MARKING SCHEME (2024-25)

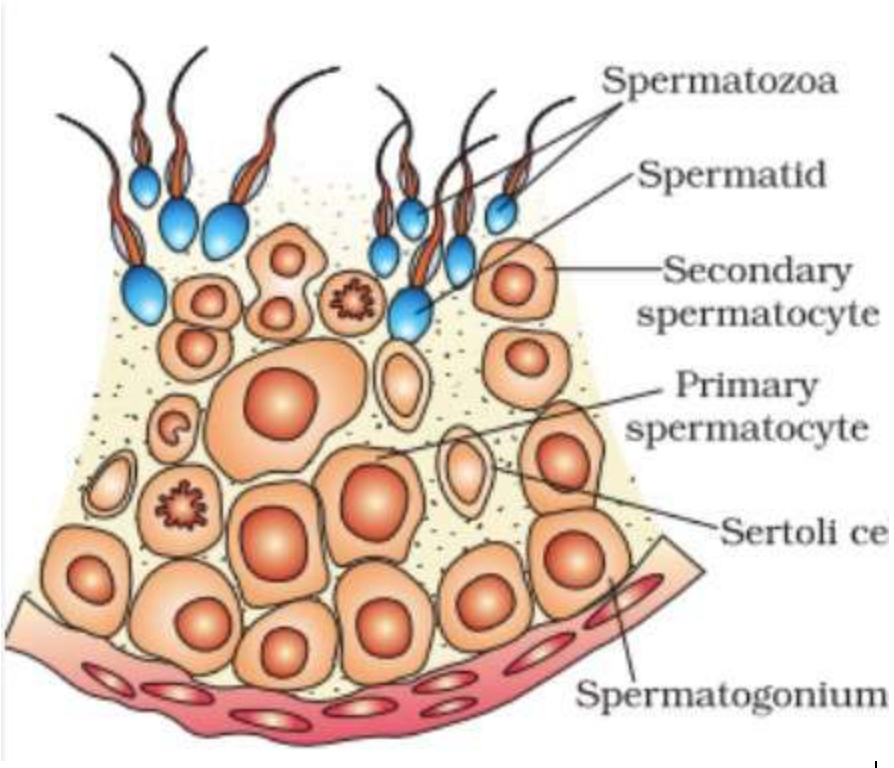
CLASS – XII

BIOLOGY (CODE- 865)

Q. No	Expected Answer/ Value Point	Marks
1	b) Syncarpous	**1**
2	c) 60000-80000	**1**
3	8	**1**
4	Autosome linked recessive trait	**1**
5	a) AUG codes for Methionine, and it also act as initiator codon.	**1**
6	H.M.S. Beagle	**1**
7	d) Thymine	**1**
8	Four	**1**
9	ELISA (Enzyme Linked Immuno-sorbent Assay)	**1**
10	b) As a blood cholesterol lowering agent.	**1**
11	c) Stanley Cohen and Herbert Boyer	**1**
12	b**)** Protein	**1**
13	b) 0.4	**1**
14	a) Gross primary productivity minus respiration losses.	**1**
15	Trophic level	**1**
16	**(a) Both A and R are true an R is right explanation of A**	**1**

17	**(a) Both A and R are true an R is right explanation of A**	**1**
18	**(c) A is true and R is false**	**1**
19	**a) Syngamy:** Fusion of one male gamete with nucleus of egg cell to form diploid zygote. **b) Triple fusion:** Fusion of other male gamete with two polar nuclei to form triploid primary endosperm nucleus.	**1** **1**
20	a) Motivate people for small families through contraceptive methods b) Statutory raising the marriageable age of females to 18 and males to 21 years	**1** **1**
21	Test cross To determine the genotype of an organism.	**1** **1**
22	Theory of chemical evolution was proposed by Oparin and Haldane. They proposed that the first form of life could have come from pre-existing non- living organic molecules and the formation of life was preceded by chemical evolution.	**2**
23	Ascaris **Two symptoms** of **ascariasis** are as follows: (i) Internal bleeding and anemia (ii) Fever **Or** **Interferons** are the proteins which are secreted by virus infected cells.	**1** **1/2** **1/2** **1**

	Interferons protect non infected cells from further viral infection.	**1**
24	**Restriction Enzymes** are molecular scissors which cut DNA at specific locations. **Role in r-DNA technology:** The cut piece of DNA is linked with plasmid DNA to form recombinant DNA and to further, transfer in host organism for cloning. **Or** Gel electrophoresis is a technique to separate, the fragments of DNA, cut by action of restriction enzymes, under electric field. Separated DNA fragments can be visualized only after staining the DNA followed by exposure to UV radiation. Ethidium bromide.	**1** **1** **1** **1/2** **1/2**
25	**Pyramid** of energy is always upright because some energy is always lost in form of heat, when energy flows from one trophic level to next trophic level in pyramid of energy. **Or** The close association between egrets and grazing cattle is called **commensalism.** The **reason** for this interaction is that when grazing cattle move, they stir up and flush out insects from vegetation that otherwise will be	**2** **1** **1**

