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HBSE MODEL PAPER 2024



Practice Papers

MODEL PAPERS

Marking Scheme

ANSWER KEY

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MARKING SCHEME SESSION (2023-24)

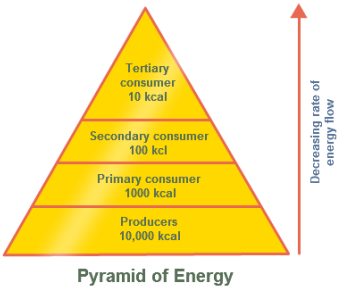
BIOLOGY CODE- 865

CLASS – XIIth

Q.No	Expected answer/Value Point	Marks
1	(b) IUDs increase phagocytosis reaction in uterus	1
2	(d) hPL, hCG, progesterone, estrogen, relaxin	1
3	(a) cross of F1 hybrid with homozygous recessive parent	1
4	(c) chromosome 1 and Y	1
5	(b) Phylogeny	1
6	(c) shaking hands with infected person	1
7	(a) *Glomus*	1
8	(c)DNA amplification	1
9	(a) Foreign DNA in its cells	1
10	(c) 64	1
11	(b) Mutualism	1
12	(c) Endangered species	1

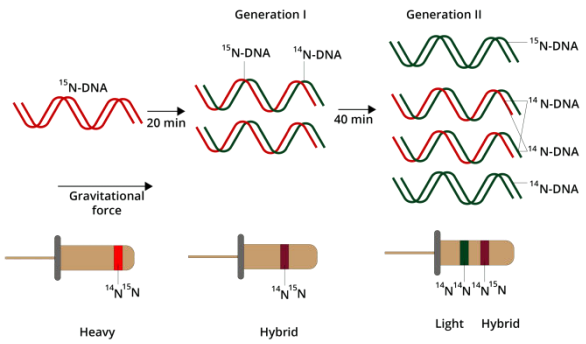
13	(c) Apple	1
14	(d) All of these	1
15	(a) Both A and R are right and R is right explanation for A	1
16	(b) A is true but R is false	1
17	(d) A is false but R is true	1
18	(c) A is false but r is true	1
19	Sporopollenin Exine protect the pollen from dessication ,acids and extreme weather condition thus increase its viability	1 1
20	The mutation that is caused by addition, deletion or substitution of single base pair is called point mutation Example sickle cell anemia is caused by point mutation where single base substitution changes codon GAC to GUG.	1 1
21	Wings of a bird and wings of butterfly are analogous organs These show convergent evolution where different structures are evolved for same function	1 1
22	GEAC refers to Genetic Engineering Approval Committee. GEAC made decision regarding validation of GMO research and safety of introducing these GMO for public service. OR Yes we agree with this statement as if genetic barriers are not used for creating GMO this can be dangerous as these organism can cause a threat to natural flora and fauna may lead to loss of biodiversity, cause ecological imbalance pose threat to our environment.	1 1 ½ ½ ½ ½
23	The person may be affected by AIDS(Acquired Immunodeficiency Syndrome). AIDS is caused by HIV-virus (Human *immunodeficiency virus*)	1 ½

	It has RNA as genetic material i.e. it is a retrovirus.	½
24	(a) Fusion of two polar nuclei and one male gamete is called triple fusion. (b) It occurs in embryo sac. Two polar nuclei and one male gamete are involved in this fusion. OR (b)Apomixis is preferred to produce seeds in hybrid crops as in this technique as: 1.seeds are formed without fertilization so no segregation of useful character. 2.Cost and time of seed production is reduced.	1 1 1 1
25	XXY karyotype can be produced by gaining extra copy of X chromosome. This is known as Klinefelter Syndrome . Such individual are males with feminine characters like Gynaecomastia They are generally sterile.	½ ½ ½ ½
26	Hugo DE Vries believe in sudden or random mutation at large scale that cause speciation. He proposed saltation as basis of evolution. On other hand Darwin theory of Natural Selection is based on slow and inheritable mutation. These mutations form the basis of variation in population. Nature select the fittest organism.	1½ 1½
27	(a) Cholera,T.B are communicable diseases that spread via air, water so in crowded areas there transmission can happen easily (b)Pathogens are diseases causing microorganisms e.g. *Salmonella typhi* that causes typhoid (c) vectors are the organisms like insects that help in transmission of the pathogen e.g. flies, mosquitoes etc	1 1 1

28	Genetically synthesized insulin does not cause allergy Easy and economical production by rDNA technology Insulin is produced by transgenic *E.coli* *Or* (a) .*Meloidegyne incognito.* . Roots (b) By using *Agrobacterium* vector nematode specific genes were introduced into host plant,introduction of DNA produce both sense and anti -sense strand of RNA that being complementary to each other , this ds RNA initiated RNAi and silenced the specific mRNA of nematode hence parasite could not survive in host.	1 1 1 ½ ½ 2
29	The energy that passes from one trophic level to next trophic level is only 10 %. This is called 10% law of energy .So the amount of energy at first level will greater as compared to the energy at last tropic level that why energy pyramids are always upright.  Pyramid of Energy	2 1
30	(a) ● Tropics have greater amount of sunlight throughout the year; ● It has ample rainfall	½ ½ ½

