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शालेय शिक्षण व क्रीडा विभाग  
राज्य शैक्षणिक संशोधन व प्रशिक्षण परिषद, महाराष्ट्र  
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संपर्क क्रमांक (०२०) २४४७ ६९३८

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## Question Bank

Standard:- 12<sup>th</sup> (Science)

Subject:- BIOLOGY (056)

### March 2021

सूचना

१. फक्त विद्यार्थ्यांना प्रश्नप्रकारांचा सराव करून देण्यासाठीच
२. सदर प्रश्नसंचातील प्रश्न बोर्डाच्या प्रश्नपत्रिकेत येतीलच असे नाही याची नोंद घ्यावी.

**BIOLOGY (056)**

**QUESTION BANK**

<b>Question no.</b>	<b>Question</b>	<b>Marking scheme</b>	<b>Chapter No.</b>	<b>Page No.</b>
<b>MCQ</b>				
<b>1</b>	<p>The outer layer of pollen grain is thick and made up of complex ,non-biodegradable substance called as.....</p> <p>A. lignin B. cellulose C. pectin <b>D. Sporopollenin</b></p>	<p>Correct answer 1 mark</p>	1	3
<b>2</b>	<p>Sporoderm is made up of .....</p> <p>A. exosporium and endosporium B. outer integuments and inner integument C. testa and tegmen <b>D. exine and intine</b></p>	<p>Correct answer 1 mark</p>	1	3
<b>3</b>	<p>The number of meiotic and mitotic divisions necessary for development of female gametophyte in angiosperms is...</p> <p>A. 1 meiosis and 2 mitosis B. 1 mitosis and 3 meiosis C. 1 meiosis and 1 mitosis <b>D. 1 meiosis and 3 mitosis.</b></p>	<p>Correct answer 1 mark</p>	1	5
<b>4</b>	<p>Identify the odd one with respect to pollinating agent.</p> <p>A. Baobab <b>B. Bottle brush</b> C. Kadamb D. Sausage</p>	<p>Correct answer 1 mark</p>	1	8

5	In vitro pollen germination and pollen tube elongation can be induced by----- - A. boric acid B. glucose C. lactose <b>D. sucrose</b>	Correct answer 1 mark	1	9
6	Self-incompatibility is found in flowers of plants..... A. <i>Calotropis</i> B. maize <b>C. Thea</b> D. <i>Gloriosa</i>	Correct answer 1 mark	1	9
7	Porogamy refers to entry of pollen tube through..... A. integuments B. chalaza <b>C. micropyle</b> D. stigma	Correct answer 1 mark	1	10
8	..... is an example of helobial endosperm. A. <i>Adoxa</i> B. coconut <b>C. <i>Asphodelus</i></b> D. sunflower	Correct answer 1 mark	1	11
9	The single shield shaped cotyledon in monocot seed is known as ..... A. coleoptile <b>B. scutellum</b> C. aleurone layer D. perisperm	Correct answer 1 mark	1	13
10	The example of dicot endospermic seed is ....	Correct answer 1 mark	1	13

	A. castor B. pea C. mango D. bean			
	<b>Single sentence answers</b>	<b>Key word in answer</b>		
<b>1</b>	Why anther is called as tetrasporangiate structure?	Presence of four pollen sacs in dithecous anther	1	3
<b>2</b>	At which stage pollen grains are shed from the anther in Angiosperms?	Bicelled stage	1	4
<b>3</b>	What is hilum with respect to ovule?	Place of attachment of funiculus with main body of ovule.	1	4
<b>4</b>	What is protandry?	Condition where androecium matures earlier than the gynoecium	1	9
<b>5</b>	Name any one plant in which double fertilization was discovered?	<i>Fritillaria</i> or <i>Lilium</i>	1	10
<b>6</b>	Why fertilization process in angiosperms is called as double fertilization?	Both male gametes are used.	1	10
<b>7</b>	Which is the most common type of endosperm in angiospermic families?	Nuclear type	1	11
<b>8</b>	What is the role of suspensor during the development of embryo?	Pushes embryo into the endosperm	1	12
<b>9</b>	What is adventive polyembryony?	Embryo develops from somatic cells or integuments	1	14
<b>10</b>	Name the hormone produced by unfertilised ovary responsible for enlargement of ovary into fruit.	Indole -3 acetic acid / auxins	1	15

<b>2 marks</b>				
<b>1</b>	Draw a well labelled diagram of T.S. anther.	Four correct labels  ½ mark each	1	3
<b>2</b>	Describe the structure of pollen grain.	Wall layers, ploidy and fate of pollen grain.  Formation through meiosis.  Each point ½ mark	1	3
<b>3</b>	Draw a well labelled diagram of male gametophyte of angiosperms.	Diagram-1 mark,  Any two correct labels (male gamete, tube nucleus and pollen tube) ½ mark each.	1	4
<b>4</b>	Describe the structure of female gametophyte of angiosperms.	4 points  ½ mark each	1	5
<b>5</b>	Mention various adaptations for wind pollination.	Any four points  ½, mark each.	1	6
<b>6</b>	What are the different adaptations shown by bird pollinated flowers?	Any four points  ½ mark each	1	8
<b>7</b>	Explain heterostyly and herkogamy with suitable example.	Meaning ½ mark and example ½ mark each.	1	9
<b>8</b>	Give the significance of double fertilization.	Any four points, ½ mark each	1	10 & 11
<b>9</b>	Mention significance of fruit and seed formation.	Two points 2 marks	1	14
<b>10</b>	Give an account of polyembryony.	Meaning-1/2 mark  Reason-1/2 mark	1	15

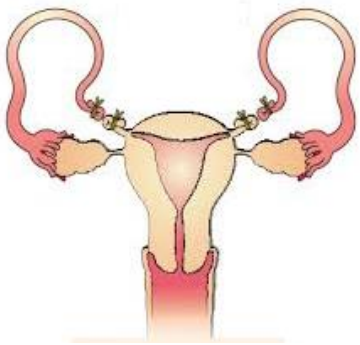
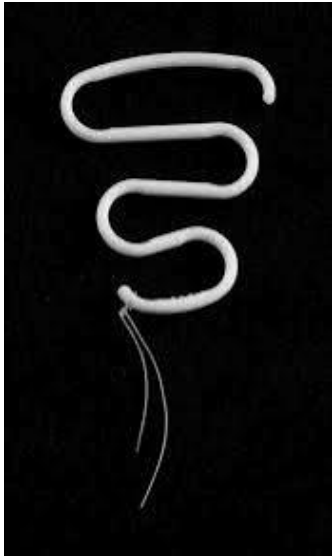
		Types ½ mark each		
<b>3 marks</b>				
<b>1</b>	Describe internal structure of anther (diagram is not expected).	Three wall layers -1/2 mark each  Tapetum-structure and function-1 marks  Pollen mother cell nature/function-1/2 mark	1	3
<b>2</b>	Explain the development of male gametophyte in angiosperms (diagram is not expected).	Development inside anther-1 and ½ marks  Development over stigma-1 and 1/1 marks	1	4
<b>3</b>	Explain water pollination in detail with its types.	Definition-1 mark  Each type with example-1 mark	1	7
<b>4</b>	Give an account of any two biotic agents for pollination along with their adaptations.	Three adaptations for each agency- 1 and ½ mark	1	7/8
<b>5</b>	Explain any two contrivances or outbreeding devices for pollination.	1 and ½ marks for correct contrivances.	1	8/9
<b>6</b>	Describe the process of fertilization in angiosperms with the help of diagram.	Process – 2 marks  Diagram-1 mark	1	10
<b>7</b>	Write a note on different types of endosperms in angiosperms.	Each type -1 mark	1	11
<b>8</b>	Describe the development of dicot embryo in flowering plants.	six sequential stages carrying ½ mark each	1	11/12
<b>9</b>	Draw a well labelled diagram of monocot seed you have studied.	Any six labels-1/2 mark each	1	13

<b>10</b>	Explain various categories of apomixis.	1 mark each type	1	14
<b>4 marks</b>				
<b>1</b>	Describe the structure of anatropus ovule with the help of labelled diagram.	Structure -2 marks Diagram with four correct labels -2 marks	1	4
2	Describe the development of female gametophyte of angiosperms with the help of diagram.	Process upto 7 celled 8 nucleate stage -2 marks Sequential diagrams -2 marks	1	5
3	Give an account of various abiotic agencies used in pollination along with their adaptations for pollination.	2 marks for each agency	1	6/7
4	Give an account of pollen pistil interaction in detail.	Meaning- 1 mark Recognition of pollen and germination – 1 mark significance- 1 mark	1	9
5	Describe the process of double fertilization in angiosperms and add a note on its significance.	Process- 2 marks Significance (two points) -2 marks	1	10/11

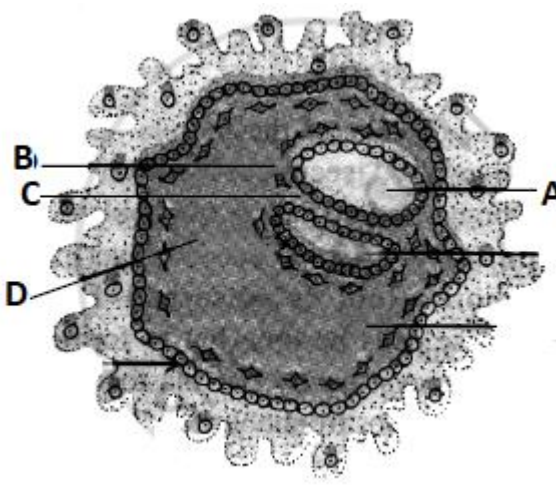
Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
<b>1</b>	The primary sex organ in human males is A. prostate gland B. seminal vesicle C. penis <b>D. testis</b>	Correct answer 1 mark	2	20
<b>2</b>	Seminal fluid is ----- in nature. A. acidic B. neutral C. sugary <b>D. alkaline</b>	Correct answer 1 mark	2	21
<b>3</b>	Which of the following is not a part of uterus? A. body B. cervix C. fundus <b>D. cornua</b>	Correct answer 1 mark	2	24
<b>4</b>	Menarche, menstrual cycle and menopause are controlled by----- A. thyrotropic hormone <b>B. gonadotropic hormone</b> C. somatotropic hormone D. corticotropin	Correct answer 1 mark	2	26
<b>5</b>	Nebenkern is ----- A. acrosome of sperm B. neck of sperm C. middle piece of sperm <b>D. mitochondrion of sperm</b>	Correct answer 1 mark	2	29

