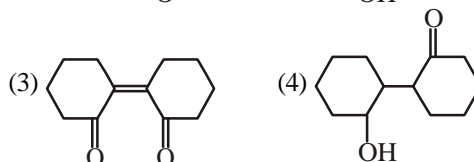
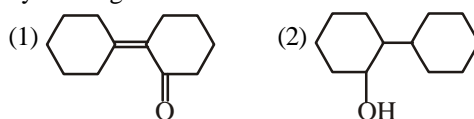
Compounds X & Y are



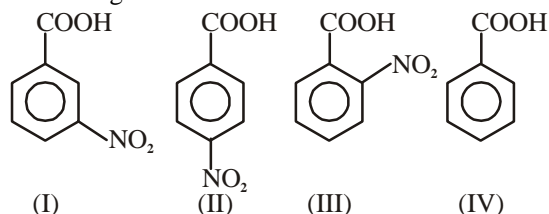
20. Cobalt (III) chloride forms several octahedral complexes with ammonia. Which of the following will not give test for chloride ions with silver nitrate at 25°C ?

- (1) $\text{CoCl}_3 \cdot 3\text{NH}_3$ (2) $\text{CoCl}_3 \cdot 4\text{NH}_3$
 (3) $\text{CoCl}_3 \cdot 5\text{NH}_3$ (4) $\text{CoCl}_3 \cdot 6\text{NH}_3$

21. Of the following which is the product formed when cyclohexanone undergoes aldol condensation followed by heating?



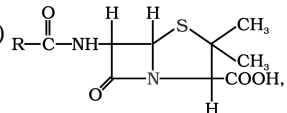
22. What is the correct order regarding the acidity of the following ?

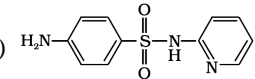


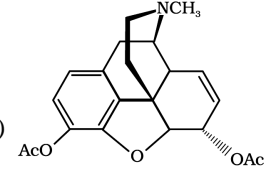
- (1) III > IV > I > II (2) II > III > I > IV
 (3) III > II > I > IV (4) IV > I > III > II

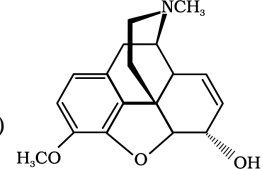
23. Glucose does not react with
 (1) Schiff's reagent (2) NH_2OH
 (3) Br_2 water (4) HNO_3

24. The incorrect matching among the following.

Structure **Name**
 (1)  Penicillin

(2)  Sulphapyridine

(3)  Heroin

(4)  Morphine

25. The incorrect matching among the following.

	Column-I	Column-II	Column-III
1.	Polypropene	Propene	Manufacture of ropes, toys, pipes, fibres, etc.
2.	Polystyrene	Styrene	Manufacturing of Fiber
3.	Glyptal	(a) Ethylene glycol (b) Phthalic acid	Manufacture of paints and lacquers
4.	Bakelite	(a) Phenol (b) Formaldehyde	For making combs, electrical switches, handles of utensils and computer discs.

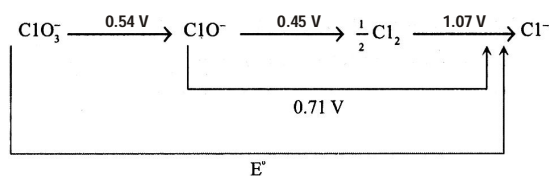
Ans.2

26. The ratio of equivalent weights of $\text{C}_2\text{H}_5\text{OH}$ in the following reactions is

- (i) $\text{C}_2\text{H}_5\text{OH} \longrightarrow \text{CH}_3\text{CHO}$
 (ii) $\text{C}_2\text{H}_5\text{OH} \longrightarrow \text{C}_2\text{H}_5\text{ONa}$
 (1) 1 : 4 (2) 1 : 1
 (3) 1 : 2 (4) 1 : 3

27. A living cell contains a solution which is isotonic with 0.2 M glucose solution. What osmotic pressure develops when the cell is placed in 0.05 M BaCl_2 Solution at 300 K?

- (1) 1.23 atm (2) 3.69 atm
 (3) 6.15 atm (4) none of these



The E° in the given diagram is

- (1) 0.5 (2) 0.6 (3) 0.7 (4) 0.8

29. The volume of gas NH_3 , CO_2 and CH_4 adsorbed by one gram of charcoal at 298 K are in

- (1) $\text{CH}_4 > \text{CO}_2 > \text{NH}_3$ (2) $\text{NH}_3 > \text{CH}_4 > \text{CO}_2$
 (3) $\text{NH}_3 > \text{CO}_2 > \text{CH}_4$ (4) $\text{CO}_2 > \text{NH}_3 > \text{CH}_4$

30. Formation of metallic copper from the sulphide ore in the commercial thermometallurgical process essentially involves which one of the following reaction?

