

**KENDRIYA VIDYALAYA SANGATHAN, LUCKNOW REGION**

**CLASS: XII**

**SUBJECT :BIOLOGY**

**MAX. MARKS:70**

**TIME:3 HRS**

**(ANSWER KEY)**

<b>SECTION A</b>		
<b>Q.N</b>	<b>ANSWERS</b>	<b>MARKS</b>
1	(c) <i>Parthenium</i>	1
2.	(a) Seminiferous tubules	1
3	(d) Sex- linked recessive	1
4	(b) dependent DNA polymerase catalyses polymerisation only in one direction (5'to 3').	1
5	(a) Ethidium bromide in UV radiation	1
6	(d) ii & iii	1
7	(b) Sample B is more polluted	1
8	(c) Antigen-antibody interaction	1
9	(a) 25%	1
10	(d) high levels of species richness and high degree of endemism	1
11	(d) 0: 1 : 7	1
12	(d) All of these	1
13	(C) A is True but R is False.	1
14	(A) Both A and R are true and R is the correct explanation of A	1
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<b>SECTION B</b>		
17	(i)a- FSH b- LH, c- LH <span style="float:right">½ x 3</span> (ii) Pituitary gland <span style="float:right">½</span> OR (i) Signals for parturition originate from the fully developed foetus the placenta which induce uterine contractions. This is called foetal ejection reflex. <span style="float:right">1</span> (ii) Colostrum contains antibodies (IgA), to (passively) immunize the baby. <span style="float:right">1</span>	2
18	i) Phenotypic ratio 3 : 1 <span style="float:right">1</span> ii) Genotypic ratio 1 : 1 <span style="float:right">1</span>	2
19	Condition is allergy, cells responsible- mast cells, chemicals histamine & serotonin <span style="float:right">½ x 4</span>	2
20	a) Towards left hand side, In the wells <span style="float:right">½ x 2</span> b) DNA fragments in band 'N' are smaller in size than fragments in band 'M'. Therefore, they moved faster and farther away. <span style="float:right">1</span>	2
21	A. i) Curve A <span style="float:right">1</span> ii) It is not realistic as resources become limiting sooner or later <span style="float:right">1</span> OR B. 1. Detritus is rich in chitin which resist decomposition <span style="float:right">1</span> 2. Marshy areas lack oxygen hence decomposition process is slow. <span style="float:right">1</span>	2
<b>SECTION C</b>		
22	a) i) spermatogenesis will be inhibited due to not getting optimal temperature. <span style="float:right">1</span>	3

	ii) Yes, one descended testis will be able to produce sperms. 1 b) i) Scrotum $\frac{1}{2}$ ii) $2 - 2.5^{\circ}\text{C}$ lower than the normal internal body temperature. $\frac{1}{2}$	
23	(a) Embryo developed from the synergid - haploid and Embryo developed from the nucellus- diploid. $\frac{1}{2} \times 2 = 1$ (b) Yes, an unfertilized apomictic embryo sac can give rise to a diploid embryo. If the megaspore mother cell develops into an embryo sac without meiotic division, it will give rise to a diploid embryo. $1 + 1$	3
24	(a) If histone proteins were rich in acidic amino acids instead of basic amino acids then they may not have any role in DNA packaging in eukaryotes as DNA is also negatively charged acidic molecule. The packaging of DNA around the nucleosome would not happen. Consequently, the chromatin fibre would not be formed. $1 + 1$ (b) The packaging of chromatin at higher level requires non-histone chromosomal proteins (NHC) 1	3
25	a) Given, number of red beetles (bb) = 36% = 0.36 therefore, frequency of allele 'b' = $\sqrt{0.36} = 0.6$ 1 b) As, $p + q = 1$ therefore, $p = 1 - 0.6 = 0.4$ so the percentage of heterozygous beetles = $2pq \times 100 = 2 \times 0.4 \times 0.6 \times 100 = 48\%$ 1 c) number of red beetles = $0.36 \times 1500 = 540$ number of black beetles = $1500 - 540 = 960$ 1	3
26	a) i) Colostrum : Passive acquired immunity as readymade antibodies are provided $\frac{1}{2}$ ii) Vaccination: Active acquired immunity as antibodies are produced by body itself $\frac{1}{2}$ b) i) Colostrum : IgA, Allergy : IgE $\frac{1}{2} \times 2 = 1$ ii) Two primary lymphoid organs : Bone marrow and Thymus $\frac{1}{2} \times 2 = 1$	3
27	(a) A- Proinsulin, B- C-Peptide $\frac{1}{2} \times 2 = 1$ (b) Insulin is synthesised naturally as a prohormone from beta cells of Islets of langerhans. 1 (c) Humulin is human insulin prepared synthetically by r-DNA technology 1 OR a) BamHI because its recognition site is present in tet <sup>R</sup> . $1 + 1 = 2$ b) Other two enzymes namely PvuI and EcoRI cannot be used because their recognition sites are not present in tet <sup>R</sup> . 1	3
28	Correct explanation of various steps of Hershey & Chase experiment (explanation or diagrammatic)	3
<b>SECTION D</b>		
29	a) 6 genotypes for 4 blood groups 1 b) Gene <i>i</i> does not produce any antigen. 1 c) in Blood group AB with genotype I <sup>A</sup> I <sup>B</sup> both the alleles I <sup>A</sup> and I <sup>B</sup> express simultaneously thus showing co-dominance. 2 OR d) The gene responsible for determination of blood group in ABO blood group system has three allelic forms instead of two thus shows multiple allelism. 2	4
30	(a) B-lymphocytes and T-lymphocytes $\frac{1}{2} \times 2 = 1$ (b) when our body encounters a pathogen for the second time 1 (c) i-It is characterised by memory of the first encounter with a pathogen.	4

