BIOLOGY I - SECTION A

1 Which of the following statements is True?

(1) Cell plate represents the middle lamella between the walls of two adjacents cells
(2) At the time of cytokinesis, organelles like mitochondria and plastids get distributed between the daughter cells
(3) Cytokinesis in plant cell is centrifugal and takes place by cell-plate formation while animal cells by furrowing / cleavage and is centripetal
(4) All are correct

2 Synapsis occurs between

1. a male and a female gamete
2. *m*RNA and ribosomes
3. spindle fibres and centromere
4. two homologous chromosomes

3 Reduction in the number of chromosomes occurs during

1. Diplotene
2. Diakinesis
3. Metaphase I
4. Anaphase I

4 Following are the events occurs during meiosis :

(A) Appearance of chiasmata
(B) Synapsis
(C) Assembly of meiotic spindle
(D) Use of recombinase enzyme
Choose the correct sequence :-

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

5 The beginning of diplotene is recognized by :

1. appearance of recombination nodules
2. Crossing over
3. Dissolution of synaptonemal complex
4. Appearance of chiasmata

6 The complex formed by a pair of synapsed homologous chromosomes is

1. Dyad
2. Tetrad
3. Univalent
4. Bivalent

7 Metaphase I is different from mitotic metaphase as in the later case

1. Two metaphasic plates are formed
2. Tetrads are arranged at the equator
3. Single metaphasic plate is formed
4. Homologous chromosomes get separated from each other

8 During meiosis, the sister chromatids separate during:

(1) Anaphase II
(2) Anaphase I
(3) The S phase
(4) Synapsis

9 By the end of Prophase II, chromosomes become

(1) Compact
(2) Loose
(3) Elongated
(4) Decondensed

10 Microtubules attach to kinetochore of sister chromatids during

1. Anaphase-I
2. Prophase-II
3. Metaphase-II
4. Anaphase-II

11 The correct sequence of phases in cell cycle is:

1. $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$
2. $M \rightarrow G_1 \rightarrow G_2 \rightarrow S$
3. $G_1 \rightarrow G_2 \rightarrow S \rightarrow M$
4. $S \rightarrow G_1 \rightarrow G_2 \rightarrow M$

12 The centrioles replicate during:

1. G_1 phase
2. S phase
3. G_2 phase
4. Early prophase

13 During cell cycle, events are under

1. Genetic control
2. Metabolic control
3. Cytoplasmic control
4. Mitochondrial control

14 Spindle fibres attach on to

(1) Kinetochore of the chromosome
(2) centromere of the chromosome
(3) Kinetosome of the chromosome
(4) telomere of the chormosome

BIOLOGY I - SECTION B

15 Mark the **correct** statement:

1 The stage between two successive meiotic division is generally long lived
2 In plant cells, wall formation starts in the centre of the cell and grows outward to meet the existing lateral walls
3 Meiosis results in conservation of specific chromosomes number of each species across generations in asexually reproducing organisms
4 Telophase - I can last for months or year

16 Choose the correct statements –

I. Mitochondria and Chloroplast transfer energy.
II. Mitochondrion is a power-house of cell as it produces most of the cellular ATP.
III. Mitochondria and chloroplast are found in all eukaryotic cells.
IV. Mitochondria are the sites of anaerobic respiration.
V. The matrix of mitochondria posses a single linear DNA, many RNA molecules, 80S ribosomes.
1. IV and V
2. I, II
3. II, IV and V
4. III and V

17 Select the wrong statement.

(1) Bacterial cell wall is made up of peptidoglycan
(2) Pili and fimbriae are mainly involved in motility of bacterial cells
(3) Cyanobacteria lack flagellated cells
(4) Mycoplasma is a wall-less microorganism