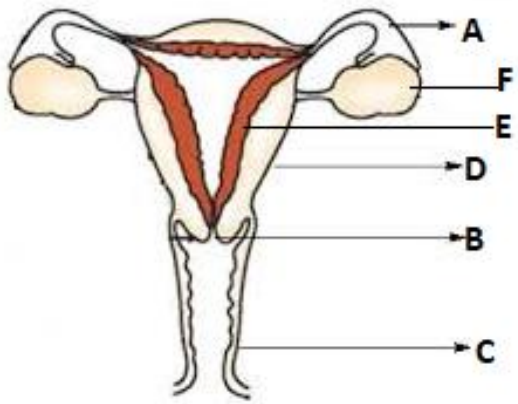


6	Nervous system develops from..... of embryonic layer. A. endoderm B. chorion <b>C. ectoderm</b> D. mesoderm	Correct answer 1 mark	2	35
7	The average period of pregnancy in human lasts for..... days of pregnancy. A. 280 B. 270 <b>C. 266</b> D. 290	Correct answer 1 mark	2	35
8	..... is not a permanent method of birth control. A. vasectomy B. tubectomy <b>C. withdrawal</b> D. castration	Correct answer 1 mark	2	39
9	The organism which causes Gonorrhoea is..... A. <i>Trepenoma</i> <b>B. Neisseria</b> C. <i>Entamoeba</i> D. <i>Salmonella</i>	Correct answer 1 mark	2	43
10	How many pairs of testis are present in human male? A. 2 pairs <b>B. 1 pair</b> C. only one testis D. only one ovary	Correct answer 1 mark	2	21
	<b>Single sentence answers</b>	<b>Key word in answer</b>		
1	Name the enzyme secreted by the prostate gland.	Acid phosphatase	2	21

2	What is glans penis?	Swollen tip of externa genitalia or penis	2	22
3	What is atresia with respect to ovary in human females?	Large scale destruction of primordial follicles.	2	23
4	Name the hydrolytic enzyme secreted by the acrosome.	Hyaluronidase	2	29
5	What is morula?	16-32 celled stage develops during cleavage	2	33
6	What is the function of inner cell mass?	Embryo proper develops from these cells	2	33
7	Name the embryonic layer from which heart, blood and blood vessels develop.	Mesoderm	2	35
8	Identify the permanent birth control method in given diagram. 	Tubectomy	2	41
9	What is the use of tablet 'Saheli'?	Oral contraceptive pill	2	41
10	Identify the IUD in the given diagram. 	Lippes loop	2	15

**2 marks**

<b>1</b>	Draw a well labelled diagram of L.S. human testis.	Four correct labels-½ mark each	2	20
<b>2</b>	Describe the structure of Graafian follicle.	Four correct points -Each point ½ mark	2	24
<b>3</b>	Write a short note on fallopian tube.	Three correct parts-1 and ½ marks  Any one function-1/2 mark	2	24
<b>4</b>	Give an account of external genitalia in human females.	Any four parts-½ mark each	2	25
<b>5</b>	Explain the structure of secondary oocyte.	Any four points ½, mark each.	2	30
<b>6</b>	Write an account of cleavage during embryonic development in humans.	Any four points with morula stage-½ mark each	2	33
<b>7</b>	Identify the parts labelled in the given diagram.  	Each label-1/2 mark	2	34
<b>8</b>	What is lactation? Which hormone is responsible for its regular secretion?	Two correct points -1 mark each	2	38
<b>9</b>	Mention any two different goals of RCH programme.	Two correct points-1 mark each.	2	39

<b>10</b>	What is MTP? Upto which month it is	Four correct points-1/2 mark each.	2	41
<b>3 marks</b>				
<b>1</b>	Describe the histology of testis with help of labelled diagram.	Structure- 2 marks  Diagram with two correct labels -1 mark	2	20
<b>2</b>	Identify the labels from the given diagram.  	Each correct label – ½ mark	2	22
<b>3</b>	Describe the histological structure of human ovary (diagram not expected).	Three correct points-1 mark each.	2	23
<b>4</b>	Explain the structure of human sperm with labelled diagram.	Structure -2 marks  Diagram with any two correct labels-1 mark	2	29
<b>5</b>	Describe the process of oogenesis in human female.	Three stages with correct explanation-1 mark each	2	29-30
<b>6</b>	Write a note on implantation.	Correct explanation, three points-1 mark each.	2	34
<b>7</b>	Human pregnancy shows three prominent trimesters. Answer the following question based on these trimester.  i) What is morning sickness during first trimester?  ii) Name the hormone secrete in second trimester.	1 mark each	2	35-36

	iii) The organ which secretes hormone in second trimester is...			
<b>8</b>	Explain the process of parturition.	Correct explanation of three stages- 1 mark each	2	38
<b>9</b>	Explain any three measures to achieve goals of RCH.	Any three correct methods-1 mark each.	2	39
<b>10</b>	Explain any three methods that can be used to overcome infertility.	Any three methods-1 mark each	2	43-44
<b>4 marks</b>				
<b>1</b>	Write an account of seminal vesicle and bulbourethral gland in male reproductive system.	Three correct points-1 and ½ marks  Any one function-1/2 mark  For each gland	2	21
<b>2</b>	Explain ovarian cycle with its different phases.	Four phases- 1 mark each	2	26-27
<b>3</b>	Describe the process of spermatogenesis with the help of diagram.	Three stages-3 marks  Diagram with two correct labels-1 mark	2	28-29
<b>4</b>	Explain mechanism of fertilization in humans.	Movement of sperm- 1 mark  Entry of sperm- 1 mark  Activation of sperm-1 mark  Syngamy 1 mark	2	31-32
<b>5</b>	Write in detail any four temporary methods of birth control.	Any four method with correct explanation -1 mark each.	2	39-40

Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
<b>1</b>	<p>The three principles of Mendelism are</p> <p><b>A. Dominance, segregation and independent assortment</b></p> <p>B. Linkage, segregation and independent assortment</p> <p>C. Linkage, dominance and segregation</p> <p>D. Linkage, dominance and Independent assortment.</p>	Correct answer – 1mark	3	52
<b>2</b>	<p>Which one of the following is back cross?</p> <p>A. <math>F_1 \times F_1</math></p> <p>B. <math>F_1 \times</math> Recessive parent</p> <p>C. <math>F_1 \times</math> Dominant parent</p> <p><b>D. <math>F_1 \times</math> Any parent</b></p>	Correct answer – 1mark	3	53
<b>3</b>	<p>RR (Red) Antirrhinum is crossed with white (WW) one. Offspring (RW) are pink. This is an example of</p> <p>A. Dominant -recessive</p> <p><b>B. Incomplete dominance</b></p> <p>C. Hybrid</p> <p>D. Supplementary genes</p>	Correct answer – 1mark	3	54
<b>4</b>	<p>The word chromosome was coined by</p> <p>A. Benda</p> <p><b>B. Waldeyer</b></p> <p>C. Robert Hooke</p> <p>D. T.H.Morgan</p>	Correct answer – 1mark	3	57

<p><b>5</b></p>	<p>Nullisomy is represented by.....</p> <p>A. (2n-1)</p> <p><b>B. (2n-2)</b></p> <p>C.(2n+1)</p> <p>D.(2n+2)</p>	<p>Correct answer – 1mark</p>	<p>3</p>	<p>57</p>
<p><b>6</b></p>	<p>Identify the odd one:-</p> <p>A. Monoploidy</p> <p>B.Diploidy</p> <p>C.Polyploidy</p> <p><b>D.Hyperploidy</b></p>	<p>Correct answer – 1mark</p>	<p>3</p>	<p>57</p>
<p><b>7</b></p>	<p>In humans, the sex chromosome complement is</p> <p><b>A.XX-XY</b></p> <p>B. XX-XO</p> <p>C.ZZ-ZO</p> <p>D. ZW-ZZ</p>	<p>Correct answer – 1mark</p>	<p>3</p>	<p>64</p>
<p><b>8</b></p>	<p>A family has five daughters and expecting sixth child. The chance of its beings a son is .....</p> <p>A. zero</p> <p>B.25%</p> <p><b>C.50%</b></p> <p>D. 100%</p>	<p>Correct answer – 1mark</p>	<p>3</p>	<p>64</p>
<p><b>9</b></p>	<p>In human beings 45 chromosomes/single X/XO abnormality causes</p> <p>A. Down's syndrome</p> <p>B. Klinefelter's syndrome</p> <p><b>C. Turner's syndrome</b></p> <p>D. Edward's syndrome</p>	<p>Correct answer – 1mark</p>	<p>3</p>	<p>67</p>
<p><b>10</b></p>	<p>Webbed neck is characteristic of ... syndrome.</p> <p><b>A.XXX</b></p>	<p>Correct answer – 1mark</p>	<p>3</p>	<p>67</p>

	B. YY C. XXY D. XO			
	<b>Single sentence answers</b>	<b>Key word in answer</b>		
<b>1</b>	Define inheritance.	Transmission of characters from generation to generation	3	49
<b>2</b>	What is allelomorph?	Alternating forms of genes	3	50
<b>3</b>	What is test cross?	Cross between F1 plant and its recessive parent	3	53
<b>4</b>	Define euploidy.	Chromosome number in a cell is exact multiple of primary basic number.	3	57
<b>5</b>	Give on example of complete linkage.	X- chromosome of <i>Drosophila</i> male.	3	59
<b>6</b>	How many linkage groups are present in <i>Drosophila melanogaster</i> ?	4 linkage groups	3	59
<b>7</b>	Which genes show straight inheritance?	Y-linked genes	3	62
<b>8</b>	How drones are produced in honey bees?	Parthenogenetically	3	66
<b>9</b>	What is the reason for 21 <sup>st</sup> trisomy?	Non disjunction or failure of separation of chromosomes or autosomes during gametogenesis.	3	66
<b>10</b>	Give the example of X- monosomy you have studied.	Turner's syndrome.	3	67
<b>2 marks</b>				
<b>1</b>	Discuss any two points due to which Mendel got success in his experiment?	1 mark each	3	49/ 50



<b>2</b>	Give any two points of difference between homozygous and heterozygous.	1 mark each.	3	50
<b>3</b>	Explain test cross with suitable example and state its ratios.	Representation of cross- 1 mark Ratio( phenotypic and genotypic) -1 mark	3	53
<b>4</b>	Give an account of incomplete dominance with suitable example.	Representation of cross- 1 mark Ratio( phenotypic and genotypic) -1 mark	3	54
<b>5</b>	Explain codominance in colour coat in cattle with checker board method.	Representation of cross- 1 mark Ratio( phenotypic and genotypic) -1 mark	3	54
<b>6</b>	Write an account of chromosomal theory of inheritance.	Four correct points -2 marks	3	56
<b>7</b>	Write a note on sex linkage.	Complete sex linkage – 1 mark Incomplete sex linkage -1 mark	3	59
<b>8</b>	Differentiate between complete and incomplete linkage.	Two correct points- 2 marks	3	59
<b>9</b>	Explain mechanism of sex determination in birds.	Correct explanation -1 mark Representation – 1 mark	3	65
<b>10</b>	Give detail account of thalassemia.	Correct explanation Two points-1 mark Symptoms any two- 1 mark	3	66

