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SAMPLE PAPER - 130

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

PHYSICS

01. A man is running on the ground. It is known that the coefficient of friction between the man and the grounds is μ. Then which of the following statements is correct
(1) Normal reaction between man and ground is equal to weight of man
(2) The direction of friction on man is in the direction of normal reaction on the man
(3) Direction of friction on man is opposite to the direction of motion of man
(4) Maximum acceleration of man can be 2μg

02. When electron jumps from n = 3 level to n = 1 level, the angular momentum changes by
(1) $\frac{h}{2\pi}$ (2) $\frac{2h}{2\pi}$ (3) $\frac{3h}{2\pi}$ (4) $\frac{4h}{2\pi}$

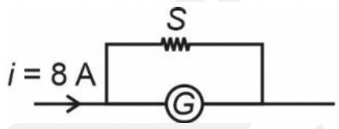
03. The magnetic field in an electromagnetic wave travelling in free space has a peak value of 10 nT. The peak value of electric field strength is
(1) 3 Vm^{-1} (2) 6 Vm^{-1} (3) 9 Vm^{-1} (4) 12 Vm^{-1}

04. The displacement of a particle is represented by the equation $y = \sin^3 \omega t$. The motion is
(1) non-periodic.
(2) periodic but not simple harmonic.
(3) simple harmonic with period $2\pi/\omega$
(4) simple harmonic with period π/ω.

05. An electric dipole with dipole moment $\vec{P} = (2\hat{i} + 3\hat{j})$ cm is kept in an electric field of $\vec{E} = 4\hat{i}$ N/C. The torque acting on it is
(1) $-12\hat{k}$ (Nm) (2) $8\hat{k}$ (Nm)
(3) $12\hat{k}$ (Nm) (4) $-8\hat{k}$ (Nm)

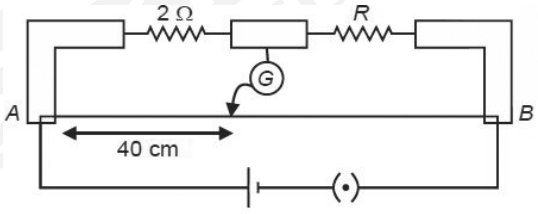
06. Electric field in a region is given by $\vec{E} = (6\hat{i} + 7\hat{j} + 8\hat{k})$ units. An area of 30 units is considered in y-z plane. Calculate the electric flux through this area.
(1) 210 units (2) 240 units
(3) 180 units (4) 630 units

07. Consider the circuit shown. Galvanometer resistance is 10 Ω and current through galvanometer is 3 mA. Find the resistance of shunt.



(1) $10^{-3}\,\Omega$ (2) $7.5 \times 10^{-3}\,\Omega$
(3) $6.75 \times 10^{-3}\,\Omega$ (4) $3.75 \times 10^{-3}\,\Omega$

08. In the meter bridge shown below the null point is at 40 cm from A, if R is shunted with 2 Ω, find the distance of new balance point from A.



(1) 22.7 cm (2) 60 cm
(3) 62.5 cm (4) 60.5 cm

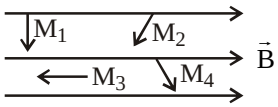
09. A uniform rope of length 12 m and mass 12 kg hangs vertically from a rigid support. A block of mass 4 kg is attached to the free end of the rope. A transverse pulse of wavelength 0.04 m is produced at the lower end of the rope. Find the wavelength of the pulse when it reaches the top of the rope.
(1) 0.04 m (2) 0.08 m
(3) 0.02 m (4) 0.1 m

10. V_{rms}, v_{av} and v_{mp} are root mean square, average and most probable speeds of molecules of a gas obeying Maxwellian velocity distribution. Which of the following statements is correct
(1) $v_{rms} < v_{av} < v_{mp}$ (2) $v_{rms} > v_{av} > v_{mp}$
(3) $v_{mp} < v_{rms} < v_{av}$ (4) $v_{mp} > v_{rms} > v_{av}$

11. The equation of state for 5g of oxygen at a pressure p and temperature T, when occupying a volume V, will be
(1) pV = (5/32) RT (2) PV = 5RT
(3) PV = (5/2) RT (4) PV = (5/16) RT

