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| **PB2/BIOEEQP/1222/C 12-JAN-2023** | | |
| **EEE CONSORTIUM**  **PRE BOARD EXAMINATION - II (2022-23)** | | |
| **Subject: BIOLOGY (044)**  **Grade: 12** | **Max. Marks:70**  **Time allowed: 3 hours** | |
| **Name:** | **Section:** | **Roll No:** |
| **General Instructions:**   1. *All questions are compulsory.* 2. *The question paper has five sections and 33 questions. All questions are compulsory.* 3. *Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.* 4. *There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.*   *Wherever necessary, neat and properly labeled diagrams should be drawn.* | | |

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|  | SECTION A |  |
| Q. No. | Question | Marks |
| 1. | Increased IMR and decreased MMR in a population will:  (a) cause rapid increase in growth rate  (b) result in decline in growth rate  (c) not cause significant change in growth rate  (d) result in an explosive population | 1 |
| 2. | In-vitro fertilization involves transfer of \_\_\_\_ into the fallopian tube.  (a) embryo up to eight cell stage  (b) embryo of thirty-two cell stage  (c) zygote  (d) either zygote or embryo up to eight cell stage | 1 |
| 3. | Which one of the following pairs of codons is correctly matched with its function or a signal for a particular amino acid?  a) AUG; ACG -Start/ Methionine  b) UUA; UCA –Leucine  c) GUU; GCU -Alanine  d) UAG; UGA -Stop. | 1 |
| 4. | ……… is a CNS stimulant as it interferes with the transport of the neuro-transmitter ………  (a) Cocaine, acetylcholine  (b) Barbiturate, glutamate  (c) Cocaine, dopamine  (d) Barbiturate, glycine | 1 |
| 5. | The spent slurry from the biogas plant is used as ………. .  (a).cooking fuel,  (b).biofertiliser,  (c).manure,  (d).inoculum | 1 |
| 6. | Identify the wrong pair:  (a). Statin : Monascus,  (b).Cyclosporin : Trichoderma  (c.) Penicillin : Staphylococci,  (d.)Ethanol : Yeast | 1 |
| 7. | The first restriction endonuclease reported was  (a) Hind II  (b) EcoRI  (c) Hind III  (d) BamHI | 1 |
| 8. | Human insulin is being commercially produced from a transgenic species of  (a) Rhizobium  (b) Saccharomyces  (c) Escherichia  (d) Agrobacterium | 1 |
| 9 | Geometric representation of age structure is a characteristics of ..   1. Population 2. Land scape 3. Ecosystem 4. Biotic community | 1 |
| 10 | The tendency of population to remain in genetic equlibrium may be disturbed by-  (a)Lack of migration  (b)Lack of mutations  (c)lack of random mating  (d)Random mating | 1 |
| 11 | -------------and his colleges have very recently tried to put price tags on Nature‘s life support services.   1. Robert Constanza 2. Robert May 3. Paul Erlich 4. Alexander Von Humbolt | 1 |
| 12 | Biodiversity of a geographical region represents  (a) Endangered species found in the region  (b) The diversity in the organisms living in the region  (c) Genetic diversity in the dominant species of the region  (d) Species endemic to the region | 1 |
|  | Directions: In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as: (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.  (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.  (c) If Assertion is true but Reason is false.  (d) If both Assertion and Reason are false. |  |
| 13 | **Assertion :** In apomixis, plants of new genetic variations are not produced. **Reason :**In apomixis, reductional division takes place. | 1 |
| 14 | **Assertion :**Hemophilia is a sex-linked disorder. **Reason :** It never occurs in females as this disorder is associated with genes of 'Y' chromosome. | 1 |
| 15 | **Assertion :** DNA fingerprinting is applied in paternity testing in case of disputes. **Reason :**It employs the principle of polymorphism in DNA sequences as the polymorphisms are inheritable from parent to children. | 1 |
| 16 | **Assertion :** Small sized animals are scarce in polar regions. **Reason :**Small sized animals have larger surface area relative to their volume and they have to spend much energy to generate body heat through metabolism. | 1 |
|  | SECTION B |  |
| 17 | How does the enzymes of the acrosome help in fertilization? | 1+1 |
| 18 | Write four symptomps of Turner”s syndrome. | 1+1 |
| 19 | Due to undue peer pressure a group of adolescents started using opioids intravenously. What are the serious problems they might face in future? | 2 |
| 20 | Give diagrammatic representation of rDNA technology. | 2 |
| 21 | 1. Identify the given pyramid. 2. When does it occur. Give one example. | 2 |
|  | SECTION C |  |
| 22 | Write the differences between wind-pollinated and insect pollinated flowers. Give examples of each type.  ( three points each ) | ½ ×6=3 |
| 23 | What is ovulation? What happens to the Graafian follicle after ovulation? | 1+2 |
| 24 | Enlist the methodologies involved in the Human Genome Project. | 3 |
| 25 | How did Darwin theory of natural selection explain the appearance of new forms on the earth? | 3 |
| 26 | a). It is generally observed that the children who had suffered from chicken pox in their childhood may not cause the same disease in their adulthood. Explain giving reasons the basis of such immunity in an individual. Name the kind of immunity.  b) What is interferon? Mention their role  *OR*  a). Why is there a fear amongst the guardians that their adolescent wards may get trapped in drug /alcohol abuse?  b) Explain addiction and dependence in respect of drug/alcohol abuse in youth | 3 |