	<p>ii-it can differentiate the self cells from non-self cells. <span style="float: right;">1x2 =2</span></p> <p>(OR)</p> <p>(d) B-lymphocytes produce an army of protein called antibodies which fight with the antigens. T-lymphocytes stimulate B-lymphocytes to produce antibodies and they are responsible for cell mediated immunity. <span style="float: right;">1x2=2</span></p>	
<b>SECTION E</b>		
31	<p>(A) i) Endosperm development precedes embryo development because endosperm provides nutrition for the developing embryo. It is an adaptation to provide assured nutrition to the developing embryo. <span style="float: right;">1</span></p> <p>(ii) Groundnut seeds are ex-albuminous because they have no residual endosperm as it is completely consumed during embryo development whereas Castor seeds are albuminous because they retain a part of endosperm as it is not completely used up during embryo development. <span style="float: right;">1</span></p> <p>(iii) Micropyle remains as a small pore in the seed coat of a seed to facilitate entry of oxygen and water into the seed during germination. <span style="float: right;">1</span></p> <p>(iv) Integuments of an ovule harden and the water content is highly reduced as the seed matures to harden and provide protection. <span style="float: right;">1</span></p> <p>(v) Apple and Cashew are not called true fruits because the thalamus also contributes to fruit formation. <span style="float: right;">1</span></p> <p style="text-align: center;">OR</p> <p>(a) Female partner is often blamed due to following reasons: (i) Social mind set (ii) Inequality of sexes (iii) Lack of awareness/male dominated society. (iv) Awareness is to be created that abnormality can occur in both male and females and infertility issues with suitable examples (v) Mutual respect towards both the partners in case of the problem and to find the remedy from medical experts (vi) Educate them to find the reason and not believe in superstitions. (ANY 4 POINTS) <span style="float: right;">½ x4=2</span></p> <p>(b) Infertility is caused due to physical abnormality in reproductive system, congenital, immunological or psychological problems. <span style="float: right;">2</span></p> <p>(c) Artificial Insemination. <span style="float: right;">1</span></p>	5
32	<p>A. i) The Nile Perch introduced into Lake Victoria in East Africa led eventually to the extinction of an ecologically unique assemblage of more than 200 species of cichlid fish in the lake. <span style="float: right;">1</span></p> <p>The environmental damage caused and threat posed to our native species by invasive weed species like carrot grass (<i>Parthenium</i>), <i>Lantana</i> and water hyacinth (<i>Eicchornia</i>). <span style="float: right;">1</span></p> <p>The introduction of the African catfish <i>Clarias gariepinus</i> for aquaculture purposes is posing a threat to the indigenous catfishes in our rivers. <span style="float: right;">1</span></p> <p>ii) in <i>situ</i> and <i>ex situ</i></p> <p><i>in situ</i> – protection of organisms in their natural habitats ex- protected areas, sacred groves, Biosphere reserves <span style="float: right;">1</span></p> <p><i>ex situ</i>- protection of organisms outside their habitat under special human care ex - zoo, gene bank. <span style="float: right;">1</span></p> <p style="text-align: center;">OR</p> <p>B. (a) If the age distribution (per cent individuals of a given age or age group) is plotted for the population, the resulting structure is called an age pyramid <span style="float: right;">1</span></p> <p>(b) (A) Expanding, Pyramidal shape (B) stable, Bell shaped and (C) declining, urn shape <span style="float: right;">½ x6=3</span></p> <p>(c) Age pyramids can provide us the inputs to find ways to control population size in case of an expanding population. eg- family planning measures. <span style="float: right;">1</span></p>	5

33	<p>(A) a) If the nutrient medium for the bacteria contains lactose the operon will be expressed as the lactose will act as inducer and in the presence of an inducer, the repressor is inactivated by interaction with inducer. This allows RNA polymerase access to promoter and transcription proceeds. 2</p> <p>b) When the active site of enzyme permease present in the cell membrane of a bacterium has been blocked by an inhibitor, the lactose is not transported into the cell because the lactose is transported into the cells through the action of permease As lactose is the inducer, the lac operon will not be switched on. 3</p> <p style="text-align: center;">OR</p> <p>(B) (a) Post-transcriptional modifications 3</p> <p>i. The primary transcripts are non-functional, containing both the coding region exon, and non- coding region intron, in RNA and are called hnRNA.</p> <p>ii. The hnRNA undergoes two additional processes called capping and tailing. In capping, an unusual nucleotide, methyl guanosine triphosphate, is added to the 5'-end of hnRNA.</p> <p>In tailing, adenylate residues (about 200–300) are added at 3'-end in a template independent manner.</p> <p>iii. Now the hnRNA undergoes a process where the introns are removed and exons are joined to form mRNA by the process called splicing.</p> <p>(b) In prokaryotes, there is a single DNA-dependent RNA polymerase that catalyses transcription of all types of RNA in bacteria. In bacteria, mRNA does not require any processing as it does not have any introns. 2</p>	
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