- (1) $\text{Cu}_2\text{S} + \frac{3}{2} \text{O}_2 \rightarrow \text{Cu}_2\text{O} + \text{SO}_2$; $\text{CuO} + \text{C} \rightarrow \text{Cu} + \text{CO}$
 (2) $\text{Cu}_2\text{S} + \frac{3}{2} \text{O}_2 \rightarrow \text{Cu}_2\text{O} + \text{SO}_2$; $2\text{Cu}_2\text{O} + \text{Cu}_2\text{S} \rightarrow 6\text{Cu} + \text{SO}_2$
 (3) $\text{Cu}_2\text{S} + 2\text{O}_2 \rightarrow \text{CuSO}_4$; $\text{CuSO}_4 + \text{Cu}_2\text{S} \rightarrow 3\text{Cu} + 2\text{SO}_2$
 (4) $\text{CuS} + \frac{3}{2} \text{O}_2 \rightarrow \text{Cu}_2\text{O} + \text{SO}_2$; $\text{Cu}_2\text{O} + \text{CO} \rightarrow 2\text{Cu} + \text{CO}_2$

BOTANY

31. Prophase I is divided into how many phase based on chromosomal behaviour?

- (1) 1 (2) 2 (3) 4 (4) 5

32. Synaptonemal complex has a role in

- (1) Chromosome pairing
 (2) Chromosome movement
 (3) Chromosome segregation
 (4) Chromosome organization

33. Emasculation is not required in flowers with

- (1) Only having pistil (unisexual)
 (2) Having both pistil and anthers (bisexual)
 (3) Having only anthers (unisexual)
 (4) All are correct

34. Mature seed contains how much moisture generally?

- (1) 10-15% by mass
 (2) 5-10% by mass
 (3) 25-30% by mass
 (4) 40% by mass

35. Dragonflies are useful to get rid of _____.

- (1) Ladybird
 (2) Aphids
 (3) Mosquitoes
 (4) Both (2) and (3)

36. Amensalism is an association between two species where:
- (1) One species is harmed and other is benefitted
 - (2) One species is harmed and other is unaffected
 - (3) One species is benefitted and other is unaffected
 - (4) Both the species are harmed
37. Productivity is the rate of production of biomass expressed in terms of
- i. $(\text{kcal m}^{-3}) \text{y}^{-1}$ ii. $\text{gm}^{-2} \text{yr}^{-1}$
 iii. $\text{g}^{-1} \text{yr}^{-1}$ iv. $(\text{kcal m}^{-2}) \text{yr}^{-1}$
- (1) ii and iii
 - (2) iii and iv
 - (3) ii and iv
 - (4) i and iii

38. 'We save the entire forest to save the tiger'. This approach of conservation is
- (1) In situ
 - (2) Ex situ
 - (3) In vitro
 - (4) In vivo

39. The extinction of passenger pigeon was due to
- (1) Increased number of predatory birds
 - (2) Over exploitation by humans
 - (3) Non-availability of the food
 - (4) Bird flu virus infection

40. Match the items given in Column I with those in Column II and select the correct option given below:

	Column-I		Column-II
A.	DU	1.	Dobson Unit
B.	CFCs	2.	Chlorofluorocarbons
C.	BOD	3.	Biochemical Oxygen Demand
D.	PIL	4.	Public Interest Litigation
E.	CNG	5.	Compressed Natural Gas

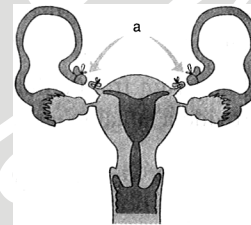
- (1) A-1; B-3; C-2; D-4; E-5
 (2) A-4; B-3; C-2; D-1; E-5
 (3) A-1; B-2; C-3; D-4; E-5
 (4) A-1; B-2; C-4; D-3; E-5
41. During Mendel's investigation, it was first time that ...A... and ...B... were applied in biology. Here A and B refers to
- (1) A-statistical analysis; B-mathematical logic
 - (2) A-statistical analysis; B-physical logic
 - (3) A-statistical analysis; B-chemistry logic
 - (4) A-statistical analysis; B-simple logic
42. The regulation of gene expression can be exerted at
- I. transcriptional level.
 - II. processing level.
 - III. transport of mRNA from nucleus to cytoplasm.
 - IV. translational level.
- Choose the correct combination for given statements.
- (1) I and II
 - (2) II and III
 - (3) III and IV
 - (4) I, II, III and IV
43. Read the following statements:
- a. The male or female cones or strobili may be borne on same tree in Pinus.
 - b. In Cycas, male cones and megasporophylls are borne on different trees.
 - c. Stem of Cycas is branched and of Pinus and Cedrus is unbranched.

