SET 3 MARKING SCHEME		
QN	ANSWER	MARKS
1	A	1
2	B	1
3	D	1
4	D	1
5	B	1
6	D	1
7	A	1
8	A	1
9	B	1
10	B	1
11	B	1
12	C	1
13	C	1
14	A	1
15	D	1
16	B	1
17	(a) Presence of sporopollenin protein in its outer layer exine (b) Pollen; non-sticky, light, feathery (anyone) Stigma: large, feathery (anyone)	2
18	The scientific name: Drosophila melanogaster. Reasons: Short life span. High reproductive rate. Clear-cut differences between males and females.	2
19	(a) Algae- Chlorella Bacteria: Methylophillus methylotropus (b) Because secondary treatment involves aerobic microbes. The microbial digestion of organic matter needs oxygen.	2
20	r- DNA is inserted within the coding sequence of β galactosidase. This causes insertional inactivation. If the plasmid does not have an insert, it produces a blue colour colony. The presence of insert results in insertional inactivation of the Z gene, and colonies do not produce any color.	2
21	(a) A- Exponential growth curve B- sigmoid growth curve (b) K- carrying capacity (c) Sigmoid growth curve is common in nature. **OR** Alien species compete for food and shelter with native species. Invasive species can change the food web in an ecosystem by destroying or replacing native food sources.	2

	Example: Introduction of Nile perch into Lake Victoria disturbed the ecosystem of the lake by eliminating several native species of small cichlid fishes. (Anyone explanation)	
22	(a) Embryo with an 8- 16 celled stage is known as a morula. Morula continues to divide and transform into blastocysts. (b) In the absence of fertilization, the corpus luteum degenerates causing the disintegration of the endometrium. (c) First polar body	3
23	Out breeding devices are meant to avoid self-pollination (autogamy) and encourage cross-pollination. Types: a. The pollen is released before the stigma becomes receptive or the stigma becomes receptive before the release of pollen. b. Anther & stigma are located at different positions. c. Self-incompatibility: It is a genetic mechanism to prevent self-pollen (from the same flower or other flowers of the same plant) from fertilization by inhibiting pollen germination or pollen tube growth in the pistil. d. Production of unisexual flowers (Any three)	3
24	It provides a site for the attachment of mRNA on ribosomes. It acts as the site for protein synthesis. The smaller subunit forms a protein synthesizing complex with mRNA. A larger subunit acts as an amino acid binding site. It also acts as for forming a peptide bond. (Any three)	3
25	(a) Convergent evolution. Such structures are called analogous organs (b) Adaptive radiation: It is the process of divergent evolution in which members of the same ancestral species of a large taxonomic group evolved along different lines in different habitats of the same geographical area Example: Darwin's Finches (c) Similarities in biochemicals such as DNA, help in deriving the line of evolution. Organisms with more similar DNA sequences have evolved from the same ancestor.	3
26	Figure 8.6 Replication of retrovirus, NCERT OR (a) Diacetylmorphine (b) plant Cannabis sativa, part- Inflorescences (c) barbiturates, amphetamines,	3
27	(a) A nematode Meloidogyne incognita infects the roots of tobacco. Nematode resistance tobacco plant can be raised using mRNA silencing (RNAI It can be prevented by RNA interference (RNAi) techniques. RNAi prevents the translation of a specific mRNA (silencing) due	3

	to a complementary dsRNA molecule. The source of this complementary RNA is an infection by RNA viruses/ transposons that replicate via an RNA intermediate. Nematode-specific genes (DNA) is introduced into host plant using Agrobacterium vectors. It produces both sense & anti-sense RNA in host cells. These RNAs are complementary. Thus, form ds RNA that initiates RNAi. (b) To detect HIV in suspected patients. To detect gene mutations in suspected cancer patients. To identify many other genetic disorders. (any two)	
28	Paul Ehrlich proposed the rivet popper hypothesis to help understand the contribution of species richness. He compared each species with rivets in the body of an airplane. The rivet popper hypothesis explains that the ecosystem is an airplane and the species are the rivets joining all parts together.	3
29	(a) NPV (nucleopolyhedrovirus) (b) Trichoderma (c) Ladybird and dragonfly (d) Bacillus thuringiensis	4
30	(a) failure of segregation of chromatids during cell division/ cytokinesis (b) Down's syndrome (c) Klinefelter's Syndrome (d) 44 A + X0	4
31	a- Electrophoresis is the process by which charged particles are separated under electric effect on an agarose gel. DNA is negatively charged and thus moves toward the positively charges anode. DNA fragments are separated according to their size through the sieving effect of the agarose gel. The smaller fragment moves farther in comparison to larger fragments. b- Ethidium bromide c- Before electrophoresis DNA fragments are cleaved by restriction endonucleases. **OR** The restriction endonuclease enzymes (Eco RI) cut DNA at specific palindromic sequences. The same restriction endonuclease is used to cut both DNA (host/ vector and desired gene). The cut causes sticky ends. With the help of the enzyme DNA ligase, the sticky ends are ligated to for r- DNA. They form H-bonds with their complementary cut counterparts. This stickiness facilitates the action of the enzyme DNA ligase. • When cut by the same restriction enzyme, the resultant DNA fragments have the same kind of sticky ends and these are joined together by DNA ligases Fig NCERT11.1, page 196	5

32	One pair of mammary glands is present. It contains glandular tissue & fat. Glandular tissue has 15-20 mammary lobes containing clusters of cells (mammary alveoli). The cells of the alveoli secrete milk. Milk is stored in the lumen of the alveoli. The alveoli open into mammary tubules. The tubules form the mammary duct. The several mammary ducts join to form a wider mammary ampulla which is connected to the lactiferous duct through which milk is sucked out. **OR** (a) Spermiation is the process by which mature spermatids are released from the supporting somatic Sertoli cells into the lumen of the seminiferous tubule. (b) Zona pellucida: Outer to the plasma membrane. Corona radiata: Outer layer formed of follicle cells (c) An LH surge is a rapid increase of the luteinizing hormone (LH) in a woman's bloodstream that occurs 24-48 hours prior to ovulation. (d) The secretions of the acrosome help sperm to enter the egg cytoplasm via zona pellucida & plasma membrane. This causes the second meiotic division of secondary oocytes to form an ovum (ootid) and a second polar body. (e) The signals originating from the fetus and placenta induce mild uterine contractions (fetal ejection reflex).	5
33	i- Phosphorus is contained in DNA but not amino acids. The radioactive ^{32}P was used to label the DNA contained in the phage. Sulfur is present in proteins and not in DNA. Radioactive ^{35}S was used to label the protein 2 phage. ii- The genetic code is a set of triplet codons that codes for amino acids. There are 64 codons out of these 61 codons code for standard amino acids while 3 are nonsense codons/ stop codons that do not code for any amino acid. Genetic code provides clues about information encoded in genetic material (DNA or RNA) that is translated to proteins. **OR** **i-** a- A- Continuous synthesis B- Discontinuous synthesis b- DNA-dependent DNA polymerase c- Fragmented DNA/ Okazaki DNA is formed due to repeated use of primers. ii- In DNA molecules, A — T base pairs are equal in number to G - C base pairs. A + G = T + C Pyrimidine = Purine	5