	● tropics do not face any natural environmental disturbances; ● so it shows greater biodiversity (b)According to me in-situ conservation is better mode as it follows the conservation of organism in its natural condition so help to maintain the ecological balance in the biosphere OR The broad utilitarian approach for biodiversity conservation is more comprehensive as it considers the ecological relationship between different communities hence give us a broader approach to understand the environment , for example it helps to understand ● the relationship of pollinator and plant ● relationship like predation and competition ● to maintain ecological balance , ● relationship of forest with rainfall and soil erosion etc	1½ One mark for each point explained
31	(a)Interferons are the proteins that activate the immune system and helps to destroy the tumors (b) Antibody IgG. (c) B lymphocytes produce antibodies T lymphocytes help B lymphocyte to produce antibodies or Active immunity is based upon principle of antigen antibody reaction where organism produce antibody on interaction with antigen Readymade antibodies are given to protect the body in passive immunity.	1 1 1 1 1 1
32	(a) In year 1952 (b)Awareness regarding reproductive health can help the individual to better understand the etiology of STD,s hence help him to protect from these. or The major task of RCH programme is to create awareness about a	1 2

	reproduction aspect and providing facilities for building a reproductively healthy society. (d)Syphilis and Gonorrhea.	1
33	Three phases of menstrual cycle are: (a)Menstrual phase: ● Discharge of mucous blood and endometrial lining through vagina. ● Occurs for 3-5days. ● Mark the start of menstrual cycle. (b)Follicular phase ● one of the primary follicles in ovary grows to mature Graafian follicle. ● Endometrium proliferate ● Estrogen level increases and reaches the peak level in the middle of the cycle (14^{th} day) (c)Luteal phase: ● Gratian follicle rupture and ovum is released (ovulation). ● Corpus luteum formed to release progesterone. ● Endometrium continue to proliferate under effect of progesterone. (d) If fertilization occurs it leads to implantation otherwise the unfertilized egg is released and it marks the beginning of another cycle OR (a)Implantation. After fertilization the zygote undergo cleavages in the oviduct and it forms 16 cells called blastomeres this stage is called morula. The morula continues to divide and transform in to blastocyst. In blastocyst outer layer of blastomeric form trophoblast and inner cell form	½ ½ ½ ½ ½ ½ ½ ½ 1 1

	inner cell mass. Trophoblast get attached to endometrium and after attachment the uterine cells divide rapidly so the blastocyst become embedded in endometrium this is called implantation . (b)Male accessory gland includes seminal vesicles prostate gland and bulbourethral glands. Secretion of these glands constitutes seminal plasma that has fructose calcium and may enzymes. Secretion of bulbourethral gland helps in lubrication of penis.	1 1 1
34	During DNA replication each newly synthesized DNA has one parental strand and one newly synthesized strand. This is called semi conservative replication. Since nitrogen is a part of DNA so Stahl and Messelson use heavy nitrogen in place of normal nitrogen (a)Meselson and Stahl grew *E. coli* on heavy Nitrogen isotope for many generations. So that N^{15} is incorporated into its DNA. Then transferred *E. coli* to medium containing N^{14} and allow them to grow. (b)The DNA in first generation has intermediate density as compared to parental DNA.the density was measured by cesium chloride density gradient method (c)DNA in second generation has half normal density and half intermediate density DNA strand. This shows semi conservative replication. g.  **OR** (a) Promoter: the sequence that is located upstream means 5' end of	1 1 1 1 1 1

	structural gene that provide binding site of RNA polymerase. The presence of promoter marks the template strand as it is present on template strand Coding Strand: The strand of DNA that has polarity 5'-3 is displaced during transcription and it does not code for RNA is called coding strand. Polymorphism: Polymorphism is variation at genetic level due to mutation. These mutations in germ cell are inheritable. These mutations keep on accumulating and form the basis of polymorphism. When such inheritable mutation are observed in a population at high frequency this is called DNA polymorphism. Polymorphism may range from single nucleotide to large scale. (b)Human Genome Project: ● Genome contains 3164 million nucleotides. ● Average gene consist of 3000 bases ● Total number of genes is App. 30000 ● Function of 50% gene is unknown. ● Less than 22% of genome code for proteins (do any four points)	1 1 2(½for each point)
35	(a) The reporter gene help to select the transformant cells by insertional inactivation of the enzyme gene. for example the insertional inactivation of enzyme β galactosidase in *E. coli* leads to formation of colourless colonies when grown on a chromogenic substrate while non transformant produce blue colonies. **Gel electrophoresis**: Process to separate the DNA fragments according to their molecular size by applying electric field across the agarose gel.DNA is negatively charged that will moves towards anode, smaller sized fragments move faster, fragments can be visualized under UV radiation as bright orange band due to dye Ethidium bromide. Desired DNA is obtained by elution process. OR The technique shown in picture is PCR(Polymerase chain reaction) PCR is used to amplify the DNA fragments of interest.DNA polymerase used in process is obtained from bacterium *Thermophilus aquaticus* that doesnot get denatured and polymerise at high temperature.	2 3 1

	PROCESS of PCR **<u>Denaturation</u>**: heating of DNA at high temp (94-98^0 Celsius) to isolate both strands **<u>Annealing</u>**: annealing of primers for synthesis of new strands. **<u>Extension</u>**: DNA polymerase binds to primer and polymerise new strands **Application of PCR** Detection of pathogenic microorganism Amplification of DNA IN DNA analysis (do any two)	 1 1 1 ½ ½