	difficult for egrets to find and catch.	
26	 **Diagrammatic sectional view of seminiferous tubule in human being.**	**3**
27	**Salient features of the Double-helix structure of DNA**: (i) DNA structure constitutes two polynucleotide chains, where the backbone is made by sugar-phosphate, and the nitrogenous bases are flanked inside. (ii) The two chains have anti-parallel polarity. It means, if one chain has the polarity 5'→3', the other has 3'→5'. (iii) The bases in two strands are paired through hydrogen bond. (a). Adenine is linked with two hydrogen bonds with Thymine. (b) Guanine is linked with Cytosine with three H-bonds. (c) Therefore, purine comes opposite to a	**½** **½** **½**

pyrimidine.

(iv) The pitch of the helix is 3.4 nm and there are roughly 10 bp in each turn. The distance between a bp in a helix is approximately 0.34 nm. ½

(v) The two chains are coiled in right handed fashion. ½

(vi) The plane of one base pair stacks over the other in double helix. ½

28

Sr. No	Name of genetic disorder	Reasons	Symptoms	
1.	Klinefelter's syndrome	An additional copy of X chromosome resulting into a karyotype of 47, XXY	Overall masculine development with Gynaecomastia	**1**
2.	Down's syndrome	Trisomy 21	Small rounded head, furrowed tongue, partially open mouth, palm broad with characteristic crease	**1**
3	Turner's syndrome	Absence of one of the X chromosomes	Sterile female with rudimentary ovary	**1**

Or

RNA Polymerase I: it transcribes rRNAs (28S, 18S, 5.8S).

RNA Polymerase II: It transcribes precursor of mRNA and heterogeneous nuclear RNA.

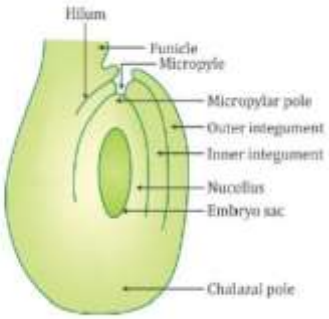
RNA Polymerase III: It helps in transcription of tRNA, 5srRNA, and snRNAs.

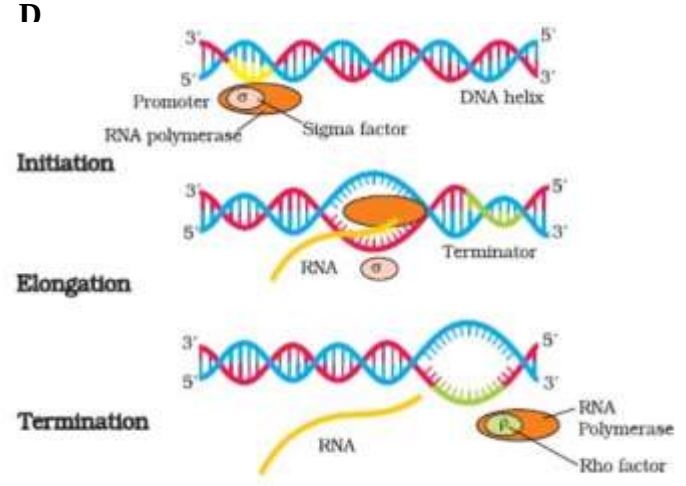
1½

	Gene Splicing: Primary transcript in eukaryotes contain both exons and introns. These introns are non- coding parts in transcript. Therefore, the removal of introns and joining of exons is called gene splicing.	**1½**
29	**Secondary treatment** of sewage is also called biological treatment because in this treatment, sewage is biodegraded with the help of microorganisms. Micro-organisms have following **roles** in sewage treatment: (i) Masses of bacteria and fungi (Flocs) are produced when primary effluent is passed into large aeration tanks which consumes major part of organic matter in effluent reducing it's BOD. (ii) Now this effluent is passed to settling tank where bacterial flocs settle as activated sludge. Small amount of activated sludge works as inoculum when passed back into aeration tank. (iii) Remaining part of sludge is taken into anaerobic sludge digester tanks where different anaerobic bacteria perform digestion of sludge to produce Biogas which is mixture of gases such as methane, hydrogen sulphide and carbon dioxide. **Or**	**3**

	(i) **Contact inhibition** is a property of normal cells. When normal cells come in contact with other cells inhibit their uncontrolled growth or tumorous growth. (ii) **Malignant tumour** is the mass of proliferating, neoplastic rapidly growing cells which invade and damage surrounding tissues. (iii) **Carcinogens** are the physical, chemical or biological agents which induce transformation of normal cells into cancerous neoplastic cells e.g. Radiations (X-rays, gamma rays and UV rays) and Chemical carcinogen like tobacco smoke.	**1** **1** **1**
30	**GMO** or Genetically Modified Organisms are plants, animals, bacteria and fungi, whose genes have been altered by manipulation. **Usefulness** of GM plants: (i) GM crops are more tolerant to abiotic stresses (Cold, draught, salt, heat). (ii) GM plants have less reliance on chemical pesticides.	**1** **1** **1**
31	(i) Rhino Virus (ii) Plasmodium which is a protozoa (iii) Amoebiasis.	**1** **1** **2**