- d. In gymnosperms, generally tap roots are found. Select the correct statements:
- (1) a, b
 - (2) a, b, d
 - (3) a, b, c
 - (4) c, d.

44. Which type of life-cycle is shown by Kelps, Ectocarpus and Polysiphonia?
- (1) Haplontic
 - (2) Diplontic
 - (3) Haplodiplontic
 - (4) Isomorphic
45. Jute, flax and hemp are fibres obtained from
- (1) Xylem
 - (2) Pericarp
 - (3) Phloem
 - (4) Cortex

ZOOLOGY

46. The primary and secondary follicle are surrounded by cells known as
- (1) Granulosa
 - (2) Mucosa
 - (3) Serosa
 - (4) Granuloma
47. The surgical procedure indicated in the figure is

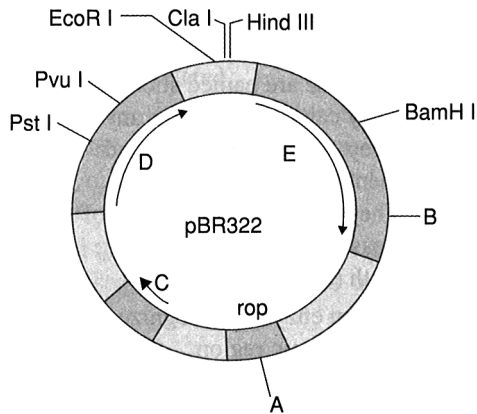


- (1) Tubectomy
 - (2) Hysterectomy
 - (3) Vasectomy
 - (4) Orchidectomy
48. The concept of chemical evolution is based on
- (1) Crystallization of chemicals.
 - (2) Effect of solar radiation on chemicals.
 - (3) Interaction of water, air and clay under intense heat.
 - (4) Possible origin of life by combination of chemicals under suitable environmental conditions.
49. Life came from outer space, this theory is called
- (1) Spore theory
 - (2) Naturalistic theory
 - (3) Special creation theory
 - (4) Spontaneous generation
50. Organs which have the same fundamental structure but different in functions are called
- (1) Vestigial organs
 - (2) Analogous organs
 - (3) Homoplastic organs
 - (4) Homologous organs
51. The main challenge for the production of insulin using rDNA technique is
- (1) Production of A peptide
 - (2) Production of B peptide
 - (3) Getting insulin assembled into a mature form
 - (4) All the above

52. PCR is used in the detection of
 (1) HIV (AIDS) (2) Cancer
 (3) Genetic disorder (4) All of these

53. Oncogenic character is seen in
 (1) E. coli (2) pBR322
 (3) T_i plasmids (4) R_i plasmids

54. Restriction enzyme B is

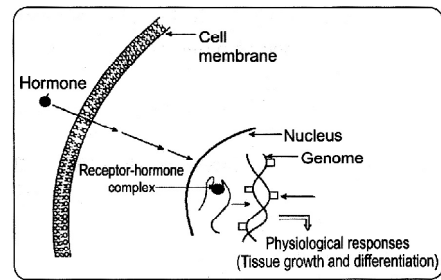


- (1) PstI (2) PvuII (3) BamHI (4) SalI

55. For transformation, micro-particles coated with DNA to be bombarded with gene gun are made up of:
 (1) Silver or Platinum (2) Platinum or Zinc
 (3) Silicon or Platinum (4) Gold or Tungsten

56. Diapedesis is
 (1) Bursting of WBC
 (2) Production of pus
 (3) Production of WBC
 (4) Passes of WBC from blood capillaries to the site of injury

57. Given below is the diagrammatic representation of the mechanism of hormone action



The above diagram could not be associated with how many of the below listed hormones ?

- Melatonin, FSH, Prolactin, GH, ACTH Testosterone, Thyroxine, MSH, Thymosin, LH
 (1) Seven (2) Eight
 (3) Nine (4) Six

58. Aqueous and vitreous humour are divided by :
 (1) lens (2) iris
 (3) retina (4) optic nerve

59. Which of the following is a feature of a bony fish?
 (1) Placoid scales present
 (2) Gills with operculum
 (3) Habitant of marine water only
 (4) Air bladder absent

60. Smoking increases _____ content in blood and reduces the concentration of haembound oxygen, This causes oxygen deficiency in the body
 (1) carbon dioxide
 (2) carbaminohaemoglobin
 (3) carbon monoxide
 (4) carboxylic acid