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| **PB1/BIQP/1222/B 08-DEC-2022** | | | | |
| **PRE-BOARD EXAMINATION – I (2022-23)** | | | | |
| **Subject: Biology**  **Grade: XII** | | Max. Marks:70Time: 3 hrs | | |
| ***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.*   1. *Wherever necessary, neat and properly labeled diagrams should be drawn.* | | | | |
|  | **SECTION A** | |  |
| 1 | Method of DNA replication in which two strands of DNA separate and synthesize new strands  (a) dispersive (b) conservative (c) semi-conservative (d) non conservative | | 1 |
| 2 | In the genetic code dictionary, how many codons are used to code for all the 20 essential amino acids ? (a) 20 (b) 64 (c) 60 (d) 61 | | 1 |
| 3 | Jacob and Monod studied lactose metabolism in E. coli and proposed operon concept. Operon concept is applicable for  (a) all prokaryotes (b) all prokaryotes and some eukaryotes (c) all prokaryotes and all eukaryotes (d) all prokaryotes and some protozoans. | | 1 |
| 4 | Which of the following statements is not correct?  (a) Pollen germination and pollen tube growth are regulated by chemical components of pollen interacting with those of the pistil.  (b) Some reptiles have also been reported as pollinators in some plant species.  (c) Pollen grains of many species can germinate on the stigma of a flower, but only one pollen tube of the same species grows into the style.  (d) Insects that consume pollen or nectar without bringing about pollination are called pollen/ nectar robbers | | 1 |
| 5 | The figure below shows three steps (A, B, C) of Polymerase Chain Reaction (PCR).  Select the option giving correct identification together with what it represents?    (a) B - denaturation at a temperature of about 98°C separating the two DNA strands (b) A - denaturation at a temperature of about 50°C (c) C - extension in the presence of heat stable DNA polymerase (d) A - annealing with two sets of primers | | 1 |
| 6 | A normal woman, whose father was colour blind is married to a normal man. The sons would be:  (a) 75% colour-blind (b) 50% colour-blind (c) all normal (d) all colour-blind | | 1 |
| 7 | Read the following four statements (A-D) about certain mistakes in them.  (A)The first transgenic cow, Rosie produced milk which was human alpha- lactalbumin enriched.  (B)Restriction enzymes are used in isolation of DNA from other macromolecules.  (C) Downstream processing is one of the steps of rDNA technology.  (D) Disarmed pathogen vectors are also used in transfer of rDNA into the host.  Which of the statements have mistakes?  (a) B and C (b) C and D (c) A and C (d) Only B | | 1 |
| 8 | The figure given below depicts a diagrammatic sectional view of the human female reproductive system.    Which set of three parts out of I-VI have been correctly identified?  (a) (II) endometrium, (III) infundibulum, (IV) fimbriae (b) (III) infundibulum, (IV) fimbriae, (V) cervix (c) (IV) oviducal funnel, (V) uterus, (VI) cervix (d) (I) perimetrium, (II) myometrium, (III) Fallopian tube | | 1 |
| 9 | The technique called Gamete Intra Fallopian Transfer (GIFT) is recommended for those females  (a) who cannot produce an ovum (b) who cannot retain the foetus inside uterus (c) whose cervical canal is too narrow to allow passage for the sperms (d) who cannot provide suitable environment for fertilization | | 1 |
| 10 | Which one of the following represents a palindromic sequence in DNA?  (a) 5'-GAATTC-3'  3 - CTTAAG - 5' (b) 5'-CCAATG-3'  3' - GAATCC - 5' (c) 5' - CATTAG - 3'  3 - GATAAC - 5' (d) 5' - GATACC - 3'  3' - CCTAAG - 5' | | 1 |
| 11 | In RNAi, the genes are silenced using:  (a) ds-RNA (b) ss-DNA (c) ss-RNA (d) ds-DNA | | 1 |