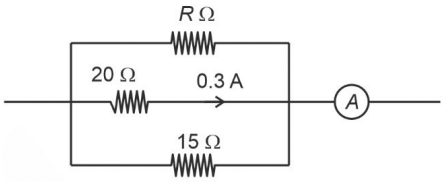
12. A shell of mass 10 kg is moving with a velocity of 10 ms^{-1} when it blasts and forms two parts of mass 8 kg and 2 kg respectively. If the 1st mass is stationary the velocity of the 2nd is
(1) 1 ms^{-1} (2) 10 ms^{-1}
(3) 100 ms^{-1} (4) 50 ms^{-1}

13. The magnetic moment of a current carrying loop is M. It is placed in a uniform magnetic field B in four different orientation named by M_1, M_2, M_3 and M_4. If potential energies in these orientation are U_1, U_2, U_3 and U_4 respectively, then



(1) $U_4 < U_2 < U_3 < U_1$ (2) $U_2 < U_3 < U_4 < U_1$
(3) $U_4 < U_1 < U_2 < U_3$ (4) $U_1 < U_2 < U_3 < U_4$

14. Consider the circuit shown:



The ammeter reads 0.9 A. Value of R is _____.
(1) 20 Ω (2) 40 Ω (3) 30 Ω (4) 60 Ω

15. When temperature of air is 20 °C, a tuning fork sounded over the open end of an air column produces 4 beats per second, the tuning fork is given a lower note. If the frequency of tuning fork is 34 Hz, then find how many beats will be produced by the tuning fork if temperature falls to 5°C?
(1) 2 beats per second. (2) 4 beats per second.
(3) 1 beat per second. (4) 3 beats per second.

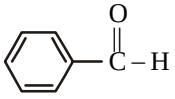
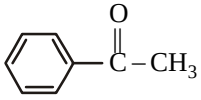
CHEMISTRY

16. Solution of camphor in nitrogen gas is an example of
(1) Gas in gas (2) Gas in liquid
(3) Solid in gas (4) Gas in solid

17. Which of the following salts will produce a minimum pH solution due to hydrolysed?
(1) NaCl (2) NH_4CN
(3) Na_2CO_3 (4) NH_4Cl

18. For the cell reaction $Ni(s) + 2Ag^+(aq) \rightleftharpoons Ni^{2+}(aq) + 2Ag(s)$, E_{cell} is
(1) $E^\circ_{cell} - \frac{RT}{2F}\ln\frac{[Ni^{2+}]}{[Ag^+]^2}$ (2) $E^\circ_{cell} - \frac{RT}{2F}\ln\frac{[Ni^{2+}]^2}{[Ag^+]}$
(3) $E^\circ_{cell} - \frac{RT}{2F}\ln\frac{[Ni^{2+}]^2}{[Ag^+]^2}$ (4) $E^\circ_{cell} - \frac{RT}{2F}\ln\frac{[Ni^{2+}]}{[Ag^+]}$

19. The rate constant for a first order reaction is 20 s^{-1}. How much time will it take to reduce the initial concentration of the reactant to its $\frac{1}{4}$th value ?
(1) 13.8×10^{-2} s (2) 10.35×10^{-2} s
(3) 6.9×10^{-2} s (4) 3.45×10^{-2} s

20. Which of the following compounds is most reactive towards nucleophilic addition reactions?
(1) $CH_3-\overset{\overset{O}{\|}}{C}-H$ (2) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$
(3)  (4) 

21. Arrange the following compounds in increasing order of boiling point.
Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol
(1) propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol
(2) propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol
(3) pentan-1-ol, butan-2-ol, butan-1-ol, propan-1-ol
(4) pentan-1-ol, butan-1-ol, butan-2-ol, propan-1-ol

22. Arrange the following hydrogen halides in order of their decreasing reactivity with propene :
(1) HCl > HBr > HI (2) HBr > HI > HCl
(3) HI > HBr > HCl (4) HCl > HI > HBr