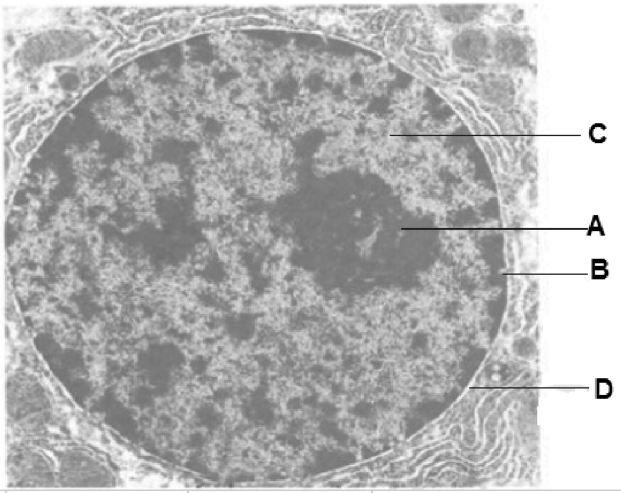
18 Match column I with column II.

Column I		Column II	
(a)	Golgi apparatus	(i)	Synthesis of protein
(b)	Lysosomes	(ii)	Trap waste and excretory products
(c)	Vacuoles	(iii)	Formation of glycoproteins and glycolipids
(d)	Ribosomes	(iv)	Digesting biomolecules

Choose the right match from the options given below:

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

19 The given diagram represents the four different structures which one of these is correct containing material and function:-



a.	Nucleolus	NOR	Synthesis of rRNA for formation of 80 S Ribosome
b.	Nuclear Pore	Chromatin	Exchange material between cytoplasm and nucleoplasm
c.	Nucleoplasm Protein	Nucleoplasmin	Formation of nuclear matrix
d.	Nuclear membrane	Ribosome	Cellulose synthesis

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

20 Read the following statements carefully

A. Lipid component of the plasma membrane mainly consists of phosphoglycerides.
B. Polar molecules can pass through the lipid bilayer of plasma membrane, therefore they do not require carrier proteins to facilitate their transport.
C. Secondary wall is capable of growth and it is formed on the outer side of the cell
D. Quasi fluid nature of lipid enables lateral movement of proteins within the overall lipid bilayer of plasma membrane
E. Middle lamella glues the different neighbouring cells together
How many statements are incorrect?
1. Three
2. Five
3. Four
4. Two

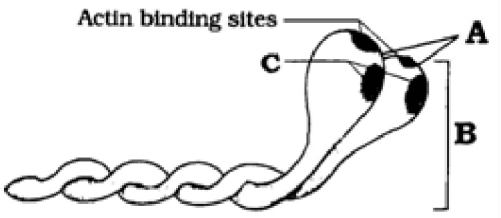
BIOLOGY II - SECTION A

21 Passage of ova through the female reproductive tract is
facilitated mainly by
(1) Amoeboid movement
(2) Ciliary movement
(3) Muscular movement only
(4) pseudopodial movement

22 Which of the following statements is not correct?
1. All locomotions are movements.
2. All movements are not locomotions
3. Animals and plants exhibit a wide range of movements
4. *Hydra* cannot use its tentacles for locomotion

23 Which of the following is not a feature of Visceral muscles?
1. Located in visceral organs of the body like the alimentary canal
2. No striations and smooth in appearance
3. Involuntary muscles
4. Transportation of food through Digested tract and maintenance of body postures are Main functions of it.

24



The above figure is related with myosin monomer (meromyosin). Identify A to C:
(1) A - head, B - cross arm, C - GTP binding sites
(2) A - head, B - cross arm, C - Ca^{+2} binding sites
(3) A - head, B - cross arm, C - ATP binding sites
(4) A - cross arm, B - head, C - ATP binding sites

25 Which of the following is not true regarding M line?
(1) Thin membrane
(2) Fibrous
(3) Holds thick filament of A band
(4) Keeps the Actin filament in centre

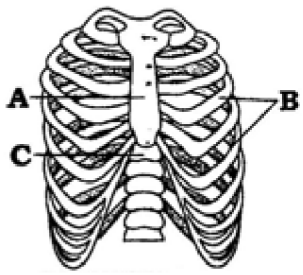
26 During contraction of muscle fibers which of the following does not happen?
1. The length of the A band gets reduced
2. The attached actin Filaments are pulled towards the centre of A band
3. The Z line attached to actin Filaments is pulled inward
4. Shortening of sarcomere

