BOTANY - SECTION A

1 In photosynthesis what occurs in PS-II?

1. It takes longer wavelength of light and e^- from H_2O
2. It takes shorter wavelength of light and e^- from H_2O
3. It takes longer wavelength of light and e^- from NADP
4. It takes shorter wavelength of light and e^- from NADP

2 Select the **correct** equation for population density at time t + 1,

1. $Nt = N_o \times [(B + I) - (D + E)]$
2. $Nt = N_o \times [(B + E) - (D + I)]$
3. $Nt = N_o \times [(B + I) + (D + E)]$
4. $Nt = N_o \times [(B + I) - (D + E)]$

3 Choose the incorrect one for *Gonyaulax*

1. Multiply rapidly
2. Is red dinoflagellate
3. Found only in fresh water
4. Has cellulosic cell wall

4

Assertion (A):	Paul Ehrlich explained the essentiality· of biodiversity for ecosystem health.
Reason (R):	According to Paul Ehrlich, airplane and rivets are analogy to ecosystem and species respectively

1.	Both **(A)** and **(R)** are True and the **(R)** is the correct explanation of the **(A)**.
2.	Both **(A)** and **(R)** are True and the **(R)** is not the correct explanation of the **(A)**.
3.	**(A)** is True but **(R)** is False.
4.	Both **(A)** and **(R)** are False.

5 Identify the phase of the aerobic respiration during which $FADH_2$ is produced:

1. glycolysis
2. oxidation of pyruvate
3. Krebs cycle
4. electron transport chain

6 Match List-I with List-II:

	List - I		List - II
a.	F_1 - F_0 particles	(i)	Site of dark reaction of photosynthesis
b.	Stroma of chloroplast	(ii)	Site of glycosidation of lipids
c.	Kinetochores	(iii)	ATP synthesis
d.	Golgi bodies	(iv)	Site of attachment of spindle fibres

Choose the correct answer from the options given below

1. a(iii), b(i), c(iv), d(ii)
2. a(iii), b(ii), c(iv), d(i)
3. a(ii), b(iii), c(i), d(iv)
4. a(ii), b(iv), c(iii), d(i)

7

Assertion (A):	A forest in a tropical region like equador has upto 10 times as many species of vascular plants as . a forest of equal area in a temperate region like the midwest of USA.
Reason (R):	Tropical environment unlike temperate ones, are less seasonal, relatively more constant and predictable.

In the light of above statements, choose the correct option.

1.	**(A)** is True but (R) is False
2.	(A) is False but (R) is True
3.	Both **(A)** and **(R)** are True and **(R)** is correct explanation of **(A)**
4.	Both **(A)** and **(R)** are True but **(R)** is not the correct explanation of **(A)**

8 Conjoint, collateral, open and endarch vascular bundles are found in

1. Monocot stem
2. Monocot root
3. Dicot root
4. Dicot stem

9 At which step, glycolysis reaches the break-even point where 2 molecules of ATP are consumed, and 2 new molecules are synthesized?

1.	Splitting of fructose-6-phosphate to two trioses
2.	Conversion of 1,3 biphosphoglycerate to 3 - phosphoglycerate
3.	Conversion of GADP to 1,3 biphosphogycerate
4.	Conversion of DHAP to GADP

10 What is the precise role played by O_2 in aerobic respiration?

1.	it plays no role
2.	it combines with acetyl-CoA at the start of the Krebs cycle
3.	it is given off as a by-product during the oxidation of pyruvate
4.	it is the final electron acceptor at the end of the electron transport chain

11 Mark the odd one (w.r.t. dominant trait in garden pea)
1. Yellow pod
2. Inflated pod
3. Axial flower
4. Yellow seed

12 Photophosphorylation in a chloroplast and _____ in mitochondria are similar processes.
1. oxidative phosphorylation
2. substrate-level phosphorylation
3. oxidative decarboxylation
4. hydrolysis

13 Identify the incorrect statement regarding adventitious roots.
1. They arise from any part of the plant other than radicle
2. They develop from nodes, internodes or leaves
3. Their main function is photosynthesis
4. They are usually found in monocots

14 Match the following column I with column II and select the correct option

	Column I		Column II
A.	Ladybird	(i)	Nucleopolyhedrovirus
B.	Bacillus thuringiensis	(ii)	Mosquito
C.	Baculoviruses	(iii)	Aphids
D.	Dragonflies	(iv)	Butterfly caterpillar

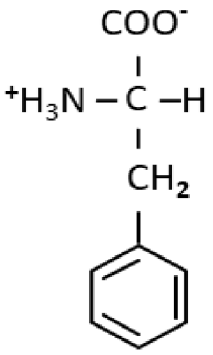
	A	B	C	D
1.	(iii)	(i)	(ii)	(iv)
2.	(ii)	(iv)	(iii)	(i)
3.	(iii)	(iv)	(i)	(ii)
4.	(ii)	(i)	(iii)	(iv)