<b>3 marks</b>				
<b>1</b>	Enlist dominant and recessive characters in pea plant with respect to position of flower, colour of seed and colour of pod in tabulated form.	Each correct character -1/2 mark	3	49
<b>2</b>	Give an account of pleiotropy with suitable example.	Correct explanation -1 mark  Representation – 1 mark  Ratio-1 mark	3	55
<b>3</b>	Describe the structure of sex chromosomes with the help of labelled diagram.	Structure of X and Y chromosomes – 1 mark each and diagrams- 1 mark	3	58
<b>4</b>	What is autosomal inheritance? Explain different disorders due to autosomal inheritance.	Definition-1 mark  Widow's peak-1 mark  Phenylketonuria-1 mark	3	61
<b>5</b>	Explain inheritance pattern of colour blindness with suitable chart.	Explanation- 1mark  Representation 2 marks	3	62
<b>6</b>	Write a note on bleeder's disease and its inheritance with suitable chart.	Explanation- 1mark  Representation 2 marks	3	63-64
<b>7</b>	Explain the mechanism of sex determination in humans with suitable chart.	Explanation -2 mark  Representation -1 mark	3	65
<b>8</b>	Write a note on Down's syndrome.	Reason for trisomy-1 mark  Any four symptoms-2 marks	3	66
<b>9</b>	What are the different characters that develop due to Klinefelter's syndrome?	Reason for X-monosomy- 1 mark  Any four symptoms-2 marks	3	67
<b>10</b>	Give reasons for development of Turner's syndrome and also mention its symptoms.	Reason -1 mark	3	67

		Any four symptoms-2 marks		
<b>4 marks</b>				
<b>1</b>	Define inheritance. Give statements for various laws of inheritance.	Definition- 1 mark Statements for 3 laws- 1 mark each	3	52
<b>2</b>	Explain intragenic and intergenic interaction with the help of example.	Intragenic interaction any one example from incomplete dominance or codominance-2 marks  Intergenic interaction-  Pleiotropy- 2marks	3	54/ 55
<b>3</b>	Explain structure of chromosomes with labelled diagram.	Structure- 2 marks  Diagram with any four correct labels- 2 marks	3	57- 58
<b>4</b>	Give detail account of sex linked inheritance.	Definition- 1 mark  X-linked inheritance- 1 mark  Y-linked inheritance- 1 mark	3	62
<b>5</b>	Give an account of one Mendelian and one chromosomal disorder you have studied.	Mendelian disorder Thalassemia- Explanation-1 mark Symptoms-any two- 1 mark  Chromosomal disorders:-  Down's syndrome/ turner's syndrome/ Klinefelter's syndrome- any one  Explanation- 1 mark  Any two symptoms-1 mark	3	66- 67

Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
<b>1</b>	Find the odd one out:  A H <sub>2</sub> A  B H <sub>3</sub>  C H <sub>2</sub> B  <b>D <u>H<sub>1</sub></u></b>	1	4	73
<b>2</b>	What happened when heat killed S-cells along with live R-cells were injected into mice?  <b>A <u>Mice died and showed live S-cells</u></b>  B Mice survived and showed live S-cells  C Mice died and showed live R-cells  D Mice died and showed dead R-cells	1	4	71
<b>3</b>	Find out the double ring compound :  <b>A <u>Adenine</u></b>  B Uracil  C Cytosine  D Thymine	1	4	76
<b>4</b>	If a DNA has 20 Adenine and 30 cytosine bases. What will be the total number of purine bases in the given sample?  A 20  <b>B <u>50</u></b>  C 30  D 100	1	4	76
<b>5</b>	Semiconservative mechanism of DNA was detected using:  A <sup>35</sup> S  B <sup>14</sup> C  C <sup>32</sup> P	1	4	77

	<b>D <sup>15</sup>N</b>			
<b>6</b>	<p>A template strand of DNA has base sequence CATGATTAC. New strand synthesized on it will be :</p> <p>A GATCAUATG</p> <p>B GTACTAACG</p> <p>C GAACTAATG</p> <p><b>D <u>GTACTAATG</u></b></p>	1	4	76
<b>7</b>	<p>During DNA replication, the separated strands of DNA are prevented from recoiling by</p> <p>A DNA primase</p> <p>B Sigma factor</p> <p>C Rho-factor</p> <p><b>D <u>SSBP</u></b></p>	1	4	75
<b>8</b>	<p>In which of the following synthesis of DNA strand is not involved directly?</p> <p>A m RNA</p> <p>B t RNA</p> <p>C Another DNA strand</p> <p><b>D <u>Protein</u></b></p>	1	4	83
<b>9</b>	<p>Wobble hypothesis is related with</p> <p>A Ambiguity in codon</p> <p>B Purine pyrimidine equality</p> <p>C Genetic code is triplet</p> <p><b>D <u>Degeneracy of genetic code and economy of tRNA molecules in the cell</u></b></p>	1	4	82
<b>10</b>	<p>During elongation of polypeptide chain, sigma factor is :</p> <p><b>A <u>Functionless</u></b></p> <p>B Retained for specific function</p> <p>C Released for re-use</p> <p>D Required during closing of chain</p>	1	4	84
<b>11</b>	<p>Enzyme required for peptide formation is :</p>	1	4	83

	<p>A Peptidase</p> <p><b>B <u>Peptidyl transferase</u></b></p> <p>C Nitrogenase</p> <p>D Nitrate reductase</p>			
<b>12</b>	<p>Exon segments are reunited after splicing by</p> <p>A RNA primase</p> <p>B RNA protease</p> <p><b>C <u>RNA polymerase</u></b></p> <p>D RNA ligase</p>	1	4	79
<b>13</b>	<p>In lac operon, lactose acts as:</p> <p><b>A <u>Inducer</u></b></p> <p>B Co-inducer</p> <p>C Repressor</p> <p>D Co-repressor</p>	1	4	87
<b>14</b>	<p>A unit of lac-operon which in the absence of lactose, suppresses the activity of operator gene is :</p> <p>A Structural gene</p> <p><b>B <u>Regulatory gene</u></b></p> <p>C Repressor protein</p> <p>D Promoter gene</p>	1	4	86
<b>15</b>	<p>A DNA segment has 75 cytosine and 40 thymine nucleotides. What shall be the total number of phosphates in the DNA segment?</p> <p>A 115</p> <p><b>B <u>230</u></b></p> <p>C 75</p> <p>D 220</p>	1	4	76
<b>Single sentence answers</b>				
<b>1</b>	What is the principle of DNA profiling?	1	4	89
<b>2</b>	What is the use of southern blotting in DNA fingerprinting?	1	4	90
<b>3</b>	Enlist the genes in Lac operon	1	4	86

4	What is meant by an operon?	1	4	86
5	AUG codon gives _____ & _____ amino acids in prokaryotes & Eukaryotes respectively.	1	4	84
6	What is meant by activation of amino acids?	1	4	84
7	What is the role of Mg <sup>++</sup> in Translation?	1	4	84
8	What are the different types of mutations?	1	4	82
9	Enlist the names of enzymes used in semiconservative replication of DNA?	1	4	75,76
10	What is central dogma of molecular biology?	1	4	77
11	What type of isotopes used in semiconservative replication experiment?	1	4	76,77
12	What is the function of RNA primer?	1	4	76
13	What is the function of SSBP?	1	4	75
14	Define RFLP'	1	4	89
15	Define Heterochromatin	1	4	74
<b>2 marks</b>				
1	Differentiate between Heterochromatin & Euchromatin'	Two points 1 mark each	4	74
2	How t-RNA acts as an adapter molecule? Explain in detail with the help of a diagram.	Explanation 1 mark diagram-1 mark	4	82,83
3	Define mutation. State its two types	Definition-1 mark Each type:- ½ mark	4	82
4	Describe Hershey-Chase experiment in detail.	Correct explanation-2 marks	4	71,72
5	Explain the role of Lactose as inducer in Lac-operon.	Correct explanation-2 marks	4	87
6	Draw neat and labelled diagram of Nucleosome.	Four correct labels- 2 marks	4	73
7	Write a note on: packaging of DNA in prokaryotes.	Correct explanation, four	4	73

		points-1/2 mark each.		
<b>8</b>	Write a note on: packaging of DNA in Eukaryotes.	Correct explanation, four points-1/2 mark each.	4	74
<b>9</b>	Explain Avery, McCarty and MacLeod's experiment in detail	Correct explanation, four points-1/2 mark each.	4	71
<b>10</b>	Draw neat and labelled diagram of Replication Fork.	Four correct labels- ½ mark each	4	75
<b>3 marks</b>				
<b>1</b>	Explain the Griffith's experiment in detail with diagram.	Explanation-2 marks Diagram-1 mark	4	70,71
<b>2</b>	Describe any three characteristics of Genetic code.	1 mark each	4	81,82
<b>3</b>	Mention any three objectives of Human Genome project.	1 mark each	4	88,89
<b>4</b>	Explain different step involved in DNA Fingerprinting.	Six correct steps in sequence ½ mark each	4	89
<b>5</b>	Draw a neat and labelled diagram of transcription and processing of hn-RNA	Three steps-1 mark each	4	79
<b>6</b>	Draw a neat and labelled diagram explaining Meselson's and Stahl's experiment.	Three steps-1 mark each	4	77
<b>7</b>	How Meselson and Stahl explained the concept of Semiconservative Replication of DNA experimentally?	Correct explanation, three points- 3marks	4	76,77
<b>8</b>	Explain the concept of operon.	Role of three enzymes- 1 mark each	4	86
<b>9</b>	Give diagrammatic representation of Lac-operon in the presence of inducer.	Three correct labels- 1 mark each	4	87
<b>10</b>	Define Genomics. Give any two applications of the genomics.	Definition-1 mark Two applications- 1 mark each	4	87,88



<b>4 marks</b>				
<b>1</b>	Describe the process of semiconservative replication of DNA with the help of neat and labelled diagram.	Four correct points-2 marks Diagram with four correct labels-2 marks	4	75,76
<b>2</b>	Describe the mechanism of translation with the help of neat and labelled diagram.	Three correct points -3 marks Diagram with two labels-1 mark	4	83,84,85
<b>3</b>	Explain processing of hn-RNA with the help of neat and labelled diagram.	Three steps-3 marks Diagram showing any one step correctly-1 mark	4	78,79
<b>4</b>	With respect to lac- operon explain the following terms:- i) regulator gene ii) promoter gene iii) structural gene iv) inducer	Each term- 1 mark	4	86,87
<b>5</b>	Define DNA fingerprinting? State any three applications of it.	Definition-1 mark Three applications-3 marks	4	89,90

Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
1	_____ is considered as connecting link between ape and man. <b>A <u>Australopithecus</u></b> B <i>Homo habilis</i> C <i>Homo erectus</i> D Neanderthal man	<i>Australopithecus</i>	5	114
2	Humans are most closely related to _____. A Marsupial B Lemur <b>C <u>Chimpanzees</u></b> D Tarsier	Chimpanzees	5	113
3	The proportion of an allele in the gene pool to the total number of alleles at a given locus is called _____. A gene pool <b>B <u>gene frequency</u></b> C gene flow D genetic drift	gene frequency	5	100
4	Transfer of a part of chromosome or set of genes to a non-homologous chromosome is called _____. A deletion B duplication C inversion <b>D <u>translocation</u></b>	translocation	5	101
5	Any random fluctuation in allele frequency, occurring in the natural population by pure chance is called _____. A gene pool B gene mutation C genetic recombination	Genetic drift	5	101

	<b>D <u>genetic drift</u></b>			
<b>Single sentence answers</b>				
<b>1</b>	Define the term 'Mendelian population'.	Interbreeding population	5	100
<b>2</b>	Define Gene pool.	Total number of genes	5	100
<b>3</b>	Name the ancestor of human also known as man with ape brain.	<i>Australopithecus</i>	5	114
<b>4</b>	Name the ancestor of human nicknamed as Handy man	<i>Homo habilis</i>	5	114
<b>5</b>	Whose fossils were discovered at the site of Shivalik hills, India?	<i>Ramapithecus</i>	5	114
<b>2 marks</b>				
<b>1</b>	Mention any two developments in human which helped him to move around safely on land.	2 points – 2 marks	5	115
<b>2</b>	Distinguish New world and old world monkeys based on their tail along with their examples.	1 point – 1 mark Example – 1 mark	5	113
<b>3</b>	What is hybrid sterility?	Definition – 1 mark Example - 1 mark	5	103
<b>4</b>	What led to better utilization of hands for holding objects effectively and better motor skills?	2 points – 2 marks	5	115
<b>5</b>	Describe modern man.	2 points – 2 marks	5	114
<b>6</b>	Distinguish between Australopithecus and Neanderthal man	2 points – 2 marks	5	114
<b>7</b>	Distinguish between <i>Homo erectus</i> and Neanderthal man	2 points – 2 marks	5	114
<b>3 marks</b>				
<b>1</b>	Name any three types of premating isolating mechanisms.	3 points – 3 marks	5	102
<b>2</b>	Name any three types of postmating isolating mechanisms.	3 points – 3 marks	5	103
<b>3</b>	Explain Geographical Isolation	3 points – 3 marks	5	102
<b>4</b>	Write down the three main concepts of modern synthetic theory.	3 points – 3 marks	5	100

<b>5</b>	What is chromosomal aberration? Give any two types of aberrations found in population.	Definition -1 mark 2 types – 2 marks	5	101								
<b>6</b>	Complete the table based on the special features of Human ancestors showing their cultural and social development.	1 - used fire 2 – Neanderthal 3 – <i>Homo habilis</i>	5	114								
	<table border="1"> <thead> <tr> <th>Ancestors</th> <th>Special features</th> </tr> </thead> <tbody> <tr> <td><i>Homo erectus</i></td> <td></td> </tr> <tr> <td></td> <td>Buried their dead</td> </tr> <tr> <td></td> <td>Made tools from stones</td> </tr> </tbody> </table>	Ancestors	Special features	<i>Homo erectus</i>			Buried their dead		Made tools from stones			
Ancestors	Special features											
<i>Homo erectus</i>												
	Buried their dead											
	Made tools from stones											
<b>7</b>	Write a note on <i>Homo habilis</i>	3 points – 3 marks	5	114								
<b>4 marks</b>												
<b>1</b>	What is genetic variation? Explain any three factors responsible for genetic variation.	Definition – 1 mark Any 3 factors – 3 marks	5	100								
<b>2</b>	Explain the concept of Natural Selection with the example of Industrial Melanism.	8 points – 4 marks	5	102								

Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
1	<p><b>Water present in the form of hydrated oxides of Silicon, Aluminium is called _____</b></p> <p>A Hygroscopic Water</p> <p>B Gravitational Water</p> <p>C <u>Combined Water</u></p> <p>D Capillary Water</p>	1	6	120
2	<p><b>Most plant cells and tissues constitutes _____% water</b></p> <p>A <u>90-95 %</u></p> <p>B 70-80 %</p> <p>C 10-25 %</p> <p>D 0-20 %</p>	1	6	119
3	<p><b>_____ type of tissues are present in epiphytic roots</b></p> <p>A Meristematic</p> <p>B Parenchyma</p> <p>C <u>Velamen</u></p> <p>D Epithelial</p>	1	6	119
4	<p><b>In the zone of absorption, epidermal cells form unicellular hair like extensions called _____</b></p> <p>A Epiblema cells</p> <p>B Roots</p> <p>C <u>Root hairs</u></p> <p>D Velamen tissues</p>	1	6	119
5	<p><b>Outer layer of root hair is made up of _____</b></p> <p>A Cellulose</p> <p>B Lignin</p>	1	6	120

	C Starch D <u>Pectin</u>			
<b>6</b>	<b>Inner layer of root hair is made up of</b> _____	1	6	120
	A <u>Cellulose</u> B Lignin C Starch D Pectin			
<b>7</b>	<b>Cell wall is _____</b>	1	6	120
	A <u>Selectively Permeable</u> B <u>Freely Permeable</u> C Non Permeable D Impermeable			
<b>8</b>	<b>Plasma Membrane is _____</b>	1	6	120
	A <u>Selectively Permeable</u> B Freely Permeable C Non Permeable D Impermeable			
<b>9</b>	<b>Root hair is _____ extension of epiblema cells</b>	1	6	120
	A Cytoplasmic B Protoplasmic C Nucleoplasmic D Cellulosic			
<b>10</b>	<b>Fine soil particles imbibe or absorb water and hold it. This is called as</b> _____	1	6	120
	A <u>Hygroscopic Water</u> B Gravitational Water C Combined Water D Capillary Water			
<b>Single sentence answers</b>				
<b>1</b>	Why water acts as a thermal buffer?	1	6	119
<b>2</b>	Define : Root hair	1	6	119

3	What is meant by Gravitational water?	1	6	120
4	What is meant by Hygroscopic water?	1	6	120
5	What is meant by Combined water?	1	6	120
6	What is meant by Capillary water?	1	6	120
7	What is the composition of outer layer of root hair?	1	6	120
8	What is the composition of inner layer of root hair	1	6	120
9	From which type of cells, root hair is originated	1	6	120
10	Which type of tissue is present in epiphytic roots?	1	6	119
<b>2 marks</b>				
1	Why water is called as ‘Elixir of Life’?	Correct explanation- two points-1 mark each	6	119
2	What are the different types of water?	Any two types- 1 mark each	6	120
3	Draw a neat and labelled diagram of “Structure of Root hair”.	Four correct labels-2 marks	6	119
4	Explain the structure of root hair.	Four correct points-2 marks	6	120
5	In which forms water is available to roots for absorption?	Any two forms- 1 mark each	6	120
6	Explain the different properties of water.	Any two- 2 marks	6	119
<b>3 marks</b>				
1	Draw a neat and labelled diagram of Root tip showing root hair zone.	Three correct labels – 1 mark each	6	119
2	Draw a neat and labelled diagram of Root hair.	Three correct labels – 1 mark each	6	119
3	Write a note on morphological structure of root.	Three correct regions of root-1 mark each	6	119,120
4	How roots can act as a water absorbing organ?	Three correct points- 1 mark each	6	119

**4 marks**

<b>1</b>	Explain the structure of root hair with the help of neat and labelled diagrams.	Four correct points- 2 marks Diagram with two correct labels-2 marks	6	119,120
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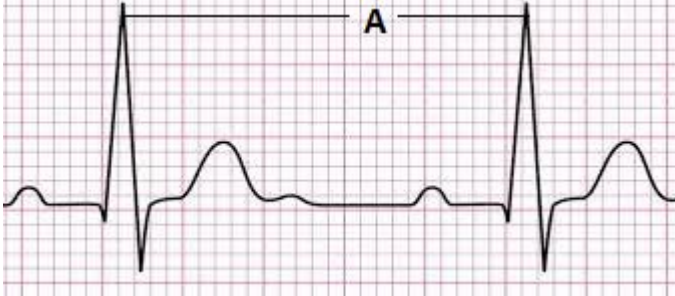
Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
1	A farmer is fed up of weeds in his Wheat farm. Which of the following chemicals he can use to overcome the problem?  A IBA B IAA C NAA <b>D <u>2,4 – D</u></b>	1	7	139
2	Gibberellins are synthesised from _____. A Acetic acid <b>B <u>Mevalonic acid</u></b> C Tryptophan D Ethephon	1	7	140
3	First natural cytokinin was obtained from _____. A Rice plants B Tobacco callus <b>C <u>Maize grains</u></b> D Human urine	1	7	140
<b>Single sentence answers</b>				
1	Buyers often complain that a particular fruit merchant uses some chemical to ripen fruits in his shop.  Name the chemical he must be using to do so.	1	7	141
2	Why is ABA known as antitranspirant?	1	7	141
3	Name the tissue that transports hormones within the plant body?	1	7	139
<b>2 marks</b>				
1	Match the column A with B			

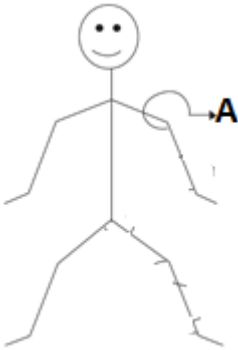
	<p>A</p> <p>i) Epinasty of flower ii) Natural auxin iii) Flowering in Litchi iv) Bolting of Beet</p>	<p>B</p> <p>a)GA3 b)NAA c)IAA d)Ethylene</p>	<p>½ marks for each correct pair = 2</p>	<p>7</p>	<p>141 139 140 140</p>
2	<p>A gardener wants to give bushy appearance to plants in our college campus.</p> <p>i) What should he do to achieve the same? ii) Which property of phytohormones he must be aware of?</p>	<p>1+ 1=2</p>	<p>7</p>	<p>139</p>	
<b>3 marks</b>					
1	<p>Write the name of ____</p> <p>a) First hormone discovered in plants. b) Biological name of fungus from which Gibberellins were first isolated. c) The name given to the first cytokinin by Skoog and Miller.</p>	<p>1+1+1=3</p>	<p>7</p>	<p>139 140 140</p>	
2	<p>Write the name of ____</p> <p>a) Gaseous growth hormone known to you. b) Standard bio assay method for auxins. c) Hormone that can overcome the requirement of vernalization.</p>	<p>1+1+1=3</p>	<p>7</p>	<p>141 142 140</p>	
<b>4 marks</b>					
1	<p>Name the phytohormone related with the given phenomenon</p> <p>a) Apical dominance b) Bolting of Cabbage c) Artificial ripening of fruit d) Acts as Antitranspirant by closing stomata</p>	<p>1 mark to each sub qn =4</p>	<p>7</p>	<p>139 140 141 141</p>	
2	<p>Write full form of-</p> <p>a) IAA b) IBA c) NAA d) 2,4-D</p>	<p>1 mark to each sub qn =4</p>	<p>7</p>	<p>139</p>	