27 Sliding filament theory can be best explained as
1. when myofilaments slide pass each other actin filaments shorten while myosin filament do not shorten
2. actin and myosin filaments shorten and slide pass each other
3. actin and myosin filaments do not shorten but rather slide pass each other
4. when myofilament slide pass each other myosin filament shorten while actin filaments do not shorten

28 Identify the incorrectly matched pair:

	Disease	Cause
1.	Myasthenia gravis	Antibodies against neuromuscular junction
2.	Tetany	Hypocalcemia
3.	Osteoporosis	Hypoparathyroidism
4.	Gout	Accumulation of uric acid crystals

29



The figure is of rib cage. Identify A, B and C respectively:
(1) Coccyx, ribs, vertebral column
(2) Sternum, ribs, vertebral column
(3) Scapula, ribs, vertebral column
(4) Tarsal, ribs, vertebral column

30 Which of the following is correct formula for vertebral column bones?
(1) C7 T12 L5 S1- fused Co-1 fused
(2) C8 T12 L5 S2- fused Co-1 fused
(3) C6 T10 L5 S3- fused Co-2 fused
(4) C7 T10 L7 S-1 fused Co-1 fused

31 The total number of bones in the limb of a man is
1. 24
2. 30
3. 14
4. 21

32 Consider the following statements:
I. Proximal radioulnar joint is a type of ellipsoidal joint.
II. The first carpo-metacarpal joint is a saddle joint.
III. Gleno-humeral joint is a ball and socket joint.
Which of the above statements are true?
1. I and II only
2. I and III only
3. II and III only
4. I, II, and III

33 How many ear ossicles are there in humans?
(1) 6
(2) 8
(3) 4
(4) 12

34 Match the following

Column I	Column II
a. Tarsal	(i) 14
b. Phalanges	(ii) 1
c. Meta tarsal	(iii) 7
d. Femur	(iv) 5

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

BIOLOGY II - SECTION B

35 Which of the following is required for the breaking of cross-bridge during muscle contraction?
1. ATP and Ca^{++}
2. ADP and Ca^{++}
3. Only Ca^{++}
4. ATP only

36 Which one of the following statements is incorrect?

1. The medullary zone of the kidney is divided into a few conical masses called medullary pyramids projecting into calyces.
2. Inside the kidney the cortical region extends in between the medullary pyramids as renal pelvis.
3. glomerulus along with Bowman's capsule is called the renal corpuscle.
4. Renal corpuscle, proximal convoluted tubule (PCT), and distal convoluted tubule (DCT) of the nephron are situated in the cortical region of the kidney.

37 Consider the following statements :

I. Many bony fishes, aquatic amphibians, and aquatic insects are ammonotelic.
II. Mammals, many terrestrial amphibians, and cartilaginous fishes are ureotelic.
III. Reptiles, birds, land snails, and insects are uricotelic.
Which of the above statements are true?

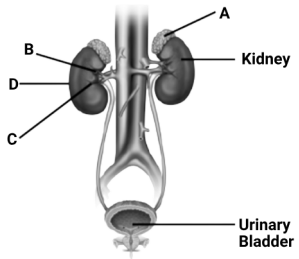
1. I and II only
2. I and III only
3. II and III only
4. I, II and III

38 Match the terms given in Column-I with their physiological processes given in column-II and choose the correct answer:

	Column-I		Column-II
(A)	Proximal convoluted tubule	(i)	Formation of concentrated urine
(B)	Distal convoluted tubule	(ii)	Filtration of blood
(C)	Henle's loop	(iii)	Reabsorption of 70-80% of electrolytes
(D)	Counter-current mechanism	(iv)	Ionic balance
(E)	Renal corpuscle	(v)	Maintainance of a concentration gradient in the medulla

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

39 Figure shows a human urinary system with structures labelled A to D. Select option which correctly identifies them and gives their characteristics and/or functions.



1.	B-pelvis - broad funnel-shaped space inner to the hilum, directly connected to loops of Henle.
2.	C- Medulla- inner zone of kidney and contains complex nephrons.
3.	D- Cortex- outer part of the kidney and does not contain any part of nephrons.
4.	A- Adrenal gland- located at the anterior part of the kidney; secretes catecholamines which stimulate glycogen breakdown.