BOTANY - SECTION B

15 Choose the mismatch from the following
1. Armyworm - Lepidopteran
2. Beetle - Coleopteran
3. Flies - Dipteran
4. Tobacco budworm - Coleopteran

16 Read the following statements and select the correct option.
Statement A: A male gamete moves towards the micropylar end and fuses with synergid cells to form a triploid primary endosperm nucleus.
Statement B: Embryo develops at the chalazal end of the embryo sac.
1. Only statement A is correct
2. Only statement B is correct
3. Both statements A and B are correct
4. Both statements A and B are incorrect

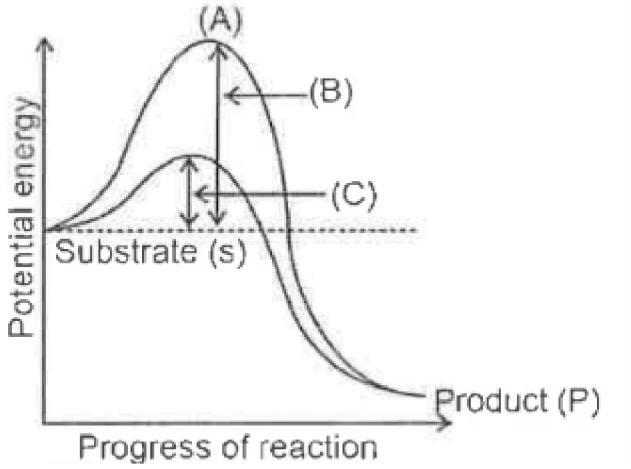
17 Identify the structure given below.



Select the correct option w.r.t. given compound.

1.	This forms the structural and functional unit of a nucleic acid.
2.	It is an aromatic amino acid.
3.	It is a conjugated lipid found in cell membrane.
4.	It has the same structural formula as that of serine.

18 Consider the figure given below and identify the labelled components (A-C) and select the correct option



	A	B	C
1.	Potential energy	Transition state	Activation energy with enzyme
2.	Activation energy without enzyme	Transition state	Potential energy
3.	Transition state	Activation energy without enzyme	Activation energy with enzyme
4.	Activation energy with enzyme	Activation energy without enzyme	Transition state

19

Given below are two statements:

Assertion (A):	Structure of amino acid changes according to pH of solution.
Reason (R):	Amino acids have two ionizable groups $-NH_2$ and -COOH that respond to pH fluctuations.

1.	Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.
2.	Both **(A)** and **(R)** are true but **(R)** is not the correct explanation of **(A)**.
3.	**(A)** is true but **(R)** is false.
4.	Both **(A)** and **(R)** are false.

20 All of the following are desirable qualities of transgenic plants except

1. Crops more tolerant to drought
2. Enhanced nutritional value
3. Pest resistant crops
4. Early exhaustion of fertility of soil

ZOOLOGY - SECTION A

21 Consider the following statements about the human genome project:

I:	The project began in 1990 supported by the United States Department of Energy
II:	It was completed in 2003
III:	The sequence of the last chromosome was published in 2006 Correct statements are

1.	**I, II** and **III**	2.	**I** and **III**
3.	**II** and **III**	4.	**I** and **II**

22 Identify a secondary consumer amongst the following:

1.	a carnivore	2.	a herbivore
3.	a plant	4.	All of the above

23

Given below are two statements:

Assertion (A):	Cartilaginous fishes have to swim constantly to avoid sinking.
Reason (R):	These fishes lack swim bladder which regulates buoyancy.

1.	Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.
2.	Both **(A)** and **(R)** are true but **(R)** is not the correct explanation of **(A)**.
3.	**(A)** is true but **(R)** is false.
4.	Both **(A)** and **(R)** are false.

24 Match Column-I with column-II and select the correct option

	Column-I		Column-II
a.	Progesterone	(i)	Iodothyronine
b.	Thyroxine	(ii)	Peptide hormone
c.	Epinephrine	(iii)	Amino-acid derivative
d.	Insulin	(iv)	Steroid hormone

1. a(iv), b(i), c(iii), c(ii)
2. a(ii), b(iii), c(iv), c(i)
3. a(iii), b(ii), c(i), c(iv)
4. a(iv), b(i), c(ii), c(iii)

25 Select the incorrect statement.

1.	Respiration is the catabolic process.
2.	When CO_2 concentration in blood decreases, breathing becomes shallower.
3.	Reducing in pH of blood will not alter the breathing rate.
4.	pO_2 in alveoli is always considerably less than that in the atmosphere.

