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| **B** | | | | |
| **PB/BI/1220/A 09/12/2020**  **PREBOARD EXAMINATION (2020-21)** | | | | |
| **Subject: BIOLOGY**  **Grade: XII** | | | Max. Marks:70Time: 3 Hrs | |
| ***General Instructions:***  ***(i) All questions are compulsory. (ii) The question paper has four sections: Section A, Section B, Section C and Section D. There are 33 questions in the question paper.***  ***Section–A has 14 questions of 1 mark each and 02 case-based questions.***  ***Section–B has 9 questions of 2 marks each.***  ***Section–C has 5 questions of 3 marks each and***  ***Section–D has 3 questions of 5 marks each.***  ***(iv) 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.***  ***(v) Wherever necessary, neat and properly labeled diagrams should be drawn*** | | | | |
|  |  | **SECTION A** | |  |
| 1 |  | Observe the pedigree chart and answer the following questions: | | 1 |
|  | (a)  (b) | Identify whether the trait is sex-linked or autosomal.  Give an example of a disease in human beings which shows such a pattern of inheritance. | |  |
| 2 |  | A polypeptide consists of 14 different amino acids.  How many base pairs must be there in the processed mRNA that codes for this polypeptide? | | 1 |
| 3 |  | State the properties of DNA replication model. | | 1 |
| 4 |  |  | | 1 |
| 5 |  | Mention two events in which DNA is unzipped. | | 1 |
| 6 |  | Pranay suffered from measles at the age of 10 years. There are rare chances of his getting infected with the same disease for the rest of his life. ” Give reason for the statement . | | 1 |
| 7 |  | A patient who had an organ transplant was given cyclosporin– A. Mention the microbial source and state the reason for administration of this bioactive molecule | | 1 |
| 8 |  | Under what conditions will the BOD be lowered in the river? | | 1 |
| 9 |  | State the role of transgenic animals in biological products with the help of an example | | 1 |
| 10 |  | Why is genetically engineered insulin preferred to the one produced from non-human sources? | | 1 |
| 11 |  | Assertion: Mycorrhizae are association between fungi and roots of higher plants.  Reason: Lichens represent mutualistic relationship between fungus and photosynthetic algae or cyanobacteria.  a) both the assertion and the reason are true and the reason is a correct explanation of the assertion.  (b) both the assertion and reason are true but the reason is not a correct explanation of the assertion.  (c) the assertion is true but the reason is false.  (d) both the assertion and reason are false. | | 1 |
| 12 |  | Assertion: Gene in eukaryote are said to be split.  Reason: Exons (coding sequences) and introns (intervening sequences) form the gene.  a) both the assertion and the reason are true and the reason is a correct explanation of the assertion.  (b) both the assertion and reason are true but the reason is not a correct explanation of the assertion.  (c) the assertion is true but the reason is false.  (d) both the assertion and reason are false. | | 1 |
| 13 |  | Assertion: Why oral insulin is not administered to diabetic people.  Reason: Insulin is digested by our digestive enzymes  a) both the assertion and the reason are true and the reason is a correct explanation of the assertion.  (b) both the assertion and reason are true but the reason is not a correct explanation of the assertion.  (c) the assertion is true but the reason is false.  (d) both the assertion and reason are false. | | 1 |
| 14 |  | Assertion: UTRs are present at both 5’ end and 3’end in mRNA.  Reason: UTRs are required for efficient translation process.  (a) both the assertion and the reason are true and the reason is a correct explanation of the assertion.  (b) both the assertion and reason are true but the reason is not a correct explanation of the assertion.  (c) the assertion is true but the reason is false.  (d) both the assertion and reason are false. | | 1 |
| 14 |  | **OR**  Assertion: Chargaff rule is applicable to RNA.  Reason: RNA is a double standard molecule.  (a) both the assertion and the reason are true and the reason is a correct explanation of the assertion.  (b) both the assertion and reason are true but the reason is not a correct explanation of the assertion.  (c) the assertion is true but the reason is false.  (d) both the assertion and reason are false. | |  |
| 15 |  | Read the following and answer any four questions from 15 (i)-(v) | | 4 |