40 Ketonuria : Ketone bodies in urine : : Uremia : _____.
Complete the analogy.

1. Elevated urea in circulating blood
2. Excretion of urea in urine
3. Deposits of uric acid in bones
4. Failure of urea production by liver

CHEMISTRY - SECTION A

41 The oxidation number of sulphur and nitrogen in H_2SO_5 and NO_3^- are respectively-

1. +6, +5
2. -6, -6
3. +8, +6
4. -8, -6

42 Which of the following reactions does not represent a redox change?

1. $CaCO_3 \rightarrow CaO + CO_2$
2. $2H_2 + O_2 \rightarrow 2H_2O$
3. $Na + H_2O \rightarrow NaOH + \frac{1}{2}H_2$
4. $MnCl_3 \rightarrow MnCl_2 + \frac{1}{2}Cl_2$

43 Which of the following displays a disproportionation reaction?

(a) $2\,Cu^{+} \rightarrow Cu^{2+} + Cu^{0}$

(b) $3\,MnO_4^{2-} + 4H^{+} \rightarrow 2\,MnO_4^{-} + MnO_2 + 2H_2O$

(c) $2\,KMnO_4 \xrightarrow{\Delta} K_2\,MnO_4 + MnO_2 + O_2$

(d) $2\,MnO_4^{-} + 3\,Mn^{2+} + 2H_2O \rightarrow 5\,MnO_2 + 4H^{\oplus}$

1. (a) and (d) only
2. (a) and (b) only
3. (a), (b) and (c)
4. (a), (c) and (d)

44 In the given balanced chemical reaction,

$IO_3^{-} + aI^{-} + bH^{+} \rightarrow cH_2O + dI_2$

The values of a, b, c, and d respectively are-

1. 5, 6, 3, 3
2. 5, 3, 6, 3
3. 3, 5, 3, 6
4. 5, 6, 5, 5

45 In an alkaline medium ClO_2 oxidize H_2O_2 in O_2 and reduces itself in Cl^{-}. How many moles of H_2O_2 will be oxidized by one mole of ClO_2?

1. 1.0
2. 1.5
3. 2.5
4. 3.5

46 Oxidation number of oxygen in potassium super oxide (KO_2) is-

1. – 2
2. – 1
3. – 1/2
4. – 1/4

47 The incorrect statement regarding the rule to find the oxidation number among the following is-

1.	The oxidation number of hydrogen is always +1.
2.	The algebraic sum of all the oxidation numbers carried by elements in a compound is zero.
3.	An element in its free or uncombined state has an oxidation number of zero.
4.	Generally, in all its compounds, the oxidation number of fluorine is -1.

48 Which is the correct set that can only act as an oxidant?

1. NO_3^{-}, SO_3, Na
2. Fe^{+3}, NO_3^{-}, SO_3
3. I^{-}, Na
4. I^{-}, NO_3^{-}

49 In the reactions given below, thiosulphate reacts differently with iodine than with bromine.

$2S_2O_3^{2-} + I_2 \rightarrow S_4O_6^{2-} + 2I^{-}$

$S_2O_3^{2-} + 2\,Br_2 + 5H_2O \rightarrow 2\,SO_4^{2-} + 2\,Br^{-} + 10H^{+}$

Which of the following statements best describes the above dual behaviour of thiosulphate?

1.	Bromine is a stronger oxidant than iodine
2.	Bromine is a weaker oxidant than iodine
3.	Thiosulphate undergoes oxidation by bromine and reduction by iodine in these reactions
4.	Bromine undergoes oxidation and iodine undergoes reduction in these reactions

50

Given below are two statements:

Assertion (A):	The decomposition of hydrogen peroxide to form water and oxygen is an example of a disproportionation reaction.
Reason (R):	The oxygen of peroxide is in –1 oxidation state and it is converted to zero oxidation state in O_2 and –2 oxidation state in H_2O.

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.	**(A)** is false but **(R)** is true.