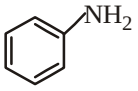
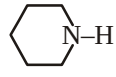
23. Which of the following is not isostructural?
(1) PO_4^{3-} (2) NH_4^+ (3) SCl_4 (4) SO_4^{2-}

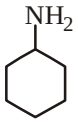
24. The element which exists in liquid state for a wide range of temperature and can be used for measuring high temperature is:
(1) B (2) Al (3) Ga (4) In

25. The existence of two different coloured complexes with the composition of $[Co(NH_3)_4Cl_2]^+$ is due to:
(1) ionisation isomerism
(2) linkage isomerism
(3) geometrical isomerism
(4) coordination isomerism

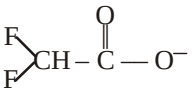
26. Of the following complex ions which is diamagnetic in nature?
(1) $[NiCl_4]^{2-}$ (2) $[Ni(CN)_4]^{2-}$
(3) $[CuCl_4]^{2-}$ (4) $[Co(F_6)]^{3-}$

27. 400 g sample of limestone liberates 44 g carbon dioxide on heating. The percentage purity of $CaCO_3$ in the sample of limestone is
(1) 25% (2) 30% (3) 50% (4) 75%

28. Which of the following is the weakest Bronsted base?
(1)  (2) 

(3)  (4) CH_3NH_2

29. How many alcohols with molecular formula $C_4H_{10}O$ are chiral in nature?
(1) 1 (2) 2 (3) 3 (4) 4

30. Ionic species are stabilised by the dispersal of charge. Which of the following carboxylate ions is the most stable?
(1) $CH_3-\overset{\overset{O}{\|}}{C}-O^-$ (2) $Cl-CH_2-\overset{\overset{O}{\|}}{C}-O^-$
(3) $F-CH_2-\overset{\overset{O}{\|}}{C}-O^-$ (4) 

BOTANY

31. RUBisCO has _____ when CO_2 & O_2 is equal.
(1) greater affinity for CO_2 than O_2
(2) greater affinity for O_2 than CO_2
(3) equal affinity for CO_2 & O_2
(4) no affinity for O_2

32. PGRs are –
(1) Small, simple, molecules of diverse chemical composition
(2) Large, simple molecules of diverse chemical composition
(3) Small, complex molecules of diverse chemical composition
(4) Large, complex molecules of diverse chemical composition

33. Bacteria infected with virus that showed radioactivity had-
(1) radioactive DNA (S_{32})
(2) radioactive DNA (S_{35})
(3) radioactive DNA (P_{32})
(4) radioactive DNA (P_{35})

34. **Assertion :** The two strands of DNA cannot be separated in their length.
Reason : Separation required very high energy.
(1) Both Assertion & Reason are correct and reason is correct explanation of assertion
(2) Both Assertion & Reason are correct and reason is not correct explanation of assertion
(3) Assertion is correct, Reason is false
(4) Assertion & Reason are false

35. For artificial hybridization experiment in bisexual flower, which of the following sequences is correct?
(1) Bagging → Emasculation → Cross-pollination → Rebagging
(2) Emasculation → Bagging → Cross-pollination → Rebagging
(3) Cross-pollination → Bagging → Emasculation → Rebagging
(4) Self-pollination → Bagging → Emasculation → Rebagging

36. Which one is correct statement about co-extinction?
(1) When a species become extinct, the plant and animal species associated with it in an obligatory way also become extinct.
(2) When a host becomes extinct, it's unique assemblage of parasites also meets the same fate
(3) In the plant pollinator mutualism, where extinction of one invariably leads to the extinction of the other.
(4) All these statements are correct.

37. Choose the correct option.

1.	Plant	i.	378
2.	Fishes	ii.	40,000
3.	Birds	iii.	427
4.	Mammals	iv.	3,000
5.	Reptiles	v.	1,300

(1) 1–ii; 2–iv; 3–v; 4–iii; 5–i
(2) 1–iii; 2–ii; 3–v; 4–i; 5–iv
(3) 1–ii; 2– iv; 3–v; 4–i; 5–iii
(4) None of the above

38. Plant capture only _____ of the PAR and this amount of energy sustains the entire living world
(1) 50 – 60 % (2) 40 – 80 %
(3) 2 – 10 % (4) 20 – 40 %