Question no.	Question	Marking Scheme	Chapter No.	Page No.
<b>MCQ</b>				
1	<p>In human respiration, chemical energy is released in the form of ____.</p> <p>A) Acetyl co-enzyme A            B) ADP            C) ADPH<sub>2</sub>            D) <b><u>ATP</u></b></p>	1 mark	8	156
2	<p>Alveoli provide the surface area for exchange of _____.</p> <p>A) food            B) enzymes            C) <b><u>gases</u></b>            D) hormones</p>	1 mark	8	156
3	<p>The movement of diaphragm, intercostal muscles and rib cage helps in _____.</p> <p>A) digestion            B) circulation            C) excretion            D) <b><u>respiration</u></b></p>	1 mark	8	156
4	<p>The volume of air that remains in the lungs after maximum respiration is _____.</p> <p>A) 1000 to 1100 ml            B) <b><u>1100 to 1200 ml</u></b>            C) 2000 to 3000 ml            D) 5200 to 5800 ml</p>	1 mark	8	
5	<p>Find out the example in which due to absence of respiratory pigment transport of respiratory gases does not takes place.</p> <p>A) <b><u>Cockroach</u></b>            B) Scoliodon            C) Frog            D) Human</p>	1 mark	8	163
6	<p>Which of the following has thickest wall?</p> <p>A) Right auricle            B) Right ventricle            C) Left auricle            D) <b><u>Left ventricle</u></b></p>	1 mark	8	170
7	<p>The phase of contraction of heart is termed as ____.</p> <p>A) diastole            B) <b><u>systole</u></b>            C) heart beat            D) heart sound</p>	1 mark	8	171

8	The free edges of cuspid valves are attached to the papillary muscles of the heart by fibres are called _____.	1 mark	8	170
	A) <b>chordae tendinae</b> B) columnae carnae C) connecting fibres D) autorhythmic fibres			
9	Ventricular depolarization is represented by _____.	1 mark	8	176
	A) P wave B) <b>QRS complex</b> C) T wave D) P and T waves			
10	The erythropoietic tissue in adult is mainly found in _____.	1 mark	8	165
	A) kidney B) liver C) <b>red bone marrow</b> D) spleen			

**Single sentence answer**

1	Name the cartilage which divides the nasal cavity into right and left nasal chambers.	1 mark	8	154
2	Give the function of epiglottis.	1 mark	8	155
3	Define total lung capacity.	1 mark	8	158
4	Sachin shows symptoms of inflammation of the sinuses and mucous discharge due to viral and bacterial infection. Identify the disorder.	1 mark	8	161
5	Define haematology.	1 mark	8	164
6	Which type of blood flows through pulmonary veins?	1 mark	8	164
7	In between which layers of pericardium, pericardial fluid is present?	1 mark	8	168
8	How many molecules of haemoglobin are found in each erythrocyte?	1 mark	8	165
9	Identify 'A' from the following ECG.	1 mark	8	176
				

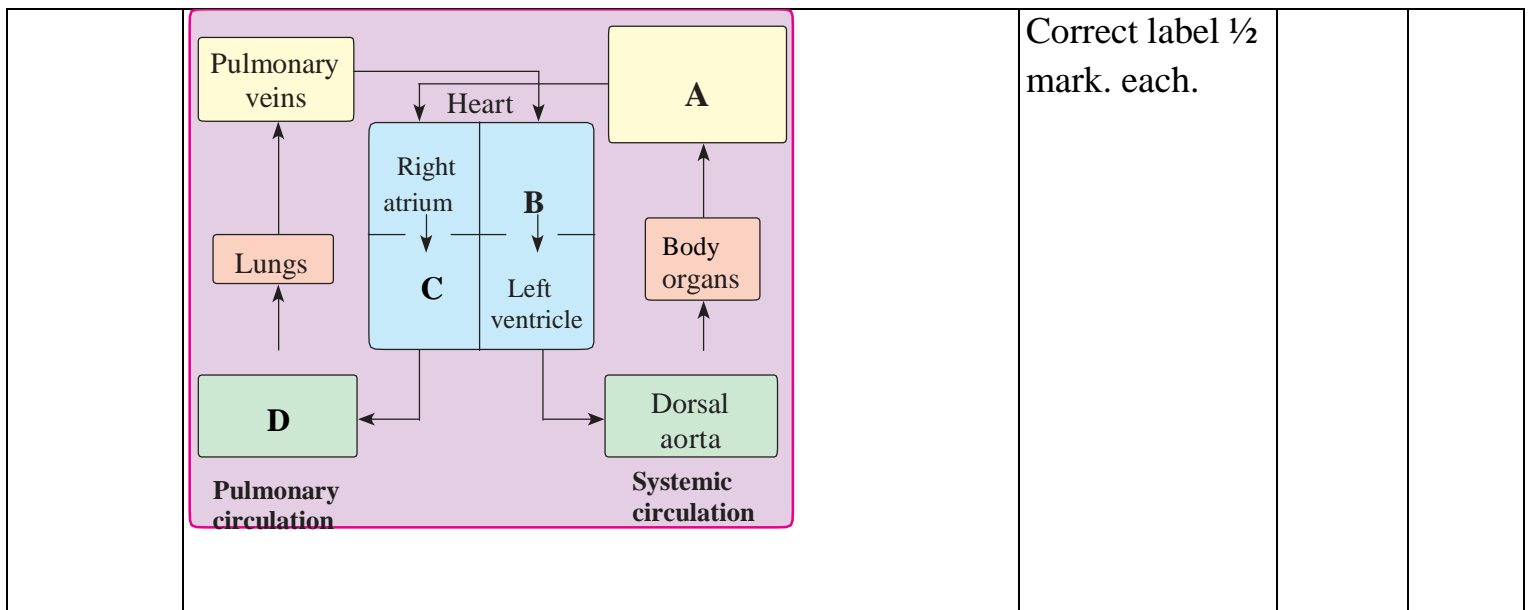
10	Identify the pulse point 'A' from below given diagram. <div style="text-align: center;">  </div>	1 mark	8	174
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**2 marks**

1	Fill in the blanks with the help of chart. <table border="1" style="margin: 10px auto; width: 80%;"> <thead> <tr> <th style="width: 25%;">Organism</th> <th style="width: 25%;">Habitat</th> <th style="width: 50%;">Respiratory surface/ organ</th> </tr> </thead> <tbody> <tr> <td>Coelenterates</td> <td>-----</td> <td>-----</td> </tr> <tr> <td>Spiders</td> <td>-----</td> <td>-----</td> </tr> </tbody> </table>	Organism	Habitat	Respiratory surface/ organ	Coelenterates	-----	-----	Spiders	-----	-----	½ mark each	8	154
Organism	Habitat	Respiratory surface/ organ											
Coelenterates	-----	-----											
Spiders	-----	-----											
2	Define Bohr effect and Haldane effect.	1 mark each	8	158									
3	Give any two effects of carbon monoxide poisoning.	2 points: 1 mark each	8	158									
4	Define intracellular transport and extracellular transport.	1 mark each	8	162									
5	Name the pigment and enzyme found in erythrocytes?	1 mark each	8	165									
6	Draw diagram of conducting system of human heart. Label SA node and bundle of His.	Appropriate diagram: 1 mark.  Each correct label: ½ mark	8	171									
7	How a portal vein differs from normal vein?	2 points: 1 mark each	8	173									

**3 marks**







1	Distinguish between inspiration and expiration.	3 points; 1 mark each	8	164
2	Write a note on Hering-Breuer reflex.	3 points; 1 mark each	8	160-161
3	Define Hamburger's phenomenon.  Add a note on it.	Definition: ½ mark.  Note: 1 mark.	8	159
4	Draw the chart of double circulation and label A, B, C and D.	1 mark. for chart	8	164






Correct label ½ mark. each.

5	Write a note on coagulation of blood.	3 marks	8	167
6	Define hypertension. Explain coronary artery disease and angina pectoris.	Definition: 1 mark. Explanation: 1 mark each.	8	175
7	Draw diagrammatic representation of cardiac cycle. Explain ventricular systole.	Correct representation: 1 mark. Explanation: 2 marks.	8	172

**4 marks**

1	With the help of labelled diagram explain the exchange of gases between alveolus and capillary.	Appropriate diagram: 1 mark. Any 2 correct labels: 1 mark. Explanation: 2 marks	8	157											
2	<p>With the help of chart identify and write the function of any <b>four</b> leucocytes.</p> <table border="1" data-bbox="259 1948 1047 2567"> <thead> <tr> <th data-bbox="259 1948 365 2083">Type</th> <th data-bbox="365 1948 673 2083">Leucocytes</th> <th data-bbox="673 1948 868 2083">Name of cell</th> <th data-bbox="868 1948 1047 2083">Function</th> </tr> </thead> <tbody> <tr> <td data-bbox="259 2083 365 2284" rowspan="2"><b>Granulocytes</b></td> <td data-bbox="365 2083 673 2284"></td> <td data-bbox="673 2083 868 2284">-----</td> <td data-bbox="868 2083 1047 2284">-----</td> </tr> <tr> <td data-bbox="365 2284 673 2567"></td> <td data-bbox="673 2284 868 2567">-----</td> <td data-bbox="868 2284 1047 2567">-----</td> </tr> </tbody> </table>	Type	Leucocytes	Name of cell	Function	<b>Granulocytes</b>		-----	-----		-----	-----	½ mark. for each correct name ½ mark. for each correct function.	8	166-167
Type	Leucocytes	Name of cell	Function												
<b>Granulocytes</b>		-----	-----												
		-----	-----												

			-----	-----			
	<b>Agranulocytes</b>		-----	-----			
			-----	-----			
<b>3</b>	<p>Draw labelled diagram of internal structure of human heart.</p> <p>Label right atrium, mitral valve, left ventricle and pulmonary semilunar valve.</p> <p>Write a function of Eustachian and tricuspid valve found in human heart.</p>				<p>Appropriate diagram: 1 mark.</p> <p>Each correct label: ½ mark</p> <p>Function: ½ mark each</p>	8	170