51 The number of moles of MnO^{-}_4 required to oxidise one mole of ferrous oxalate completely in an acidic medium is-

1. 0.6 mole
2. 0.4 mole
3. 7.5 moles
4. 0.2 mole

52 Standard reduction potentials of the half-reactions are given below:

$F_{2(g)} + 2e^- \rightarrow 2F^-_{(aq)}$; $E^\circ = +2.85\ V$

$Cl_{2(g)} + 2e^- \rightarrow 2Cl^-_{(aq)}$; $E^\circ = +1.36\ V$

$Br_{2(g)} + 2e^- \rightarrow 2Br^-_{(aq)}$; $E^\circ = +1.06\ V$

$I_{2(g)} + e^- \rightarrow 2I^-_{(aq)}$; $E^\circ = +0.53\ V$

The strongest oxidizing and reducing agents, respectively, are:

1. $Br_2\ and\ Cl^-$
2. $Cl_2\ and\ Br^-$
3. $Cl_2\ and\ I_2$
4. $F_2\ and\ l^-$

53 The standard electrode potential (E°) values of Al^{3+}/ Al, Ag^+ / Ag, K^+ / K, and Cr^{3+} / Cr are -1.66 V, 0.80 V, -2.93 V, & -0.79 V respectively. The correct decreasing order of the reducing power of the metal is-

1. Ag > Cr > Al > K
2. K > Al > Cr > Ag
3. K > Al > Ag > Cr
4. Al > K > Ag > Cr

54 Consider the given data:

$E_{Fe^{3+}/Fe^{2+}} = 0.77;\ E_{I^-/I_2} = -0.54$

$E_{Ag^+/Ag} = 0.80;\ E_{Cu/Cu^{2+}} = -0.34$

$E_{Fe^{3+}/Fe^{2+}} = 0.77;\ E_{Cu/Cu^{2+}} = -0.34$

$E_{Ag/Ag^+} = -0.80;\ E_{Fe^{3+}/Fe^{2+}} = 0.77$

Using the electrode potential values given above, identify the reaction which is not feasible:

1.	$Fe^{3+}_{(aq)}$ and $I^-_{aq)}$
2.	$Ag^+_{(aq)}$ and $Cu_{(s)}$
3.	$Fe^{3+}_{(aq)}$ and $Cu_{(s)}$
4.	$Ag_{(s)}$ and $Fe^{3+}_{(aq)}$

CHEMISTRY - SECTION B

55 Consider the following two reactions :

$NO(g) + \frac{1}{2}O_2(g) \rightleftharpoons NO_2(g);\ K_1 = 4 \times 10^{-3}$

$2NO_2(g) \rightleftharpoons 2NO(g) + O_2(g);\ K_2 = ?$

If K_1 and K_2 are equilibrium constants, the value of K_2 will be:

1. 6.25×10^4
2. 2.5×10^2
3. 4×10^{-3}
4. 1.6×10^2

56 For the reaction 2A(g) + B(g) → 2D(g) ; ΔU° = -10.5 kJ and ΔS° = - 44.1 J K^{-1}, the value of ΔG° for the given reaction would be-

1. 1.6 J
2. -0.16 kJ
3. 0.16 kJ
4. 1.6 kJ

57 Which element exhibits both positive and negative oxidation states?

1. Cs
2. Ne
3. I
4. F

58 An incorrect statement about equilibrium among the following is:

1.	Equilibrium is possible only in a closed system at a given temperature.
2.	All measurable properties of the system remain constant.
3.	All the physical processes stop at equilibrium.
4.	The opposing processes occur at the same rate and there is a dynamic but stable condition.

.

59

$\frac{1}{2}N_{2\,(g)} + \frac{1}{2}O_{2\,(g)} \rightarrow NO_{(g)}$;

$\Delta_r H^\circ = 90\ kJ\ mol^{-1}$

$NO_{(g)} + \frac{1}{2}O_{2\,(g)} \rightarrow NO_{2\,(g)}$;