|  |  | The abuse of drugs by young people can be investigated only in the context of their total personal and social situation. Therefore differentiation must be made between the motivation of beginning drug consumption and the conditional factors which are found in the situation of drug addicts. While in the group of 'beginners' needs and wishes typical for their age are found, different motivational patterns can be seen in the various groups of addicts. From this point of view it is possible to give some directions for prophylaxis and therapy. At the same time it must be realized that formal analysis of the career of addiction gives only the foreground:  In recent years, synthetic psychotomimetic drug abuse has experienced an increasing popularity, especially among young people. Youth often conduct rave party in isolated areas .Police often raid those areas and gets packet of smack and syringes from those areas .The most important enablers to this phenomenon are: Easy product purchase, lack of information about the potential threat posed by their consumption and the difficulties of identifying analytes in biological products through simple techniques Thus developing the proper methods to identify these substances has become a priority. | |  |
|  | i) | LSD is obtained from  a)*Erythroxylon cocca*  b) Tricophyton  c*) Claviceps purpurea*  d) Datura | |  |
|  | ii) | Name the plant from which Ganga is obtained  a) *Erythroxylon cocca*  b) *Cannabis sativa*  c) *Papaver somniferum*  d) Datura | |  |
|  | iii) | What is the chemical name of smack  a) Diacetyl morphine  b) Hydromorphine  c) morphine  d) heroin | |  |
|  | iv) | which of the human system gets affected by cannabinoids  a) Cardiovascular system  b) Respiratory system  c) Digestive system  d) Excretory system | |  |
|  | v) | v) Why is taking smack considered as an abuse ?  a) It is highly addictive  b) It transmit various diseases  c) It affects the physical growth of youngsters  d) it is fatal | |  |
| 16 |  | Read the following and answer any four questions from 15 (i)-(iv) | | 4 |
|  |  | Tropical rainforests are often considered to be the “cradles of biodiversity.” Though they cover only about 6% of the Earth’s land surface, they are home to over 50% of global biodiversity. Rain forests also take in massive amounts of carbon dioxide and release oxygen through photosynthesis. They also store very large amounts of carbon, and so cutting and burning their biomass contributes to global climate change. Many modern medicines are derived from rainforest plants, and several very important food crops originated in the rainforest, including bananas, mangos, chocolate, coffee, and sugar cane. In order to qualify as a tropical rainforest, an area must receive over 250 centimeters of rainfall each year and have an average temperature above 24 degrees centigrade, as well as never experiencing frosts. Here are countless reasons, both anthropocentric and ecocentric, to value rainforests. But they are one of the most threatened types of ecosystems in the world today. It’s somewhat difficult to estimate how quickly rainforests are being cut down, but estimates range from between 50,000 and 170,000 square kilometers per year. Even the most conservative estimates project that if we keep cutting rainforests as we are today, within about 100 years there will be none left. | |  |
|  | i) | Name the largest rainforest in the world  a) Amazon forest  b) Congo Basin  c) Tongass national forest  d) Kinbalu national park | |  |
|  | ii) | Which of the following country has the highest biodiversity  a) South America  b) South Africa  c)India  d) Russia | |  |
|  | iii) | Which of the following is not a cause for loss of biodiversity  a) destruction of habitat  b) Invasion by alien species  c)Keeping animals in zoological park  d) over exploitation of natural resources | |  |
|  | iv) | Which one of the following is not a major characteristic feature of biodiversity hot spots ?  a) Large number of species  b)Abundance of endemic species  c) Mostly located in the tropics  d)Mostly located in polar regions | |  |
|  |  | **SECTION B** | |  |
| 17 |  | A flower of tomato plant following the process of sexual reproduction produces 240  viable seeds.  Answer the following questions giving reasons :  (a) What is the minimum number of pollen grains that must have been involved in the  pollination of its pistil ?  (b) How many male gametes were involved in this case ?  (c) How many megaspore mother cells were involved ?  (d) What is the minimum number of microspore mother cells involved in the above  case ?  OR  i) Name a seed where nucellus remains persistent. Give the technical term for persistent nucellus  ii) The plant Yucca and moth cannot complete their life cycle without each other. Why? | | 2 |