26

Assertion:	Gene therapy is used to treat hereditary diseases like ADA deficiency.
Reason:	It replaces the defective mutant allele with a functional one.

1.	Both **(A)** and **(R)** are True and the **(R)** is the correct explanation of the **(A)**.
2.	Both **(A)** and **(R)** are True and the **(R)** is not the correct explanation of the **(A)**.
3.	**(A)** is True but **(R)** is False.
4.	Both **(A)** and **(R)** are False.

27 Read the following statements and choose the correct option

Statement A:	In Emphysema, the surface area of gaseous exchange is reduced
Statement B:	Due to excessive smoking, the walls of alveoli are damaged

1. Both statements are incorrect
2. Both statements are correct
3. Only statement A is incorrect
4. Only statement B is incorrect

28 Select the uncommon feature between Pheretima and Taenia.
1. Presence of bilateral symmetry
2. Both are triploblastic animals
3. Both are hermaprhodites
4. Internal fertilisation

29 Match the following and choose the correct option from below

	Column-I		Column-II
a.	Myasthenia gravis	(i)	Rapid spasms in muscles
b.	Tetany	(ii)	Inflammation of joints and accumulation of uric acid
c.	Gout	(iii)	Autoimmune disorder
d.	Osteoarthritis	(iv)	Degeneration of articular cartilage and proliferation of new bone

1. a(iii), b(ii), c(i), d(iv)
2. a(iii), b(i), c(ii), d(iv)
3. a(ii), b(i), c(iii), d(iv)
4. a(i), b(ii), c(iii), d(iv)

30 Select the incorrect statements w.r.t. the human kidney
1. Left kidney is placed a little higher than the right one
2. Retroperitoneal in position
3. Contains two million neurons each
4. Located in abdomen at the level of T_{12} to L_3

31 Select the incorrect match

1.	Gastrin	-	Stimulates gastric gland secretions
2.	CCK	-	Targets both pancreas and gall bladder
3.	Erythropoietin	-	Stimulates RBC production
4.	Cortisol	-	Inflammatory mineralocorticoid

32 Given below are two statements:

Assertion (A):	Na^+ reabsorption from glomerular filtrate occurs in PCT, ascending limb of loop of Henle and collecting duct
Reason (R):	Na^+ is always reabsorbed by passive process in PCT, ascending limb of loop of Henle and collecting duct

1. Both **(A)** and **(R)** are True and **(R)** is the correct explanation of **(A)**.
2. Both **(A)** and **(R)** are True but **(R)** is not the correct explanation of **(A)**.
3. **(A)** is True but **(R)** is False.
4. Both **(A)** and **(R)** are False.

33 Choose the odd one w.r.t. glands of the female reproductive system.

1. Batholon's gland
2. Mammary gland
3. Greater vestibular gland
4. Cowper's gland

34 Select the incorrect matching of three items and their grouping category

1. Ileum, ischium pubis - Form coxal bones of pelvic girdle
2. Actin, myosin, troponin - Muscle proteins
3. Malleus, incus, stapes - Ear osicles
4. Hyoid, zygomatic, sphenoid - Skull bones

ZOOLOGY - SECTION B

35 Select the wrong statement:

1. Isogametes are similar in structure, function, and behavior
2. Anisogametes differ either in structure, function of behavior
3. In Oomycetes female gamete is smaller and motile, while male gamete is larger and non-motile
4. *Chlamydomonas* exhibits both isogamy and anisogamy and *Fucus* shows oogamy

36 Identify the incorrectly matched pair.

1. polydactyly–autosomal dominant
2. cystic fibrosis–autosomal recessive
3. albinism–autosomal recessive
4. sickle cell anaemia–autosomal dominant

37 Which of the following statements is false?

1. The ovaries in frog are structurally and functionally connected with kidneys
2. A mature female frog can lay 2500 to 3000, unfertilised ova at a time
3. In male frog there are 10-12 vasa efferntia arise from testes and enter kidneys on their side and open into Bidder's canal
4. The eggs of frog are mesolecithal and telolecithal

38 Select the correct statement

1. The PNS is the site of information processing and control
2. All the nerves of the body associated with the PNS comprise the CNS
3. The autonomic neural system relays impulses from the CNS to the involuntary organs of the body
4. The CNS is divided into two divisions called sympathetic neural system and parasympathetic neural system

