COMMON PRE-BOARD EXAMINATION 2022-23

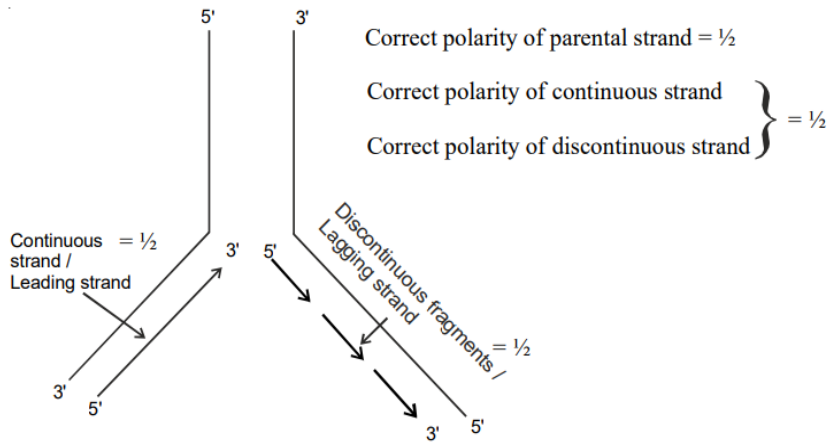
Subject: BIOLOGY (044) (Marking Scheme)

Class: XII | Time: 3 Hours

Date: | Max. Marks: 70

Q. N.	Value Points	Marks
1.	d. all of these	1
2.	c. ICSI	1
3.	b. It is a single stranded DNA	1
4.	c. frequency of the heterozygous genotype	1
5.	d. loss of cell mediated immunity	1
6.	c. passive immunity	1
7.	a. be rapidly pumped back from sedimentation tank to aeration tank	1
8.	b. Satellite DNA occurring as highly repeated short DNA segments.	1
9.	c. 0.1/year	1
10.	b. parasitism	1
11.	c. Lignin and chitin	1
12.	b. A - 4, B - 1, C - 2, D – 3	1
13.	c. A is true but R is false	1
14.	c. A is true but R is false	1
15.	a. Both A and R are true, and R is the correct explanation of A	1
16.	c. A is true but R is false	1
	Section B	
17.	Intrauterine devices They make the uterus unsuitable for implantation They increase phagocytosis of sperms within the uterus and prevent fertilisation.	½ ½ 1
18.	Short statured with small round head Partially open moth with protruding furrowed tongue Palm is broad with characteristic palm crease Physical, psychomotor, and mental development retarded	½ ½ ½ ½
19.	a) Salmonella typhi b) Pathogens enter the human body through contaminated food and water. c) The body organ affected is small intestine. d) Widal test.	½ ½ ½ ½
20.	a) Palindromic nucleotide sequence is the recognition sequence present both on the vector and on a desired/alien DNA for the action of the same (specific) restriction endonuclease to act upon. b) Same restriction endonuclease binds to both vector and the foreign DNA, cut each of the two strands of the double helix at specific points in their sugar phosphate backbone of recognition sequence for restriction endonucleases/palindromic sequence of vector and foreign DNA, to cut strand a little away from the centre of the palindromic sites, creates overhanging stretches/sticky ends.	½ ½ ½ ½
21.	a) Examples of alien species invasions. b) Over exploitation by humans c) Sacred groves are forest patches for worship in several parts in India. They are found in Khasi and Jaintia Hills in Meghalaya, Aravalli hills of Rajastan, Western Ghats of Karnataka and Maharashtra OR The net productivity decreases which results in decrease in the flow of energy in the successive trophic level. Two factors are: Less availability and less nutrient availability.	½ ½ 1 1 1

	Section C	
22.	Vigorous contraction of the uterus at the end of pregnancy causes expulsion/delivery of the foetus. This process of delivery of the foetus (childbirth) is called parturition. Parturition is induced by a complex neuroendocrine mechanism. The signals for parturition originate from the fully developed foetus and the placenta which induce mild uterine contractions called foetal ejection reflex. This triggers release of oxytocin from the maternal pituitary. Oxytocin acts on the uterine muscle and causes stronger uterine contractions, which in turn stimulates further secretion of oxytocin. The stimulatory reflex between the uterine contraction and oxytocin secretion continues resulting in stronger and stronger contractions. This leads to expulsion of the baby out of the uterus through the birth canal – parturition.	½ ½ ½ ½ ½
23.	a) For storage if seeds which can be use as food throughout the year and also to raise crop in the next season. b) This can be observed in parthenocarpic fruits. The seedless fruits that are available in the markets such as grapes is a good example. c) Coconut water is free nuclear endosperm Kernel is cellular endosperm	1 1 ½ ½
24.	He observed that when the two genes in a dihybrid cross are located on the same chromosome the proportion of parental gene combinations in the progeny was much higher than the non- parental or recombination of genes. (ii) Morgan and his group found that when genes were grouped on the same chromosome, some genes are tightly linked and show less recombination. (iii) When the genes are loosely linked they show higher recombination.	1 1 1
25.	If the host evolves special mechanism for rejecting or resisting the parasite, the parasite has to (simultaneously) evolve/co-evolve the mechanism to counter act and neutralise them is called co-evolution. In plants like cuscuta, haustoria, lack of chlorophyll, lack of leaves. In animals, loss of unnecessary sense organs as they do not interact with external environment, presence of adhesive organs, loss of digestive system, high reproductive capacity, etc.	1 4x ½
26.	a) The first infection of chicken pox produces a primary response and antibodies are generated against chicken pox virus, subsequent encounter with the same virus elicits a highly intensified secondary response, due to the memory cells formed during the first encounter. This kind of immunity is active immunity. b) Proteins secreted by viral infected cells, which protects non-infected cells from viral infection are called interferons.	1 1 1
27.	a) Denaturation of double stranded DNA at high temperature Annealing of two sets of primers Extension of primers to form dsDNA by *Taq* polymerase and deoxynucleotides. b) Thermus aquaticus, it remains active during the high temperature, (induced to denature double stranded DNA) and catalyse polymerisation of DNA.	½ ½ 1 ½ ½
28.	Paul Ehrlich proposed the rivet popper hypothesis. This hypothesis states that in an airplane (ecosystem) all parts are joined together using thousands of rivet (species). If every passenger travelling in it starts popping a rivet to take home (causing a species to become extinct), it may not affect flight safety (proper functioning of the ecosystem) initially but as more and more rivets are removed, the plane becomes dangerously weak over a period of time. Also, which rivet is removed may also be critical like rivets on the wings (key species) is more serious threat to flight safety than loss of few rivets on the seats or windows inside the plane.	½ ½ ½ ½ 1