| 18 |  | i) Write the percentage of F2 homozygous and heterozygous populations in a typical monohybrid cross  ii) Write the genotypes of both the parents who have produced a sickle celled anaemic offspring | | 2 |
| 19 |  | A pea plant producing yellow coloured and round seeds is given with unknown genotypes.  Explain how you would find the correct genotypes of the plants with respect to the two traits mentioned. Work out the cross and Name and Define it. | | 2 |
| 20 |  | Name the device/method which can prevent contraception in the following ways.  i) By increasing phagoytosis of sperm within the uterus.  ii) By suppressing sperm motility and thereby the fertilizing ability  iii) By making uterus unsuitable for implantation  iv) Inhibit ovulation and implantation | | 2 |
| 21 |  | Mention the problems that are taken care of by Reproduction and Child Health Programme | | 2 |
| 22 |  | A doctor was explaining to his students about a particular disease vector that booms  particularly during the rainy season (warm and humid). He also explained that one of the type of this disease can show shivering effect and may be fatal. Name the type and its causative agent. Also explain the reason for the other symptoms of the disease? | | 2 |
| 23 |  | What are methanogens? How do they help to generate biogas? | | 2 |
| 24 |  | How have biotechnologists effectively used Agrobacterium tumefaciens in plants ? | | 2 |
| 25 |  | Why is it important to measure the size of a population in a habitat or an ecosystem ?  **OR**  Co evolution is a spectacular example of mutualism between and animal and a plants. Explain it with the help of an example | | 2 |
|  |  | **SECTION C** | |  |
| 26 |  | When a snapdragon plant bearing pink colour flower was selfed , it was found that , 69 plants were having red colored flowers . What would be the number of plant bearing pink flower and white flower . Show with the help of Punnett square , Identify the principle of inheritance in involved in this experiment | | 3 |
| 27 |  | What are the significance of predation in nature? | | 3 |
| 28 |  | *CryIAb* is introduced in a plant to control infestation by corn borer.  a) Name the resultant plant after successful insertion of the gene desired.  b) Summarize the action of the gene introduced  OR  a) Tobacco plants are damaged severely when infested witha nematode .Name the nematode and explain the strategy that is adapted to stop this infestation.  b) Name the vector used for introducing the nematode specific gene in tobacco plant. | | 3 |
| 29 |  | Name the two different categories of microbes naturally occurring in sewage water. Explain their role in cleaning sewage water into usable water. | | 3 |
| 30 |  | a)      **b)** A student while crossing across a papaya orchard observed that some papaya plants have flowers with a very small papaya like structure at its base, while there were other papaya plants that had flowers without such a swollen portion. What information do you get concerning the type of plant and the flower from the above data? | | 3 |
|  |  | **SECTION D** | |  |
| 31 |  | Describe the roles of pituitary and ovarian hormones during the menstrual cycle in a  human female.  **OR**  (a) Draw a labelled diagram of sectional view of human ovary showing different stages of oogenesis. (b) Where is morula formed in humans? Draw a flow chart to explain the process of its development from zygote. | | 5 |
| 32 |  | (a) One of the codons on *m*RNA is AUG. Draw the structure of *t*RNA adapter molecule for this codon.  (b) Name the RNA polymerase that transcribes *t*RNA in eukaryotes.  (c) Why is *t*RNA called an adaptor molecule?  **OR**  Draw a labelled schematic structure of a transcription unit. Explain the function of each  component in the unit in the process of transcription. | | 5 |
| 33 |  | (a) Describe the characteristics a cloning vector must possess.  (b) Why DNA cannot pass through the cell membrane  (c) How is a bacterial cell made ‘competent’ to take up recombinant DNA from the medium?  **OR**  a) Mention the steps involved in ‘genetic engineering’  b)Draw a labelled sketch of sparged-stirred-tank bioreactor. | | 5 |
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