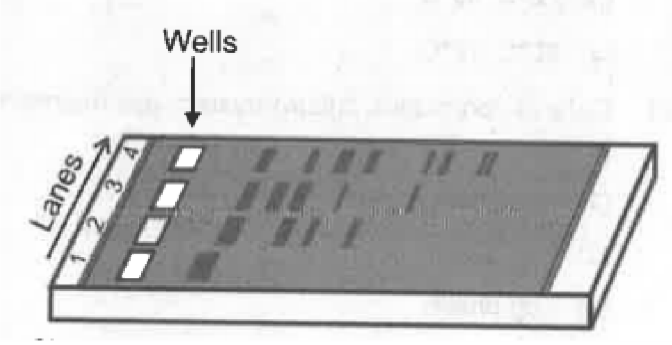
39 Read the following statements

Statement X:	An ideal contraceptive should be user-friendly, easily available, effective and irreversible with no or least side-effects
Statement Y:	'Nirodh' is a popular brand of condom for females

Choose the correct option regarding the above statements from the following

1. Both statements are correct
2. Both statements are incorrect
3. Only X is correct
4. Only Y is correct

40 The figure below is the diagrammatic representation of a typical agarose gel electrophoresis.



Choose the correct option.

1.	DNA fragments move towards anode because they are positively charged
2.	Separation of DNA fragments occurs due to sieving effect in gel
3.	Larger DNA fragment move faster than smaller fragments
4.	DNA fragments are visualized after staining with bromoethane in green light

CHEMISTRY - SECTION A

41 2-Methyl propene on oxidation with hot $KMnO_4$ gives:
1. Acetone
2. Ethanoic acid
3. CO_2 and H_2O
4. Both 1 & 3

42 The IUPAC name for $CH_3COCH_2COCH_3$ is:
1. Pentane-2,4-dione
2. Pentane-1,4-dione
3. Pentane-2,2-dione
4. Pentane-3,4-dione

43 The correct sequence of increasing orders of reactivity in nucleophilic addition reaction is:
1. Butanone < Propanone < Propanal < Ethanal
2. Butanone > Propanone > Propanal > Ethanal
3. Butanone < Propanal < Propanone < Ethanal
4. Propanal < Propanone < Ethanal < Butanone

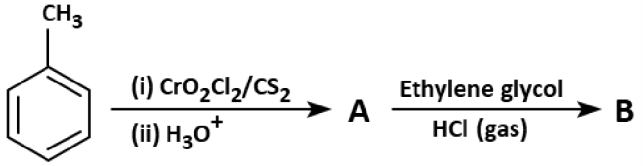
44 Select the correct option based on the statements below:

Assertion (A):	The geometry of formaldehyde molecule is planar.
Reason (R):	Formaldehyde molecule contains sp^2 hybridized carbon atom.

1.	Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.
2.	Both **(A)** and **(R)** are true but **(R)** is not the correct explanation of **(A)**.
3.	**(A)** is true but **(R)** is false.
4.	Both **(A)** and **(R)** are false.

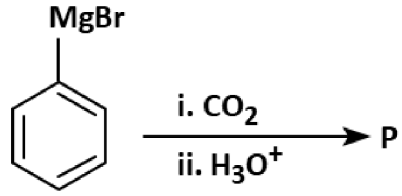
45 A compound that can be reduced to the corresponding hydrocarbon by Zn-Hg/ conc. HCl is:
1. Butan-2-one
2. Acetic acid
3. Acetamide
4. Ethyl acetate

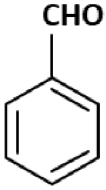
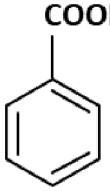
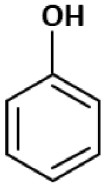
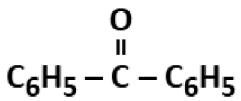
46 The final product 'B' in the below-mentioned reaction is:



1.	Ester	2.	Acetal
3.	Ketal	4.	Lactone

47 In the below reaction, product 'P' is:



1.		2.	
3.		4.	

48 The product 'B' in the below mentioned reaction is:

$$CH_3C \equiv N + H_2O \xrightarrow[\text{Excess}]{H^+} A \xrightarrow[\Delta]{NaOH + CaO} B$$

1. $CH_3-\overset{\overset{O}{\|}}{C}-NH_2$
2. $CH_3-\overset{\overset{O}{\|}}{C}-OH$
3. $CH_3-\overset{\overset{O}{\|}}{C}-ONa$
4. CH_4

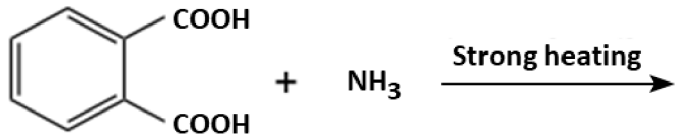
49 An organic compound (A) (molecular formula ($C_8H_{16}O_2$) gives a carboxylic acid (B) upon hydrolysis by dilute sulphuric acid and an alcohol (C). Oxidation of(C) with chromic acid produces(B). (C) on dehydration gives but-1-ene. Compound B is:

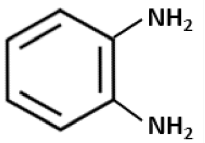
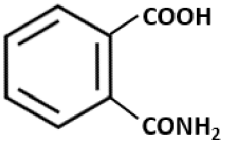
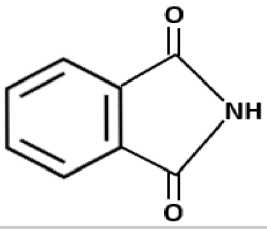
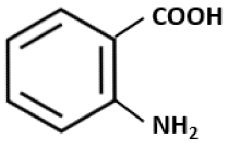
1.	Butanoic acid	2.	Propanoic acid
3.	Butanol	4.	Propanoic acid

50 The correct order of decreasing acid strength of trichloroacetic acid (A), trifluoroacetic acid (B), acetic acid (C), and formic acid (D) is:

1. B > A > D > C
2. B > D > C > A
3. A > B > C > D
4. A > C > B >D

51 The product of the below-mentioned reaction is:



1.		2.	
3.		4.	

52 The compounds that undergoes the Cannizzaro reaction are:

(i) Methanal
(ii) 2-Methylpentanal
(iii) Benzaldehyde
(iv) Benzophenone

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

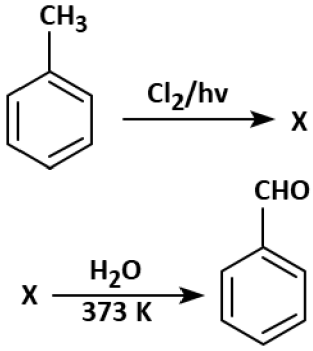
53 Match the acids given in Column I with their correct IUPAC names given in Column II.

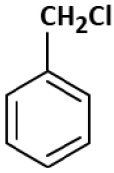
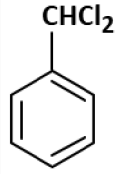
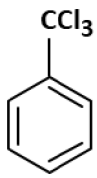
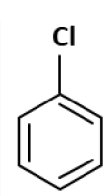
Column I (Acids)	**Column II (IUPAC names)**
A. Phthalic acid	**1**. Hexane-1,6-dioic acid
B. Glutaric acid	**2**. Benzene-1,2-dicarboxylic acid
C. Succinic acid	**3**. Pentane-1,5-dioic acid
D. Adipic acid	**4**. Butane-1,4-dioic acid

Codes

	A	**B**	**C**	**D**
1.	2	3	4	1
2.	3	1	4	2
3.	1	4	3	2
4.	4	3	2	1

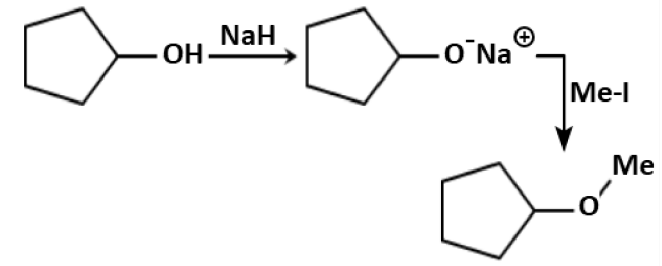
54 The product 'X' in the below mentioned reaction is:



1.		2.	
3.		4.	

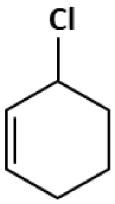
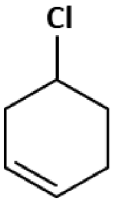
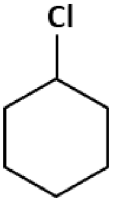
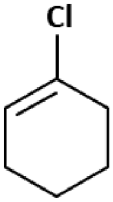
CHEMISTRY - SECTION B

55 The below-mentioned reaction can be classified as:

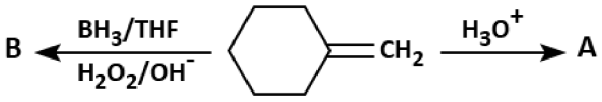


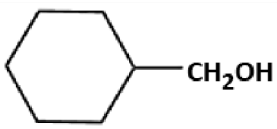
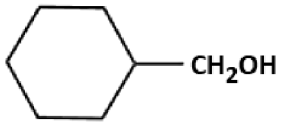
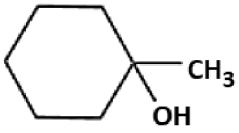
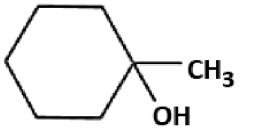
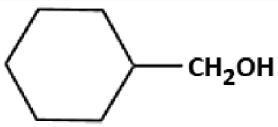
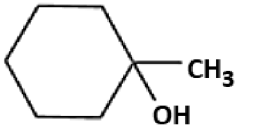
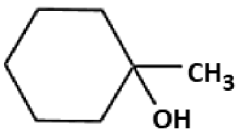
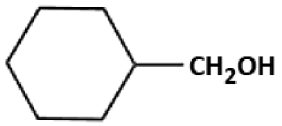
1. Alcohol formation reaction
2. Dehydration reaction
3. Williamson alcohol synthesis reaction
4. Williamson ether synthesis reaction