| 12 | Select the correct sequence for transport of sperm cells in male reproductive system.  (a) Testis 🡪 Epididymis 🡪 Vasa efferentia 🡪 Vas deferens 🡪 Ejaculatory duct 🡪 Inguinal canal 🡪 Urethra 🡪 Urethral meatus (b) Testis 🡪 Epididymis 🡪 Vasa efferentia 🡪 Rete testis 🡪 Inguinal canal 🡪 Urethra (c) Seminiferous tubules 🡪 Rete testis 🡪 Vasa efferentia 🡪 Epididymis 🡪 Vas deferens 🡪Ejaculatory duct 🡪 Urethra 🡪 Urethral meatus (d) Seminiferous tubules 🡪 Vasa efferentia 🡪 Epididymis 🡪 Inguinal canal 🡪 Urethra | | 1 |
|  | Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:  A. Both A and R are true and R is the correct explanation of A.  B. Both A and R are true and R is not the correct explanation of A.  C. A is true but R is false.  D. A is False but R is true. | |  |
| 13 | **Assertion :** Flowers are the structures related to sexual reproduction in flowering plants**.** **Reason :**Various embryological processes of plants occur in a flower. | | 1 |
| 14 | **Assertion : :** Corpus luteum degenerates in the absence of fertilization. **Reason :** Progesterone level decreases. | | 1 |
| 15 | **Assertion :** Introduction of sex education in schools should be encouraged. **Reason :**This will encourage children to believe in myths about sex related aspects**.** | | 1 |
| 16 | **Assertion :** RNAi is silencing of a specific tRNA. **Reason :**Cellular defence mechanism in eukaryotes is RNAi. | | 1 |
|  | **SECTION B** | |  |
| 17 | 1. Name two organisms where males are heterogametic. 2. Write the scientific name of garden pea. | | 2 |
| 18 | State two differences between Perisperm and Pericarp. | | 2 |
| 19 | Comment on Reproductive and Child health care programme of the government to improve reproductive health of the people. | | 2 |
| 20 | What are the major functions of male accessory ducts? | | 2 |
| 21 | Define biotechnology. Name two principles of biotechnology.  OR  **Since DNA is a hydrophillicmoelcule, it cannot pass through cell membranes. Name and explain the technique with which the DNA is forced into**   1. **a bacterial cell** 2. **a plant cell** 3. **an animal cell.** | | 2 |
|  | **SECTION C** | |  |
| 22 | **A tRNA is charged with the amino acid methionine.**  **(i) Give the anti-codon of this tRNA.**  **(ii) Write the Codon for methionine.**  **(iii) Name the enzyme responsible for binding of amino acid to tRNA.** | | 3 |
| 23 | In Mendels breeding experiment on garden pea, the offspring of F2 generation are obtained in the ratio of 25% pure yellow pod, 50% hybrid green pods and 25% green pods State   1. which pod colour is dominant 2. The Phenotypes of the individuals of F1 generation. 3. Workout the cross. | | 3 |
| 24 | **In recombinant DNA technology, vectors are used to transfer a gene of interest in the host cells. Mention any three features of vectors that are most suitable for this purpose.** | | 3 |
| 25 | When the pollen is transferred from anther to stigma of same flower,the pollination is called autogamy.   1. Cleistogamous flowers are invariably autogamous.Explain 2. Geitonogamy is functionally cross pollination,but genetically similar to autogamy.Why? 3. List any two strategies a plant with chasmogamous flower can evolve to prevent self pollination. | | 3 |
| 26 | 1. Write a short note on egg apparatus. 2. What is triple fusion?   OR  Starting with the zygote, draw the diagrams of the different stages of embryo development in a dicot. | | 3 |
| 27 | Draw a labelled diagram of human sperm. | | 3 |
| 28 | Describe the methods of birth control by which fertilization of ovum by sperm is prevented. | | 3 |
|  | **SECTION D** | |  |
|  | Q.no 29 and 30 are case based questions. Each question has subparts with internal choice in one subpart. | |  |