$\Delta_r H^\circ = -74\ kJ\ mol^{-1}$

The thermodynamic stability of $NO_{(g)}$ based on the above data is-

1. Less than $NO_{2(g)}$
2. More than $NO_{2(g)}$
3. Equal to $NO_{2(g)}$
4. Insufficient data

60 The oxidising agent and reducing agent in the given reaction are :

$Cl_2O_{7\,(g)} + 4H_2O_{2\,(aq)} + 2\,OH^-_{(aq)} \rightarrow$

$2\,ClO^-_{2\,(aq)} + 4O_{2\,(g)} + 5H_2O_{(l)}$

1. Oxidizing agent = H_2O_2; Reducing agent = Cl_2O_7
2. Oxidizing agent = Cl_2O_7; Reducing agent = H_2O_2
3. Oxidizing agent = H_2O_2; Reducing agent = H_2O_2
4. None of the above

PHYSICS - SECTION A

61 If the velocity of a particle is $v = At + Bt^2$, where A and B are constants, then the distance travelled by it between 1 s and 2 s is:

1. $3A + 7B$
2. $\frac{3}{2}A + \frac{7}{3}B$
3. $\frac{A}{2} + \frac{B}{3}$
4. $\frac{3}{2}A + 4B$

62 Consider the motion of the tip of the second hand of a clock. In one minute (assuming R to be the length of the second hand), its:

1.	displacement is $2\pi R$
2.	distance covered is $2R$
3.	displacement is zero.
4.	distance covered is zero.

63 Choose the incorrect alternative:

1.	Newton's first law is the law of inertia.
2.	Newton's first law states that if the net force on a system is zero, the acceleration of any particle of the system is not zero.
3.	Action and reaction act simultaneously.
4.	The area under the force-time graph is equal to the change in momentum.

64 A block of mass 10 kg, moving in the x-direction with a constant speed of 10 ms^{-1}, is subjected to a retarding force $F = 0.1x$ J/m during its travel from $x = 20$ m to 30 m. Its final kinetic energy will be:

1. 475 J
2. 450 J
3. 275 J
4. 250 J

65 The coordinates of the position of masses $m_1 = 7$ gm, $m_2 = 4$ gm, $m_3 = 10$ gm are $\vec{r}_1 = (\hat{i} + 5\hat{j} - 3\hat{k})$, $\vec{r}_2 = (2\hat{i} + 5\hat{j} + 7\hat{k})$, $\vec{r}_3 = (3\hat{i} + 3\hat{j} - \hat{k})$ respectively in cm. The position of the centre of mass of the system would be:

1. $\left(-\frac{15}{7}, \frac{85}{17}, \frac{1}{7}\right)$ cm
2. $\left(\frac{15}{7}, -\frac{85}{17}, \frac{1}{7}\right)$ cm
3. $\left(\frac{15}{7}, \frac{85}{21}, -\frac{1}{7}\right)$ cm
4. $\left(\frac{15}{7}, \frac{85}{21}, \frac{7}{3}\right)$ cm

66 The distance of a planet from the sun is 5 times the distance between the earth and the sun. The time period of the planet is:

1. $5^{3/2}$ *years*
2. $5^{2/3}$ *years*
3. $5^{1/3}$ *years*
4. $5^{1/2}$ *years*

67 A planet moves around the sun. At a point P, it is closest to the sun at a distance d_1 and has speed v_1. At another point Q, when it is farthest from the sun at distance d_2, its speed will be:

1. $\frac{d_2 v_1}{d_1}$
2. $\frac{d_1 v_1}{d_2}$
3. $\frac{d_1^2 v_1}{d_2}$
4. $\frac{d_2^2 v_1}{d_1}$

68 Two spheres of masses m and M are situated in air and the gravitational force between them is F. If the space around the masses is filled with a liquid of specific density 3, the gravitational force will become:

1. $3F$
2. F
3. $F/3$
4. $F/9$

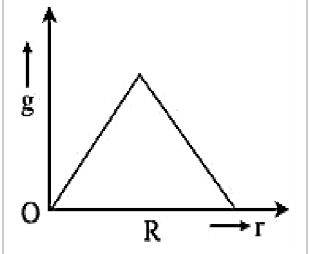
69 Mass M is divided into two parts xM and $(1-x)M$. For a given separation, the value of x for which the gravitational attraction between the two pieces becomes maximum is:

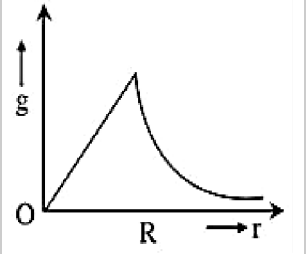
1. $\frac{1}{2}$
2. $\frac{3}{5}$
3. 1
4. 2

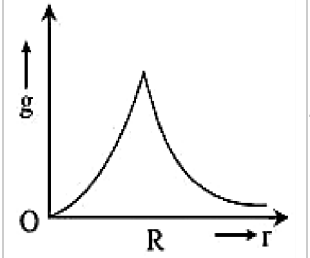
70 Two particles of mass m and 4m are separated by a distance r. Their neutral point is at:

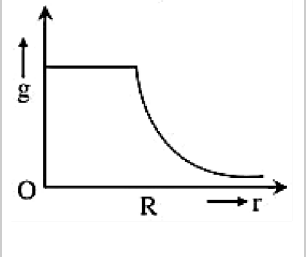
1. $\frac{r}{2}$ from m
2. $\frac{r}{3}$ from 4m
3. $\frac{r}{3}$ from m
4. $\frac{r}{4}$ from 4m

71 Starting from the centre of the earth having radius R, the variation of g (acceleration due to gravity) is shown by:

1. 

2. 

3. 

4. 

72 What is the depth at which the value of acceleration due to gravity becomes $\frac{1}{n^{th}}$ time it's value at the surface of the earth? (radius of the earth = R)

1. $\frac{R}{n^2}$
2. $\frac{R(n-1)}{n}$
3. $\frac{Rn}{(n-1)}$
4. $\frac{R}{n}$

73 The density of a newly discovered planet is twice that of the earth. The acceleration due to gravity at the surface of the planet is equal to that at the surface of the earth. If the radius of the earth is R, the radius of the planet would be:

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

74 The gravitational potential energy of an isolated system of three particles, each of mass m placed at three corners of an equilateral triangle of side l is:

1. $\frac{-Gm}{l^2}$
2. $\frac{-Gm^2}{2l}$
3. $\frac{-2Gm^2}{l}$
4. $\frac{-3Gm^2}{l}$

PHYSICS - SECTION B

75 An artificial satellite moving in a circular orbit around the earth has a total (kinetic + potential) energy E_0 . Its potential energy is?

1. $-E_0$
2. 1. 5 E_0
3. $2E_0$
4. E_0

76 If the radius of a planet is R and its density is ρ , the escape velocity from its surface will be:

1. $v_e \propto \rho R$
2. $v_e \propto \sqrt{\rho} R$
3. $v_e \propto \frac{\sqrt{\rho}}{R}$
4. $v_e \propto \frac{1}{\sqrt{\rho} R}$

77 The escape velocity for a rocket from the earth is 11.2 km/s. Its value on a planet where the acceleration due to gravity is double that on the earth and the diameter of the planet is twice that of the earth (in km/s) will be:
1. 11.2
2. 5.6
3. 22.4
4. 53.6

78 A particle is located midway between two point masses each of mass M kept at a separation 2d. The escape speed of the particle is: (neglect the effect of any other gravitational effect)
1. $\sqrt{\frac{2GM}{d}}$
2. $2\sqrt{\frac{GM}{d}}$
3. $\sqrt{\frac{3GM}{d}}$
4. $\sqrt{\frac{GM}{2d}}$

79 If the gravitational force between two objects were proportional to $\frac{1}{R}$ (and not as $1/R^2$) where R is the separation between them, then a particle in circular orbit under such a force would have its orbital speed v proportional to:
1. $1/R^2$
2. R°
3. R^1
4. $1/R$

80 Time period of a satellite revolving above Earth's surface at a height equal to R (the radius of Earth) will be:
(g is the acceleration due to gravity at Earth's surface)
1. $2\pi\sqrt{\frac{2R}{g}}$
2. $4\sqrt{2}\pi\sqrt{\frac{R}{g}}$
3. $2\pi\sqrt{\frac{R}{g}}$
4. $8\pi\sqrt{\frac{R}{g}}$

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.