56 The compound among the following that most easily converted into a dehydrohalogenation state is:

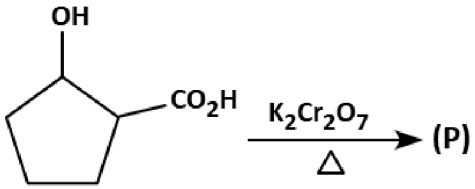
1.		2.	
3.		4.	

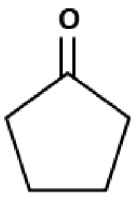
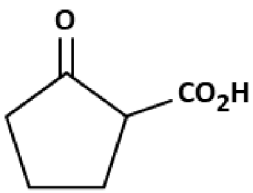
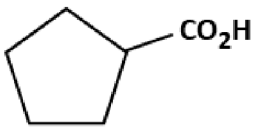
57 "A" and "B" are respectively:



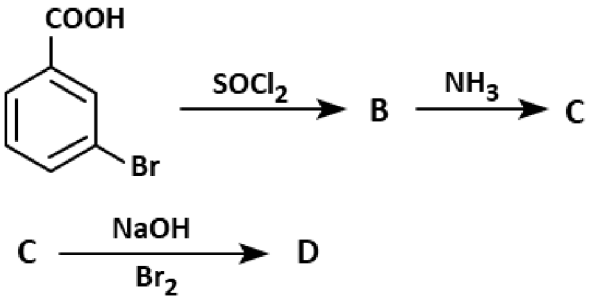
	A	B
1.		
2.		
3.		
4.		

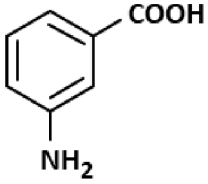
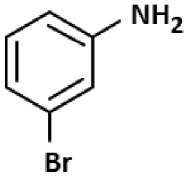
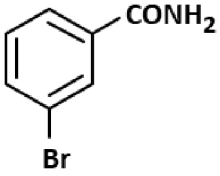
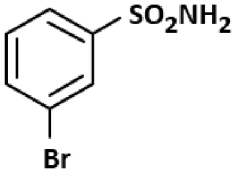
58 Product (P) is:



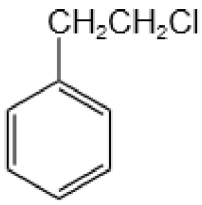
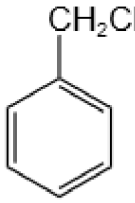
1.		2.	
3.		4.	

59 The product 'D' in the below-mentioned reaction will be:



1.		2.	
3.		4.	

60 A compound that does not undergo S_N1 reaction with OH^- is:

1.	CH_2=CH-CH_2Cl	2.	$(CH_3)_3CCl$
3.		4.	

PHYSICS - SECTION A

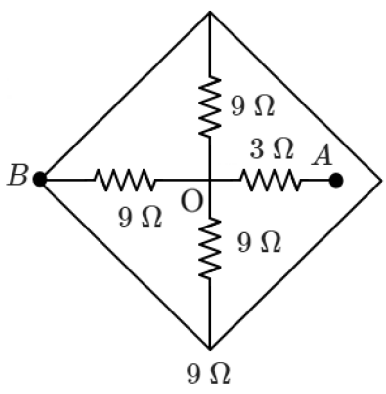
61 The average translational kinetic energy of O_2 (molar mass 32) molecules at a particular temperature is 0.048 eV. The translational kinetic energy of N_2 (molar mass 28) molecules in eV at the same temperature is:

1. 0.0015
2. 0.003
3. 0.048
4. 0.768

62 The resistance of a wire is R ohm. If it is melted and stretched to n times its original length, its new resistance will be:

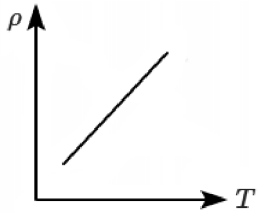
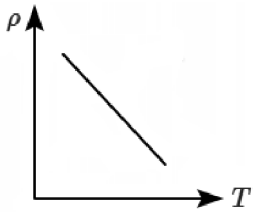
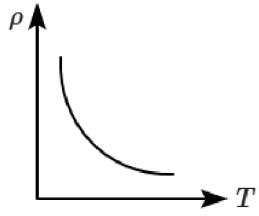
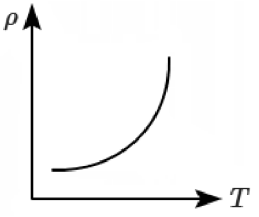
1. nR
2. $\frac{R}{n}$
3. n^2R
4. $\frac{R}{n^2}$