		Three symptoms: a) Constipation b) abdominal pain c) Stools with excess mucous and blood clots. **Or**	**1**
	(i)	*Salmonella typhi*	**1**
	(ii)	Widal Test.	
32	(i)	The approach in which we conserve and protect the whole ecosystem and it's biodiversity at all levels is called *in situ* conservation. To protect entire forest to save the tiger.	**1**
	(ii)	Johannesburg, South Africa.	**1**
	(iii)	Four major causes of biodiversity losses are: (a) Habitat loss and fragmentation. (b) Over-exploitation (c) Alien species invasions (d) Co-extinctions	**2**
		Or **Broadly Utilitarian argument:** Biodiversity plays a major role in many ecosystem services that nature provides. For example Amazon forest is estimated to produce 20 percent of the total oxygen in the earth's atmosphere with the help of photosynthesis.	

33	**(i)**	In flow chart the hormone released by hypothalamus is **gonadotropin releasing hormone (GnRh)** **Function**: • It begins spermatogenesis at the age of puberty. • It Stimulates secretion of two gonadotropins: a) **Luteinising hormone** b) **Follicle stimulating hormone**	**1** **1** ½ ½
	(ii)	The hormone released by anterior pituitary which acts on Leydig cell is **Luteinising hormone.** **Function**: Luteinizing hormone stimulates synthesis and secretion of androgens.	½ ½
	(iii)	The hormone released by Leydig cells is androgen. Function: Androgen stimulates the process of spermatogenesis. **Or** Labelled diagram of typical anatropous ovule in flowering plants.  	½ ½ **5**
34	**Transcription**: The process of copying the genetic information from one strand of DNA into		**1**

	RNA is known as transcription. **Process of transcription in bacteria**: The process of transcription in bacteria consists of 3 steps: (i) **Initiation** of transcription Process: RNA polymerase binds to promotor and associates transiently with initiating factor sigma ρ(σ) initiates transcription. (ii) **Elongation** of transcription process: After binding to promotor, RNA polymerase facilitates opening of DNA helix. It uses nucleoside triphosphates as substrates and polymerises into nucleotides following principle of complementarity (except base pairing of adenosine with uracil instead of thymine). **D**  **ng process of Transcription in Bacteria**	**1** **1** **1**

	(iii)	Termination of transcription process: Once the polymerase reaches to terminator region the nascent RNA falls off. Polymerase transiently associated with rho (ρ) termination factor also falls off.	**1**
		Or	
	(i)	**Aim of the experiment done by Hershey and Chase:**	**1**
		They worked to discover whether it was protein or DNA from virus that enters bacteria.	**1**
	(ii)	They worked on **bacteriophage virus** which infects bacteria.	
	(iii)	**Main Steps:**	
		(a). They grew some viruses on a medium that contained radioactive phosphorus to prepare radioactive DNA and some others on medium that contained radioactive sulfur to prepare radioactive protein.	**1**
		(b). Radioactive phages were allowed to attach to E. coli bacteria. Then, the viral coats were removed from the bacteria by agitating them in a blender. The virus particles were separated from the bacteria by a centrifuge.	**1**
	(iv)	**Conclusion:**	**1**
		Bacteria which were infected with viruses that had radioactive DNA were radioactive, indicating that DNA was the genetic material that passed from the virus to the bacteria.	

35	(i)	Polymerase Chain Reaction	**1**
	(ii)	**Three steps** as given below:	**½**
		(a) Denaturation	**½**
		(b) Primer annealing	**½**
		(c) Extension of primers	**½**
		(iii) Role played by *Thermus aquaticus* in PCR: Repeated DNA amplification in PCR is achieved by the use of a thermostable DNA polymerase which is isolated from *Thermus aquaticus* bacteria.	**2**
		Or	
		• **Origin of replication (ori)** is a sequence from where replication starts and any piece of DNA when linked to this sequence can be made to replicate within host cell.	**1**
		• **Recognition sites**, in vector, are the sequences needed, to link the alien DNA. The presence of recognition site helps particular restriction enzyme to cut the vector DNA at a particular sequence.	**1**
		• **Selectable Marker** is a DNA sequence that aids in detecting and eliminating non-	**1**

		transformants and allowing selective growth of transformants. In given vector pBR322, the genes encoding resistance to following antibiotics are used as selectable markers: • **tet_R resistant** to **tetracycline**. • **amp_R resistant** to **ampicillin.**	**1** **1**