39. Two kingdoms figuring in all biological classification are:
(1) Protista and Plantae
(2) Protista and Animalia
(3) Monera and Animalia
(4) Plantae and Animalia

40. The difference between rough endoplasmic reticulum and smooth endoplasmic reticulum is that rough endoplasmic reticulum:
(1) Does not contain ribosomes
(2) Contains ribosomes
(3) Does not transport proteins
(4) Transports proteins

41. Choose the correct statement –
(1) The male and female cones borne on same plant as in Cycas
(2) The male and female cones borne on different plant as in Cycas
(3) The male and female cones borne on same plant as in Pinus
(4) Both (1) & (3)

42. Most widely used source of ethylene –
(1) Is Ethephon
(2) Hasters fruit ripening in tomato and apple
(3) In aqueous solution is absorbed on the plant roots
(4) More than one option is correct

43. In sickle cell anaemia, resultant effect of mutation is change of amino acid residue-
(1) Valine to alanine (2) Valine to glutamic acid
(3) Alanine to valine (4) Glutamic acid to valine

44. Read the following statements and find out the incorrect statement.
a. The number and length of stamens is variable in flowers of same species.
b. A typical angiosperm anther is bilobed with each lobe having two theca.
c. Often a longitudinal groove runs lengthwise separating the theca.
d. The anther consists of four microsporangia located at the corners one in each lobe.
e. The microsporangia develop further and become pollen sacs. They extend longitudinally all through the length of an anther and are packed with pollen grains.
(1) b, c and e (2) a, c and d
(3) a and d only (4) a and b only

45. Find the correct floral formula of actinomorphic, bisexual flower having five united sepals, five united petals, epipetalous five stamens and bicarpellary syncarpous superior ovary
(1) $\oplus ♂♀ K_{(5)} C_{(5)} A_{(5)} G_{(2)}$
(2) $\oplus ♂♀ K_{(5)} \overset{\frown}{C_{(5)}\ A_{(5)}}\ \underline{G_{(2)}}$
(3) $\oplus ♂♀ K_{(5)} \overset{\frown}{C_{(5)}\ A_5}\ \underline{G_{(2)}}$
(4) $\oplus ♂♀ K_{(5)} \overset{\frown}{C_{(5)}\ A_{(5)}}\ \overline{G}_{(2)}$

ZOOLOGY

46. The following table shows certain diseases, their causative organisms and symptoms.

Diseases	Causative Organisms	Symptoms
I. Filariasis	A	Inflammation in lower limbs
II. Typhoid	B	High fever stomach pain
III. C	Rhinoviruses	Nasal congestion and discharge
IV. Ascariasis	Ascaris	D

The correct option regarding A, B, C and D is
(1) A-Wuchereria, B-Salmonella typhi, C-Common cold, D-Internal bleeding, fever, anaemia
(2) A-Salmonella typhi, B-Ascaris, C-Typhoid, D-Stomach pain headache
(3) A-Ascaris, B-Entamoeba histolytica, C-Pneumonia, D-Constipation, fever
(4) A-Entamoeba histolytica, B-Salmonella typhi, C-Common cold, D-Nasal discharge, high fever

47. Match the following columns.

Column I	Column II
A. Biopsy	1. Uses X-rays to generate a three- dimentional image of the internal of an object,
B. Radiography	2. Leukaemia
C. Blood or bonemarrow test	3. X-rays are used to detect cancer of the internal organs
D. Computed tomography	4. A piece of the suspected tissue cut into thin sections, stained and examined under microscope

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

48. Bilateral symmetry does not occur in:
(1) Obelia (2) Octopus
(3) Mammal (4) Frog

49. Which of the following belongs to the same phylum?
(1) Earthworm, Pinworm, Tapeworm
(2) Prawn, Scorpion, Locusta
(3) Sponge, Sea-anemone, Starfish
(4) Malarial parasite, Amoeba, Mosquito

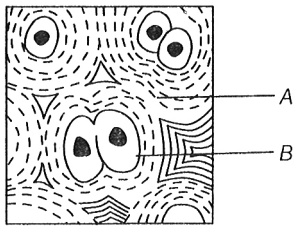
50. Match the following columns.