63 The equivalent resistance between A and B is:

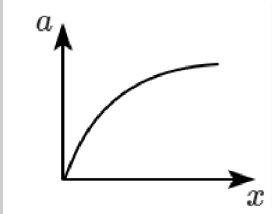
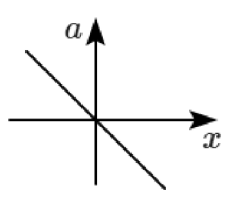
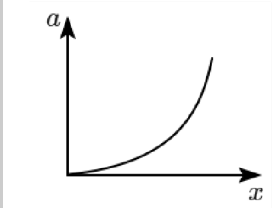
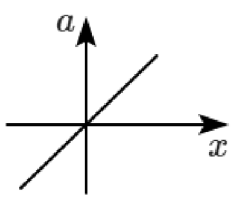


1. 3 Ω
2. 6 Ω
3. 9 Ω
4. 12 Ω

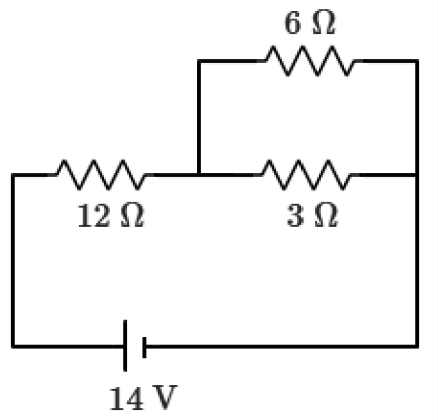
64 The dependence of resistivity (ρ) on the temperature (T) of a semiconductor is, roughly, represented by:

1.		2.	
3.		4.	

65 The variation of acceleration, a of a particle executing SHM with displacement x is:

1.		2.	
3.		4.	

66 Power consumed in the given circuit is P_1. On interchanging the position of 3 Ω and 12 Ω resistances, the new power consumption is P_2. The ratio of $\frac{P_2}{P_1}$ is:



1.	2	2.	$\frac{1}{2}$
3.	$\frac{3}{5}$	4.	$\frac{2}{5}$

67 Four point charges $-Q, -q, 2q$ and $2Q$ are placed, one at each corner of the square. The relation between Q and q for which the potential at the center of the square is zero, is:

1.	$Q = -q$	2.	$Q = -\frac{1}{q}$
3.	$Q = q$	4.	$Q = \frac{1}{q}$

68 A voltmeter of resistance 660 Ω reads the voltage of a very old cell to be 1.32 V while a potentiometer reads its voltage to be 1.44 V. The internal resistance of the cell is:
1. 30 Ω
2. 60 Ω
3. 6 Ω
4. 0.6 Ω

69 A hollow metal sphere of radius R is uniformly charged. The electric field due to the sphere at a distance r from the centre:

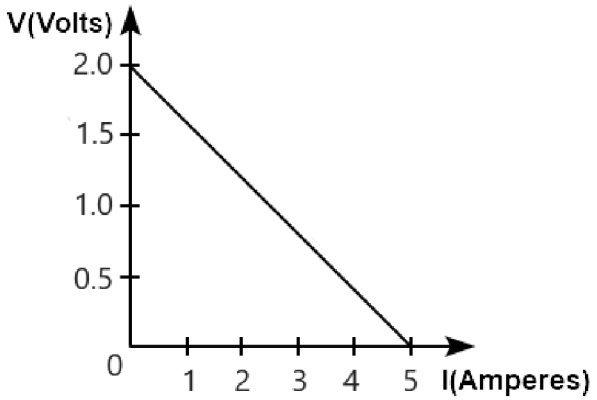
1.	decreases as r increases for $r < R$ and for $r > R$.
2.	increases as r increases for $r < R$ and for $r > R$.
3.	is zero as r increases for $r < R$, decreases as r increases for $r > R$.
4.	is zero as r increases for $r < R$, increases as r increases for $r > R$.