	Section D	
29.	a) DNA b) RNA is more ancient than DNA The major life processes evolved around RNA c) DNA contains deoxyribose sugar and thymine base OR c) RNA, No	1 1 1 1 1
30.	a) Methanogens Act on cellulosic materials like cow dung and agricultural waste b) Methanogens are anaerobic methane producing bacteria which grow on cellulosic material in cow dung to decompose it to produce large amount of methane, CO_2 and H_2 c) A - biogas. It can be used as a source of energy. C - Spent slurry or sludge. It can be used as fertiliser. OR Indian Agricultural Research Institute and Khadi and Village Industries Commission	½ ½ 1 1 1 1
	Section E	
31.	a) Diagram Labelling 4 x ½ b) i) Vas deferens carries sperm from epididymis to urethra Vas efferentia carries sperms from testis to epididymis ii) Spermatogenesis – process of production of sperms Spermiogenesis – process by which spermatids are transferred to spermatozoa. OR Release of FSH and LH from pituitary , during follicular phase or between 5th - 14th day of menstrual cycle leads to growth of primary follicle to Graafian follicle in the ovary , Estrogen from growing follicle helps proliferation of uterine endometrium or its repair , high level of LH at middle /14th day of the menstrual cycle leads to rupture of GF causing release of ovum / ovulation , remaining cells of GF transform into Corpus Luteum (CL) under the influence of LH , CL secretes progesterone that maintains endometrium in preparation for pregnancy , level of FSH and LH fall due to rise of progesterone and estrogen (25th day of the cycle) , leading to degeneration of CL , level of progesterone falls , leading to disintegration of uterine endometrium and menstruation starts (0-5 day of the cycle)	1 2 ½ ½ ½ ½ 10 x ½
32.	(a) - Replication of DNA begins at ori, to form a replication fork = ½ + ½ - DNA dependant DNA polymerase forms a new strand in 5' ⟶ 3' direction = ½ - Role of DNA ligase is to join discontinuously synthesised fragments = ½  b. S phase = ½ Polyploidy = ½	5

	OR Ans. (a) (i) Eight molecules of (positively charged basic proteins called) histones are organised to form histone octamer (ii) Negatively charged DNA wrapped around positively charged histone octamer to give rise to nucleosome (iii) Nucleosome constitute the repeating unit of a structure called chromatin = 1 × 3 (b) **Euchromatin** — **Heterochromatin** - Loosely packed — - Densely packed - Stains light — - Stains dark - Transcriptionally active — - Transcriptionally inactive ***(Any two differences)*** = 1 + 1	3 2
33.	a) Gene therapy is the collection of methods that allows correction of a gene defect that has been diagnosed in a child/embryo. b) Adenosine deaminase deficiency (ADA) c) Cause: Deletion of ADA gene d) Lymphocytes from the blood of the patient are grown on culture outside the body. A functional ADA cDNA is then introduced into these lymphocytes using a retroviral vector. The genetically engineered lymphocytes are returned to the blood of the patient. Disadvantages- Therapy is not completely curative as cell do not remain alive and periodic infusion of lymphocytes is required OR a) *Meloidogyne incognita* It can be prevented by using RNA interterence (RNAi) process which is checked by the silencing of specific mRNA due to a complementary dsRNA. dsRNA binds and prevents translation of the mRNA (silencing). The source of this dsRNA could be from an infection by viruses having RNA genomes or mobile genetic elements (transposons) which replicate through an RNA intermediate. By using Agrobacterium vectors, nematode-specific genes were introduced into the host plants which produce both sense and anti-sense RNA in the host cells. These two RNAs are complementary to each other and form a double-stranded RNA (dsRNA)that initiates RNAi and hence silence the specific mRNA of the nematode. The parasite cannot survive in the transgenic host, so protects the plants from pests.	1 1 ½ ½ ½ ½ 1 ½ 1 ½ 1 1 1

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