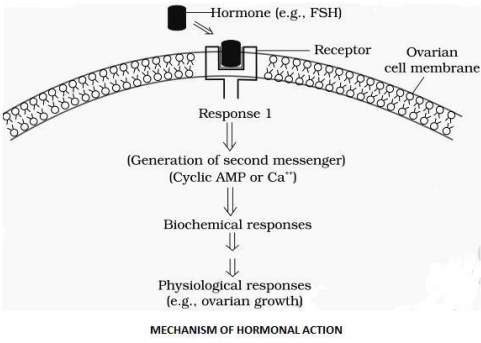
Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
1	Diffused type of nervous system is seen in _____. <b>A <u>Hydra</u></b> B <i>Planaria</i> C Cockroach D Earthworm	<i>Hydra</i>	9	182
2	Planaria shows _____ type of nervous system. A nerve net. <b>B <u>ladder</u></b> C ganglionated D brain	ladder	9	183
3	In order for a stimulus to be effective, the stimulus must have a minimum intensity called _____ stimulus. A subliminal B depolarised <b>C <u>threshold</u></b> D polarised	threshold	9	186
4	The resting potential of a neuron is _____. A 30 millivolts B -30 millivolts C 70 millivolts <b>D <u>-70 millivolts</u></b>	-70 millivolts	9	189
5	The third ventricle of brain is connected to the fourth ventricle of brain through _____. A Foramen of Monro <b>B <u>Duct of Sylvius</u></b> C Metacoel D Eustachian tube	Duct of Sylvius	9	193



6	Degeneration of dopamine producing neurons in the CNS causes _____ disease. A ADHD B Alzheimer's <b>C <u>Parkinson's</u></b> D Fever	Parkinson's	9	206
7	_____ is a mineralocorticoid secreted by Adrenal gland. <b>A <u>Aldosterone</u></b> B Cortisol C Corticoid D Androgen	Aldosterone	9	214
8	_____ has an important role in the development of immune system by maturation of T lymphocytes. A Thyroxine <b>B <u>Thymosin</u></b> C Aldosterone D Parathormone	Thymosin	9	214
9	Hyper secretion of growth hormone in childhood causes _____. A Acromegaly B Dwarfism <b>C <u>Gigantism</u></b> D Goitre	Gigantism	9	210
10	_____ shows gastric contractions and inhibit the secretion of gastric juice. A Gastrin B Secretin <b>C <u>Entero- gastrone</u></b> D Inhibin	Entero- gastrone	9	217
<b>Single sentence answers</b>				
1	Which cells of PNS secrete myelin sheath around the nerves?	Schwann cells	9	185
2	Give function of astrocytes in nervous system.			

		1 mark	9	185
3	What is the covering of nerve fascicule called?	Endoneurium	9	185
4	How electrical synapse differs from chemical synapse?	1 point – 1 mark	9	187
5	What is the function of red nucleus?	1 function – 1 mark	9	194
6	Define Saltatory conduction.	Definition – 1 mark	9	189
7	Name the hormone secreted by Pars intermedia in lower vertebrates.	Melanocyte stimulating hormone	9	211
8	Which disease is caused by hyper secretion of Glucocorticoids?	Cushing's disease	9	215
9	Which organ acts a temporary endocrine gland in females?	Placenta	9	216
10	Give one role of hormone therapy.	Definition – 1 mark	9	217
<b>2 marks</b>				
1	'Injury to the medulla oblongata causes sudden death' Explain.	2 points – 2 marks	9	194
2	Which two hormones are responsible for the regulation of calcium and phosphorus in the blood?	Calcitonin parathormone	9	213
3	Describe any two hormones produced by the ovaries	2 hormones – 2 marks	9	216
4	Name the glucocorticoid used in treatment of allergy and why?	Name – 1 mark  Reason – 1 mark	9	215
5	Which hormone is secreted by Pineal gland? What is its function?	Name – 1 mark  Function – 1 mark	9	211
6	Sketch and label T.S of Spinal cord.	Labelled diagram	9	195
7	Sketch and label V.S of Pituitary gland.	Labelled diagram	9	209

**3 marks**

<b>1</b>	Write a note on meninges of Brain.	3 points – 3 marks	9	189									
<b>2</b>	Describe any three functions of hypothalamus.	3 points – 3 marks	9	193									
<b>3</b>	Name three Mixed cranial nerves along with their numbers.	3 – 3 marks	9	196									
<b>4</b>	Distinguish between Cerebrum and Cerebellum.	3 differences – 3 marks	9	191, 194									
<b>5</b>	<p>Answer the questions after observing the diagram given below.</p>  <p>1) What acts as the first messenger?                  2) Why can't hormones like catecholamines enter their target cells through plasma membrane?                  3) Name the mode of hormone action shown in the diagram.</p>	3 points – 3 marks	9	208									
<b>6</b>	<p>Complete the table based on disorders caused due to under secretion or over secretion of Thyroid gland.</p> <table border="1" data-bbox="272 1747 876 2083"> <thead> <tr> <th>Secretion</th> <th>Adults</th> <th>Children</th> </tr> </thead> <tbody> <tr> <td>Hypo secretion</td> <td></td> <td></td> </tr> <tr> <td>Hyper secretion</td> <td></td> <td></td> </tr> </tbody> </table>	Secretion	Adults	Children	Hypo secretion			Hyper secretion			3 points – 3 marks	9	212
Secretion	Adults	Children											
Hypo secretion													
Hyper secretion													
<b>7</b>	<p>Give the names of the hormones released by neurohypophysis.</p> <p>A boy shows excessive thirst and micturition because of deficiency of a hormone secreted by neurohypophysis. Name the disease he is suffering from.</p>	Hormones - 2 mark  Disease – 1 mark	9	210									

**4 marks**

1	Describe the functional areas of Cerebrum.	4 points -4 marks	9	192
2	Distinguish between Sympathetic and parasympathetic nervous system.	4 points -4 marks	9	199
3	Describe any four hormones secreted by Adenohypophysis.	4 hormones-4 marks	9	210
4	Write a note on the four different kinds of cell in Pancreas.	4 cells – 4 marks	9	215
5	<p>Complete the flowchart of the process of conduction of nerve impulse.</p> <pre> graph TD     A[Application of stimulus on a resting nerve] --&gt; B[Permeability of membrane changes]     B --&gt; C[ ]     C --&gt; D[positive ions inside axon increases]     D --&gt; E[ ]     E --&gt; F[Polarity reverses and depolarisation takes place]     F --&gt; G[Repolarisation - potassium gates open]     G --&gt; H[ ]     H --&gt; I[Axoplasm becomes negatively charged and ECF becomes positive again]     </pre>	4 points -4 marks	9	189

Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
<b>1</b>	Immunity acquired after an infection is _____ immunity A. Artificial Acquired B. Passive C. Innate <b>D. <u>Natural Acquired</u></b>	1 mark for correct answer	10	Pg. 223
<b>2</b>	Passive immunity is _____. A. Acquired through natural overt or latent infection B. Acquired through Vaccination <b>C. <u>Acquired through readymade antibodies</u></b> D. Acquired by activating immune system of the body	1 mark for correct answer	10	Pg. 223
<b>3</b>	'Pathogens' are _____ A. Substances produced against any disease. B. Chemical substances produced by the host cells to kill the parasite animal. <b>C. <u>Disease causing organisms.</u></b> D. Cells which kill the parasites	1 mark for correct answer	10	Pg. 228
<b>4</b>	Which one of the following diseases is a communicable? A. Rickets <b>B. <u>Malaria</u></b> C. Diabetes D. Scurvy	1 mark for correct answer	10	Pg. 228

5	<p>Which one of the following is the most accurate definition of the term 'health'?</p> <p>A. Health is the state of body and mind in a balanced condition.</p> <p>B. Health is the reflection of a smiling face.</p> <p><b>C. <u>Health is a state of complete physical, mental and social well-being.</u></b></p> <p>D. Health is the symbol of economic prosperity.</p>	1 mark for correct answer	10	Pg. 221
6	<p>AIDS is caused by _____</p> <p>A. Fungus</p> <p><b>B. <u>Virus</u></b></p> <p>C. Bacterium</p> <p>D. Helminth worm</p>	1 mark for correct answer	10	Pg. 237
7	<p>A person preparing food in an unhygienic place can be a major source of spread of disease _____</p> <p>A. Pneumonia</p> <p>B. Syphilis</p> <p><b>C. <u>Typhoid</u></b></p> <p>D. Cancer</p>	1 mark for correct answer	10	Pg. 232
8	<p>Carcinoma is cancer of _____ cells.</p> <p><b>A. <u>Epithelial</u></b></p> <p>B. Connective tissue</p> <p>C. Bone</p> <p>D. Blood</p>	1 mark for correct answer	10	Pg. 235
9	<p>Inactive gene that can cause cancer is called _____</p> <p>A. Transposon</p> <p><b>B. <u>Proto-oncogene</u></b></p>	1 mark for correct answer	10	Pg. 236

	C. Tumour promoter gene D. Tumour suppressor gene			
<b>10</b>	antiviral proteins released by cells infected by the virus are called _____ A. histamines <b>B. <u>interferons</u></b> C. pyrogens D. allergens	1 mark for correct answer	10	Pg. 222
<b>Single sentence answers</b>				
<b>1</b>	Define 'Health', as given by WHO.	1 mark	10	Pg. 221
<b>2</b>	What are Non-communicable diseases?	1 mark	10	Pg.228
<b>3</b>	Name the causative pathogen of Ascariasis.	1 mark	10	Pg.230
<b>4</b>	What is 'serology'?	1 mark	10	Pg.226
<b>5</b>	Name the vector of malarial pathogen.	1 mark	10	Pg. 229
<b>6</b>	What are congenital diseases?	1 mark	10	Pg.228
<b>7</b>	Name the vector of pathogen responsible for filariasis.	1 mark	10	Pg. 232
<b>8</b>	When a drug addict is not allowed to take drugs he shows certain typical symptoms. What are these symptoms termed as?	1 mark	10	Pg. 242
<b>9</b>	What is 'Leukemia'?	1 mark	10	Pg. 235
<b>10</b>	Define 'Adolescence'.	1 mark	10	Pg. 239
<b>2 Marks</b>				
<b>1</b>	Enlist the four types of T- lymphocytes, responsible for immune response of our body	½ mark for each	10	Pg. 224