70 Internal resistance of a 2.1 V cell which gives a current of 0.2 A through a resistance of 10 Ω is:
1. 0.5 Ω
2. 0.8 Ω
3. 1.0 Ω
4. 0.2 Ω

71 The drift velocity of free electrons in a conductor is v when a current i is flowing in it. If both the radius and current are doubled, then the drift velocity will be:
1. v
2. $\frac{v}{2}$
3. $\frac{v}{4}$
4. $\frac{v}{8}$

72 For the travelling harmonic wave, $y(x,t) = 2.0\ cos\ 2\pi(10t - 0.0080x + 0.35)$ where x and y are in cm and t is in seconds. The phase difference between the oscillatory motion of two points separated by a distance of 4 m will be:
1. 0.8π rad
2. π rad
3. 6.4π rad
4. 4π rad

73 For a cell, the graph between the potential difference (V) across the terminals of the cell and the current (I) drawn from the cell is shown in the figure below. The emf and the internal resistance of the cell are, respectively:



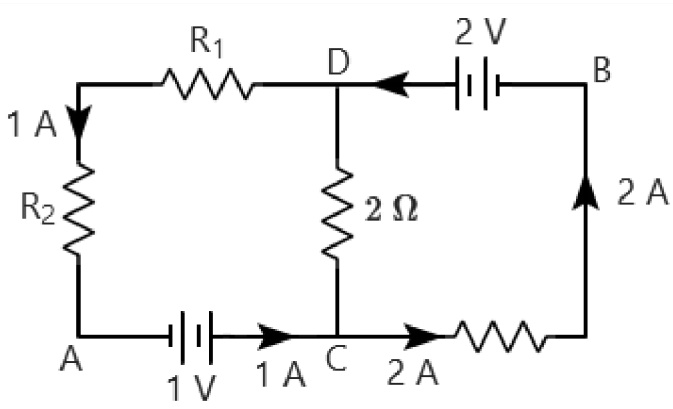
1. $2\ \text{V}, 0.5\ \Omega$
2. $2\ \text{V}, 0.4\ \Omega$
3. $> 2\ \text{V}, 0.5\ \Omega$
4. $> 2\ \text{V}, 0.4\ \Omega$

74 If the potential difference across ends of a metallic wire is doubled, the drift velocity of charge carriers will become:

1. double
2. half
3. four times
4. one-fourth

PHYSICS - SECTION B

75 In the circuit shown in the figure below, if the potential at point A is taken to be zero, the potential at point B will be:

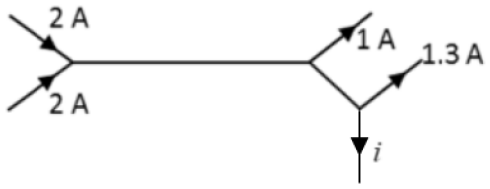


1. $+1\ \text{V}$
2. $-1\ \text{V}$
3. $+2\ \text{V}$
4. $-2\ \text{V}$

76 Three resistances P, Q, and R, each of $2\ \Omega$ and an unknown resistance S form the four arms of a Wheatstone bridge circuit. When the resistance of $6\ \Omega$ is connected in parallel to S, the bridge gets balanced. What is the value of S?

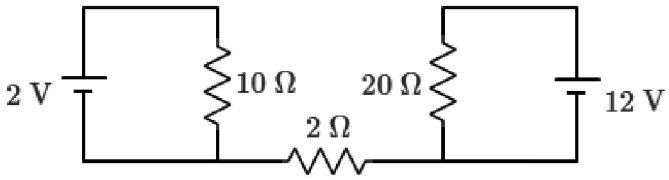
1. $2\ \Omega$
2. $3\ \Omega$
3. $6\ \Omega$
4. $1\ \Omega$

77 The figure below shows currents in a part of the electric circuit. The current i is:



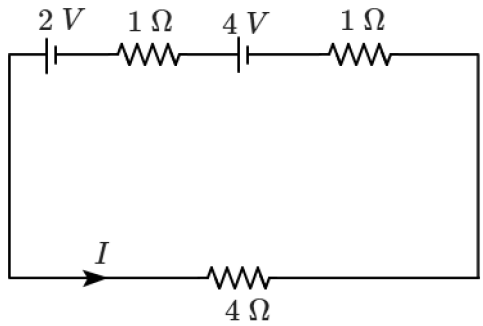
1. 1.7 A
2. 3.7 A
3. 1.3 A
4. 1 A

78 Current through the 2 Ω resistance in the electrical network shown is:



1.	zero	2.	1 A
3.	3 A	4.	5 A

79 For the circuit shown in the figure, the current I will be:



1. 0.75 A
2. 1 A
3. 1.5 A
4. 0.5 A

80 Given below two statements:

Statement I:	Kirchhoff's junction law follows the conservation of charge.
Statement II:	Kirchhoff's loop law follows the conservation of energy.

1.	Both **Statement I** and **Statement II** are wrong.
2.	**Statement I** is correct but **Statement II** is wrong.
3.	**Statement I** is wrong and **Statement II** is correct.
4.	Both **Statement I** and **Statement II** are correct.

Fill OMR Sheet*

*If above link doesn't work, please go to test link from where you got the pdf and fill OMR from there. After filling the OMR, you would get answers and explanations for the questions in the test.