| 29 | STDs constitute a major public health problem for both developing and developed countries. The emergence of HIV infection has increased the importance of measures aimed at control of STDs. A proper understanding of the patterns of STDs prevailing in different geographic regions of a country is necessary for proper planning and implementation of STD control strategies. It is with this aim that the authors have reviewed the relevant published literature from India over the past 25 years. To sum up, bacterial STDs like chancroid and Gonorrhoea are showing a declining trend, but the viral STDs like herpes genitalis and condylomata acuminata are showing upward trend. There is a decline in the number of patients with STDs attending the hospital. Whether this is due to an actual decrease in the incidence of STDs or due to other factors is uncertain. The increased availability of facilities for treatment of STDs at peripheral centres might be a factor leading to a decline in the number of patients with STDs approaching higher centres like the teaching hospital where this study was undertaken. The emphasis on the syndromic approach to the management of STDs might have increased the accessibility to healthcare for these patients with STDs. Awareness about HIV and fear of STDs are factors of reducing infection with STDs. Another factor to be considered is the widespread use of antibacterials, including quinolones and the new macrolides, for the treatment of other diseases. This can result in partial treatment or modified course of the bacterial STDs, thereby leading to apparent reduction in the total number of cases of STDs  attending STD clinics as well as a decrease in the proportion of bacterial to viral STDs.  (i) Which of the following is not a bacterial STD?  a) Syphilis b) Gonorrhoea c) Herpes genitalis d) Chlamydiasis  (ii) Choose the odd one out:  a) Genital herpes b) Genital warts c) Trichomoniasis d) Hepatitis B  (iii) Which of the following symptoms is not seen in case of an STD?  a) Slight pain in genitals  b) Swelling in the genitals  c) Itching and fluid discharge from the genitals  d) Redness/discoloration in the genitals  (iv) Which of the following is not a complication which arises when STDs are not  treated on time?  a) PID  b) Infertility  c) Cancer of the rectum  d) Still births  OR  (iv) Which contraceptive method is effective against STDs. | | 4 |
| 30 | i) Identify the process depicted in the above diagram.  a) DNA Extraction  b) Cloning  c) Gene Therapy  d) Sequencing  ii) Which enzyme is crucial for the immune system to function?  a) ZDA  b) YDA  c) AAD  d)ADA  iii) What are the other methods for the treatment of ADA Deficiency?  a) Bone Marrow Transplantation  b) Enzyme Replacement Therapy  c) Both A and B  d)Medicines  iv) In gene therapy, the gene defects are cured in a child or in \_\_\_\_\_ stage.  OR  iv) Name the vector used to introduce a functional ADA cDNA into the patient’s lymphocytes. | | 4 |
|  | **SECTION E** | |  |
| 31 | What is an operon? Describe the major steps involved in an operon?  **OR**   1. Who performed the blender experiment? 2. What does this experiment prove? 3. Describe the steps followed in this experiment? | | 5 |
| 32 | Differentiate between dominance, co-dominance & Incomplete dominance with one example each.  **OR**  In dogs, barking trait is dominant over silent trait & erect ears are dominant over drooping ears. What is the expected phenotypic ratio of offspring when dogs heterozygous for both the traits are crossed? | | 5 |
| 33 | a) Read the graph given above and correlate the uterine events that take place according to the hormone levels on (i)6-15 days (ii)16-25 days (iii) 26-28 days (if the ovum is not fertilized) b)  (i) At what stage is oogenesis initiated in human female?  (ii) When does the oocyte complete oogenesis?  **OR**   1. Draw a neat diagram of the female reproductive system and label the parts associated with the following. 2. Production of gamete 3. Site of fertlization 4. Site of implantation 5. Birth canal 6. Write any four differences between spermatogenesis and oogenesis. | | 5 |

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