<b>2</b>	Enlist any four barriers that contribute to innate immunity.	½ mark for each	10	Pg. 222
<b>3</b>	Enlist any four therapies used to treat a cancer patient.	½ mark for each	10	Pg. 236
<b>4</b>	Give any four the symptoms of Ascariasis.	½ mark for each	10	Pg. 230
<b>5</b>	State the significance of mother's milk to a new-born.	1 mark for correct answer	10	Pg.223
<b>6</b>	Enlist any two features of Acquired immunity.	1 mark for each	10	Pg. 222-223
<b>7</b>	Sketch and label – Structure of Antibody	½ mark for diagram and 1 ½ marks for three labels	10	Pg. 225
<b>3 Marks</b>				
<b>1</b>	When the ELISA test was conducted on an immune-suppressed person, he tested positive for a pathogen.  a) Identify the disease the patient is suffering from.  b) Name the causative entity.  c) Mention the cells of the body that are attacked by the pathogen.	1 mark each	10	Pg. 237
<b>2</b>	Explain the importance of epithelial surface in innate immunity.	1 mark each	10	Pg. 225
<b>3</b>	Explain any three causes of substance abuse during adolescence.	1 mark each	10	Pg. 241
<b>4</b>	Explain the three stages of adolescence.	1 mark each	10	Pg. 239



<b>5</b>	Give the preventive measures of AIDS	½ mark each	10	Pg.238
<b>6</b>	a) How is a tumor formed in the body?  b) What are the two types of tumor?  c) Which of these under goes metastasis?	1 mark each	10	Pg. 234
<b>7</b>	Explain the mode of transmission of HIV.	1 mark each	10	Pg. 237
<b>4 Marks</b>				
<b>1</b>	Explain the various types of acquired immunity.	1 mark each	10	Pg. 223
<b>2</b>	Explain the clinical manifestation of AIDS.	1 mark each	10	Pg. 238
<b>3</b>	Explain any four therapies used in treatment of cancer.	1 mark each	10	Pg. 236

Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
1	Wheat -Atlas 66 has high contents of _____. A <b><u>protein</u></b> B vitamin C carbohydrates D Fats	1	11	253
2	Species of ____ is involved in cheese formation. A <b><u>Penicillium</u></b> B <i>Lactobacillus</i> C <i>Saccharomyces</i> D <i>Leuconostoc</i>	1	11	259
3	<i>Aspergillus niger</i> is used to prepare vit ____ A D B B2 C B12 D <b><u>C</u></b>	1	11	260
4	<i>Saccharomyces cerevisiae</i> is used to produce enzyme ____. A <b><u>Invertase</u></b> B Pectinase C Lipase D Cellulase	1	11	261
5	Select the odd one from given herbicides. A <b><u>Cactoblastis</u></b> B <i>Alternaria</i> C <i>Fusarium</i> D <i>Phytophthora</i>	1	11	266
6	_____ associated with plants like <i>Azolla</i> and <i>Cycas</i> can be used as a biofertilizers. A <b><u>Anabaena</u></b>	1	11	266

	<p>B <i>Nostoc</i></p> <p>C <i>Plectonema</i></p> <p>D <i>Oscillatoria</i></p>			
7	<p>Antibiotic Chloromycetin is obtained from _____.</p> <p>A <i>Streptomyces erythreus</i></p> <p>B <i>Penicillium chrysogenum</i></p> <p>C <b><u><i>Streptomyces venezuelae</i></u></b></p> <p>D <i>Streptomyces griseus</i></p>	1	11	261
8	<p>Indian curd is prepared by inoculating milk with _____.</p> <p>A <b><u><i>Lactobacillus acidophilus</i></u></b></p> <p>B <i>Lactobacillus bulgaricus</i></p> <p>C <i>Penicillium roquefortii</i></p> <p>D <i>Penicillium camembertii</i></p>	1	11	259
<b>Single sentence answer</b>				
1	What is biofortification?	1	11	252
2	Name biofortified wheat variety for high protein content.	1	11	253
3	What is the main function of a fermenter?	1	11	259
4	Name the chamber in which the suspended objects are filtered and removed during sewage treatment?	1	11	262
5	What is mycorrhiza?	1	11	267
6	Name the tank to which the sewage water is passed after the preliminary treatment?	1	11	263
7	What are flocs with respect to sewage treatment	1	11	263
8	Small part of activated sludge is passed back into primary sedimentation tank.	1	11	263

	If the above statement is correct then rewrite as it is and in case it is incorrect then reframe it.													
<b>2 marks</b>														
<b>1</b>	Rearrange the names of tanks used in sewage treatment as per the flow of procedure. a) settling tank b) Grit Chamber c) aeration tanks d) primary sedimentation tank.	½ mark for each correct position	11	263										
<b>2</b>	Give names of two organisations which provide most commonly used models of biogas plants.	1+1	11	264										
<b>3</b>	A young girl is health conscious. Her dietician advised her to include mushrooms in her diet. What must be the reason?	Two points _ 1 mark each	11	259										
<b>4</b>	Match the column A with B and rewrite correct pairs.  <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">A</td> <td style="width: 50%; text-align: center;">B</td> </tr> <tr> <td>i. Atlas 66</td> <td>a) vit A</td> </tr> <tr> <td>ii. Rice</td> <td>b) vit C</td> </tr> <tr> <td>iii. Spinach</td> <td>c) protein</td> </tr> <tr> <td>iv. bitter gourd</td> <td>d) Iron</td> </tr> </table>	A	B	i. Atlas 66	a) vit A	ii. Rice	b) vit C	iii. Spinach	c) protein	iv. bitter gourd	d) Iron	1/2mark for each correct pair	11	253
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i. Atlas 66	a) vit A													
ii. Rice	b) vit C													
iii. Spinach	c) protein													
iv. bitter gourd	d) Iron													
<b>5</b>	Name two bacteria which are responsible for fermenting dough of idli, dosa.	Two names_ 1 mark each	11	259										
<b>6</b>	Name two acids produced by using <i>Aspergillus niger</i> ?	Two names _ 1 mark each	11	260										
<b>7</b>	Name two amino acids found in fortified Maize variety?	Two names_ 1 mark each	11	253										
<b>3 marks</b>														
<b>1</b>	Match the column A with B and rewrite correct pairs  <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">A</td> <td style="width: 50%; text-align: center;">B</td> </tr> <tr> <td>I. Mycoherbicides</td> <td>a) <i>Cactoblastis</i></td> </tr> <tr> <td>II. Bacterial herbicides</td> <td>b) <i>Alternaria</i></td> </tr> <tr> <td>III. Insects as herbicides</td> <td>c) <i>Xanthomonas</i></td> </tr> </table>	A	B	I. Mycoherbicides	a) <i>Cactoblastis</i>	II. Bacterial herbicides	b) <i>Alternaria</i>	III. Insects as herbicides	c) <i>Xanthomonas</i>	1 mark for each correct pair	11	265		
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2	State any three benefits of using Biogas.	1 mark for each correct point	11	264										
3	Write chemical reactions to represent Methanogenesis.	1 mark for each correct reaction	11	264										
4	Describe the structure of a biogas plant.	3points, 1 mark each	11	264										
5	State any three benefits of mycorrhiza.	1 mark for each correct point	11	267										
6	State any three benefits of Biofertilizers.	1 mark for each correct point	11	268										
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2	Explain the process of sewage water treatment before it can be discharged into natural bodies.	2points = 1 mark for each step. 4steps = 4 mark	11	262- 263										
3	<p>Match the column A with B and rewrite correct pairs.</p> <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: center; width: 50%;"><b>A</b></th> <th style="text-align: center; width: 50%;"><b>B</b></th> </tr> </thead> <tbody> <tr> <td>i. Symbiotic N<sub>2</sub> fixing bacteria</td> <td>a) VAM</td> </tr> <tr> <td>ii. Free-living N<sub>2</sub> fixing bacteria</td> <td>b) <i>Rhizobium</i></td> </tr> <tr> <td>iii. Phosphate solubilizer</td> <td>c) <i>Nostoc</i></td> </tr> <tr> <td>iv. Endomycorrhizae</td> <td>d) <i>Micrococcus</i></td> </tr> </tbody> </table>	<b>A</b>	<b>B</b>	i. Symbiotic N <sub>2</sub> fixing bacteria	a) VAM	ii. Free-living N <sub>2</sub> fixing bacteria	b) <i>Rhizobium</i>	iii. Phosphate solubilizer	c) <i>Nostoc</i>	iv. Endomycorrhizae	d) <i>Micrococcus</i>	1 mark for each correct pair	11	266
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Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
1	The technique which involves addition or deletion of genes is.... <b>A <u>genetic engineering</u></b> B gene therapy C gene splicing D gene piracy	1	12	273
2	ECoRI is obtained from... A <i>Escherichia coli</i> R13 <b>B <u>Escherichia coli Ry13</u></b> C <i>Escherichia coli</i> R225 D <i>Escherichia coli</i> RC	1	12	275
3	The enzyme restriction endonuclease ... <b>A <u>cuts double strand of DNA</u></b> B joins strand of DNA C cuts RNA strand D cuts single stranded DNA	1	12	275
4	Ti plasmid being used for introducing genes in plants obtained from.... A <i>Agrobacterium rhizogenes</i> B <i>Escherichia coli</i> C <i>Agrobacterium</i> T20 <b>D <u>Agrobacterium tumefaciens</u></b>	1	12	277
	Polymerase chain reaction is most useful in.... <b>A <u>DNA amplification</u></b> B DNA synthesis C protein synthesis D selective replication of DNA	1	12	274
5	In Bt cotton a transgenic plant, Bt refers to.... A bold cotton <b>B <u>Bacillus thuringiensis</u></b>	1	12	283

	C beta carotene D tumor inducing bacteria			
7	In transgenic crop substance provitamin A is obtained in.... <b>A <u>rice</u></b> B tomato C canola D sugarcane	1	12	283
8	In Anaemia the Recombinant protein....is produced by r-DNA technology. A Relasein <b>B <u>Insulin</u></b> C Erythroprotein D Antoitrsin	1	12	280
9	In biotechnology GMO refers to.... A generation mediated organisms <b>B <u>genetically modified organisms</u></b> C good modified organisms D gross modified organisms	1	12	282
10	First biopatent to genetically engineered bacterium.... <b>A <u>Pseudomonas</u></b> B <i>Agrobacterium</i> C <i>Azatobacter</i> D <i>E. coli.</i>	1	12	289
<b>Single sentence answers</b>				
1	In which transgenic plant the substance Flavonoids obtained as antioxidants.	1	12	283
2	What is Germline therapy?	1	12	282
3	Which Recombinant proteins is obtained for Hepatitis-B by r-DNA technology.	1	12	280
4	What is plasmid?	1	12	277
5	What is Palindromic sequence?	1	12	276
6	Alu-I is obtained from which organism?	1	12	275