| 27 | How are restriction endonuclease enzymes named? Write examples. | 3 |
| 28 | (i) Why is there a need to conserve biodiversity?  (ii) Name and explain any two ways that are responsible for the loss of biodiversity. | 3 |
|  | SECTION D |  |
| 29 | **CASE STUDY**  The word parthenogenesis originates from the Greek language meaning virgin birth. In honeybees, the drones are entirely derived from the queen, their mother. Parthenogenesis is a form of reproduction where the unfertilized egg will develop into a DRONE BEE while fertilized eggs will hatch into the WORKER BEES. This type of reproduction occurs in various species in nature. Fertilized eggs will develop into QUEEN BEES or WORKER BEES. It will depend on the size and type of the cells and on the composition of food fed by WORKER BEES to BEE LARVAE. The DRONE BEES are always born from unfertilized eggs. Drones produce sperm cells that contain their entire genome, so the sperm are all genetically identical except for mutations. The male bees‟ genetic makeup is therefore entirely derived from the mother, while the genetic makeup of the female worker bees is half derived from the mother, and half from the father. The QUEEN BEES mate with numerous DRONE BEES high in the air. This polyandry and the phenomenon of parthenogenesis in honey bees create a super-organism in the beehive populations. The WORKER BEES who share the same father and mother are called SUPER SISTERS because they are more closely related to each other than their sisters who have different fathers.  i. Identify the members of a bee colony which possess same chromosome number.  a. Drone and Queen  b. Drone and Worker  c. Queen and Worker  d. Both a and c.  ii. The cell division involved in the formation of egg and sperm in honey bees respectively  a. Mitosis and meiosis  b. Mitosis only  c. Meiosis and mitosis  d. Meiosis only.  iii. In a honey bee colony, the queen is different from workers in  a. Chromosome number  b. The way of production in sexual or asexual method  c. The type of gametes involved in production  d. The type of food given in larval stage.  iv. Some of the members in a honey bee colony have no father but have grandfather, they are  a. Workers  b. Drones  c. Queen  d. Both drones and workers. | 4 |
| 30 | A wide range of organisms belonging to bacteria, viruses, fungi, protozoans, helminths, etc., could cause diseases in man. Such disease-causing organisms are called pathogens. Most parasites are therefore pathogens as they cause harm to the host by living in (or on) them. The pathogens can enter our body by various means, multiply and interfere with normal vital activities, resulting in morphological and functional damage. Pathogens have to adapt to life within the environment of the host. For example, the pathogens that enter the gut must know a way of surviving in the stomach at low pH and resisting the various digestive enzymes. A few representative members from different groups of pathogenic organisms are discussed here along with the diseases caused by them. Preventive and control measures against these diseases in general, are also briefly described. Salmonella typhi is a pathogenic bacterium which causes typhoid fever in human beings. These pathogens generally enter the small intestine through food and water contaminated with them and migrate to other organs through blood. Sustained high fever (39° to 40°C), weakness, stomach pain, constipation, headache and loss of appetite are some of the common symptoms of this disease. Intestinal perforation and death may occur in severe cases.  Typhoid fever could be confirmed Widal test : A classic case in medicine, that of Mary Mallon nicknamed Typhoid Mary, is worth mentioning here. She was a cook by profession and was a typhoid carrier who continued to spread typhoid for several years through the food she prepared.  1) In a classic case, who was spreading typhoid by cooking?  (a) Mary Mallon  (b) Typhoid Cook  (c) Classic Mallon  (d) Mary Classic  2)What is the causative organism of amoebiasis?  (a) *Plasmodium vivax*  (b) *Salmonella typhi*  (c) *Entamoeba histolytica*  (d) *Aedes Aegypti*  3)The organisms like viruses, helminths, protozoa and bacteria which are responsible for causing disease in man are known as……?  (a) Non-Infectious  (b) Enzymes  (c) Typhoid  (d) Pathogens  4) Write the name of pathogenic bacteria that causes typhoid and its symptoms. | 4 |
|  | **SECTION E** |  |
| 31 | Describe the roles of pituitary and ovarian hormones during the menstrual cycle in a human female.  *OR*  Explain in detail the various developmental stages of the zygote until implantation with suitable diagrams. | 5 |
| 32 | How did Alfred Hershey and Martha Chase arrive at the conclusion that DNA is the genetic material?  **OR**  Describe Frederick Griffith’s experiment on *Streptococcus pneumonia* with the help of a diagram. | 5 |
| 33 | Name the insect that attacks cotton crops and causes lot of damage to the crop. How has Bt cotton plant overcome this problem and saved the crop ? Explain.Write the role of gene cry IAb**.**  **OR**  Explain with the help of one example how genetically modified plants can   1. Reduce usage of chemical pesticides. 2. Enhance nutritional value of food crops | 5 |

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