Column I	Column II
A. Hippocampus	1. Fighting fish
B. Betta	2. Catla
C. Clarias	3. Sea horse
D. Labeo	4. Angel fish
	5. Rohu
	6. Magur

(1) A-3, B-1, C-6, D-5 (2) A-6, B-2, C-4, D-1
(3) A-3, B-2, C-6, D-4 (4) A-4, B-1, C-6, D-5

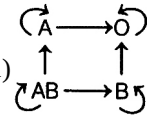
51. Which of the following statements are true/false?
I. In higher phyla, cellular level of organisation is seen.
II. Phylum-Platyhelminthes have cellular level of organisation.
III. Cellular level of organisation is seen when the cells are not arranged as loose cell aggregates.
IV. Molluscs exhibit tissue level of organisation.
Choose the correct option of the following.
(1) I and II are true, but III and IV are false
(2) All statements are false
(3) All statements are true
(4) III and IV are true, but I and II are false

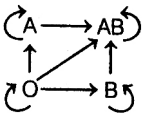
52. In the given diagram of TS of cartilage, identify A and B.

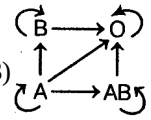


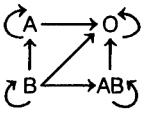
(1) A-Collagen; B-Chondrocyte
(2) A-Osteocyte; B-Collagen
(3) A-Microtubule; B-Osteocyte
(4) A-Chondrocyte; B-Collagen

53. Which of the given option is correct about blood groups and donor compatibility?

(1) 

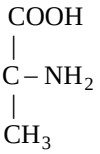
(2) 

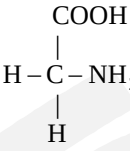
(3) 

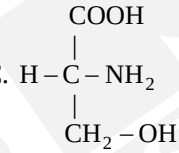
(4) 

54. Which vector is used to deliver gene in animal cell?
(1) Retroviruses (2) Disarmed retroviruses
(3) T_1 plasmid (4) E. coli

55. Name the amino acids A-C correctly.

A. 

B. 

C. 

(1) A-Glycine, B-Serine, C-Alanine
(2) A-Alanine, B-Glycine, C-Serine
(3) A-Serine, B-Glycine, C-Alanine
(4) A-Serine, B-Alanine, C-Glycine

56. Match the following columns.

	Column I		Column II
A.	XX-Female and XO-male method of sex determination	1.	Female heterogametic
B.	X/A = 1.5	2.	Turner's syndrome
C.	Karyotype 45	3.	Cockroach
D.	ZW female - ZZ male method of sex determination	4.	Meta female

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

57. Which of the following statements are correct in reference with the frog?
I. Eyes are bulged and covered by nictitating membrane.
II. Membranous tympanum receives the sound signals.
III. The frog never drinks water.
IV. A pair of nostrils is present above the mouth.
(1) I and II (2) III and IV
(3) I and IV (4) I, II, III and IV

58. Which of the following statements is/are incorrect?
I. Left end of a polysaccharide is called non-reducing end, while right end is called reducing end.
II. Starch and glycogen are unbranched molecules.
III. Starch and glycogen are the reserve food materials of animals and plants, respectively.
IV. Starch can hold iodine molecules in its helical secondary structure, but cellulose being non-helical, cannot hold iodine.
(1) I and II
(2) All statements are incorrect
(3) Only IV
(4) II and III

59. **Statement I:** In systemic arteries, the partial pressure of carbon dioxide is much higher as compared to that of oxygen.
Statement II: Amount of CO_2 that can diffuse through the diffusion membrane is much higher than that of O_2.
(1) Both Statements I and II are incorrect.
(2) Statement I is correct, but Statement II is incorrect.
(3) Statement I is incorrect, but Statement II is correct.
(4) Both Statements I and II are correct.

60. Prehistoric cave art developed about ...A... years ago. Agriculture came around ...B... years back and human settlements started. Choose an appropriate option for A and B to complete the given NCERT statement.
(1) A–18000; B–2000
(2) A–18000; B–10000
(3) A–10000; B–5000
(4) A–15000; B–5000