7	What is the role of Taq-polymerase in PCR technology?	1	12	274
8	Bt-cotton shows adverse effect on the population of which butterfly?	1	12	288
<b>2 marks</b>				
1	What is Biopiracy? Explain it with respect to Turmeric.	Definition-1 mark Two correct points-1 mark	12	290
2	How Biotechnology is applicable with respect to Genomics?	Any two correct points-2 marks	12	279
3	Explain how transgenic fish is commercially beneficial.	Any two correct points-2 marks	12	287
4	Write any two human disorders and to cure which recombinant proteins are produced?	Two points-1 mark each	12	280
5	For production of edible vaccines plants are used. Explain this any one example.	Correct explanation-1 mark Example-1 mark	12	285
6	Write a note on uses of somatic cell gene therapy.	Any two applications-1 mark each	12	282
7	Define vector? write any two examples,	Definition -1 mark  Two examples-1/2 mark each.	12	277
<b>3 marks</b>				
1	Explain traditional use of Biotechnology.	Three correct points-1 mark each	12	272
2	Define biotechnology? Which are the basic principles and process of biotechnology?	Definition-1 mark	12	272

		Basic process and principles-2 marks		
3	What is gene cloning? Explain different tools used for it.	Definition-1 mark  Any two types of tools-1 mark each	12	273
4	Explain types of enzymes used in biotechnology?	Three correct points function of enzyme-1 mark	12	275
5	What is Recognition sequence? Explain in brief.	Definition-1 mark  Explanation- two correct points- 2marks	12	275
6	Define Biotechnology? How it is used in production of Human insulin.	Definition 1 mark  Two correct points in production process- 1 mark each	12	280
7	What is GM plant? Write its different advantages.	Definition-1 mark  Any two advantages- 2 marks	12	283
<b>4 marks</b>				
1	What is PCR? Explain different steps involved in it.	Definition-1 mark  Three step- 1 mark each	12	274
2	Explain the following terms with respect to rDNA technology  i) passanger DNA	Each term-1 mark	12	277

	ii) Chimeric DNA iii) Transformed cell iv) restriction site			
<b>3</b>	Define biotechnology. Give any three application of it?	Definition-1 mark  Any three application-1 mark each	12	279
<b>4</b>	Which are different adverse effect of biotechnology on human health and environment?	Any four points- 1 mark each	12	288
<b>5</b>	Explain biopatent and Biopiracy with different examples?	Correct explanation- two points- 2 marks each	12	289

Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
1	An association of individuals of different species living in the same habitat and having functional interactions is called as...  <b>A <u>biotic community.</u></b> B population. C ecosystem. D tropical niche.	1	13	293
2	Community is defined as.... A Group of similar Angiosperms. <b>B <u>interacting populations.</u></b> C interacting ecosystem D group of mangroves.	1	13	293
3	Regional and local variations within each biome lead to the formation of variety of...  <b>A <u>Habitats</u></b> B niches C species D genus	1	13	293
4	Maximum absorption of rainfall water is done by....  <b>A <u>tropical evergreen forest.</u></b> B tropical deciduous forest. C coniferous forest. D deserts	1	13	293
5	The cattle egret and grazing cattle in close association is a classic example of...  A Mutualism. B Parasitism. <b>C <u>Commensalism.</u></b> D Competition	1	13	305

6	<p>The ecological niche of population is a ...</p> <p>A geographical area where it lives.</p> <p><b><u>B set of conditions and resources that it uses.</u></b></p> <p>C habitat of organisms</p> <p>D place of origin of organisms</p>	1	13	294
7	<p>Tropical dense forests are due to...</p> <p>A high rainfall and low temperature</p> <p><b><u>B high rainfall and warm temperature</u></b></p> <p>C low rainfall and high temperature</p> <p>D low rainfall and low temperature</p>	1	13	295
8	<p>Polar bears show hibernation during...</p> <p><b><u>A winter</u></b></p> <p>B summer</p> <p>C rainy season</p> <p>D favourable conditions</p>	1	13	297
9	<p>In Logistic growth curve lag phase shows...</p> <p>A fast growth</p> <p><b><u>B initial stage of growth</u></b></p> <p>C stationary phase of growth</p> <p>D diminishing phase of growth</p>	1	13	300
10	<p>The number of deaths under ideal conditions is known as</p> <p><b><u>A Absolute mortality</u></b></p> <p>B Realized mortality</p> <p>C Absolute natality</p> <p>D Realized natality</p>	1	13	298
<b>Single sentence answers</b>				
1	Define Absolute Mortality.	1	13	298
2	How absolute Natality differs from Realized Natality.	1	13	298
3	What is population ecology?	1	13	298
4	Define the term spatial niche.	1	13	295

5	What is ESS?	1	13	298
6	Define the term Habitat.	1	13	294
7	Rearrange the terms population, Biome, Community and Organisms in ecological hierarchy	1	13	293
8	What Allen's rule indicates in adaptation?	1	13	297
<b>2 marks</b>				
1	Show the graphical representation of mean annual rainfall with respect to mean annual temperature.	Any two correct representations-1 mark each	13	293
2	Define the term Biome and population.	1 mark each	13	293
3	How Habitat differs from Niche?	Any two correct points-1 mark each	13	294
4	How 'Temperature' as an abiotic factor plays a role in ecology?	Any two correct points-1 mark each	13	295
5	Define the term Adaptation. State its two advantages.	Definition- 1 mark Any two advantages-1/2 mark each	13	297
6	What is Mortality? What are its two types?	Definition- 1 mark Each type-1/2 mark	13	298
7	Define the term population interactions. State its two types	Definition- 1 mark Each type-1/2 mark	13	301
<b>3 marks</b>				
1	Define Niche with its different types.	Definition – 1 mark Any two types -1 mark each	13	295
2	Define mutualism. Explain its one type.	Definition -1 mark	13	302

		Correct example and explanation-2 marks		
3	Explain any three important characteristics of population.	Three correct characters- 1 mark each	13	297
4	Explain different population interactions with examples.	Any three types- 1 mark each	13	301
5	What is Commensalism? Explain it with suitable example.	Definition- 1 mark Correct explanation and example-2 marks	13	304
6	Explain the role of any three abiotic factors affecting the environment.	Three factors with correct explanation- 1 mark each	13	295
7	Explain different types of growth models.	Two types – 1 and ½ mark each	13	300
<b>4 marks</b>				
1	Define population growth. Explain different types of age pyramids.	Definition – 1 mark Any three pyramids- 1 mark each	13	299
2	Which are different biotic and abiotic factors involved in ecology and how they play their role?	Any two biotic and abiotic factors with correct explanation- 2 marks each	13	294
3	What is population interaction? Explain the interactions in Mutualism and Competition.	Definition -1 mark Mutualism and commensalism correct explanation-1 and ½ mark each	13	302

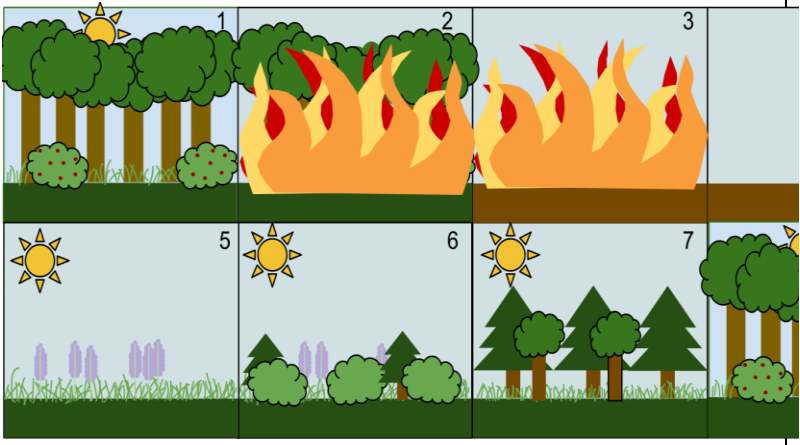
Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
<b>1</b>	Lichens taking roots on bare rocks are an example of _____. A. climax community <b>B. <u>pioneer species</u></b> C. climax species D. secondary succession	1 mark	14	Pg. 317
<b>2</b>	Growth of new grasses and shrubs on a patch of forest burnt down by forest fire, is a an example of _____ A. <b>secondary succession</b> B. pioneer species C. climax species D. primary succession	1 mark	14	Pg. 319 Fig. 14.14
<b>3</b>	All types of ecological succession whether on land or in water always reaches _____ A. <b>climax community</b> B. pioneer species C. climax species D. secondary succession	1 mark	14	Pg. 318
<b>Single sentence answers</b>				
<b>1</b>	What is 'Sere'?	1 mark	14	Pg. 316
<b>2</b>	Define 'Ecological succession'	1 mark	14	Pg. 316
<b>3</b>	What is 'Climax community'?	1 mark	14	Pg. 317



**2 Marks**

<b>1</b>	Name the types of succession of plants based on the nature of habitat.	1 mark each	14	Pg. 317
<b>2</b>	Give reasons – ‘Primary succession is always slower than secondary succession’	1 mark each	14	Pg. 317

**3 Marks**

<b>1</b>	What are ‘pioneer species’? Give two examples of them.	1 mark each	14	Pg. 317
<b>2</b>	<p>Explain the following sequence of succession after a forest fire.</p> 	1 mark each	14	Pg. 317

**Answer the following – 4 Marks**

<b>1</b>	Explain the progress of ecological succession in newly formed volcanic island.	1 mark each	14	Pg. 317
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Question no.	Question	Marking scheme	Chapter No.	Page No.
<b>MCQ</b>				
1	Dodo bird, stellar sea cow and passenger pigeon are few examples of extinction due to _____. A habitat loss B hunting C Alien species invasion <b>D <u>overexploitation.</u></b>	1	15	326
2	Select the odd example with respect to types of conservation strategies. A Pawra tribals in Satpuda have protected varieties of corn with different coloured kernels. B Kanha forest as tiger reserve. <b>C <u>Crocodile bank of Chennai</u></b> D Sacred groves	1	15	328
3	India boasts a handsome share of ____ % of total biodiversity wealth of the earth. A 2.4 <b>B <u>8.1</u></b> C 14 D 22	1	15	325
<b>Single sentence answers</b>				
1	What is 'Hello Forest'?	1	15	341
2	Name the Japanese method of plantation adapted by our government.	1	15	341
3	A medicinal plant <i>Rauwolfia vomitoria</i> shows variations in concentration of reserpine from location to location. What type of level of biodiversity is this?	1	15	322
<b>2 marks</b>				
1	Write full form of ____ i) IUCN ii) NBA	1+1	15	326

				330
<b>2</b>	Give any four factors that favour high speciation at lower altitudes.	½ mark each =2	15	323
<b>3</b>	With the help of any one example explain Alien species invasion as one of the causes of Biodiversity losses.	Meaning 1 mark+exa 1 mark	15	326
<b>3 marks</b>				
<b>1</b>	Enlist any six categories into which a given species is placed once it has been thoroughly evaluated by IUCN.	1/2mark each =3	15	327
<b>2</b>	The reasons for conservation of biodiversity can be classified into three categories. Name them and describe each in brief.	½ mark name+1/2 mark describe	15	328
<b>4 marks</b>				
<b>1</b>	Describe any four measures to achieve Mission Harit Maharashtra	1 mark each	15	341

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