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| **PB1/BIQP/1222/A 08-DEC-2022** | | | | | | | |
| **PREBOARD EXAMINATION - I (2022-23)** | | | | | | | |
| **Subject: BIOLOGY**  **Grade: XII** | | | Max. Marks:70Time: 3 Hrs | | | | |
| **Name:** | | | | | **Section:** | **Roll No:** | |
| ***General Instructions:***   1. All questions are compulsory 2. The question paper has 5 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 mark each ; section D has 2 case based questions of 4 marks each ;section E has 3 questions of 5 marks each 4. There is over all choice . However , internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions 5. Wherever necessary, neat and properly labeled diagrams should be drawn | | | | | | | |
|  | **SECTION A** | | | | | |  |
|  | If Meselson and Stahl's experiment is continued for sixth generations in bacteria, the ratio of Heavy strands 15N/15N :Hybrid15N/14N : light 14N/14N containing DNA in the sixth generation would be | | | | | | |
|  | **a.** | 1:1:1 | | **b.** | 0:1:7 | | |
|  | **c.** | 0:1:15 | | **d.** | 0:1:31 | | |
| **2.** | What are minisatellites ? | | | | | | |
|  | **a.** | 10-40 bp sized small sequences within the genes | | **b.** | Short coding repetitive region on the eukaryotic genome | | |
|  | **c.** | Short non-coding repetitive sequence forming large portion of eukaryotic genome | | **d.** | Regions of coding strands of the DN | | |
| **3.** | The human chromosome with the highest and least number of genes in them are respectively | | | | | | |
|  | **a.** | Chromosome 21 and Y | | **b.** | *b*) Chromosome 1 and X | | |
|  | **c.** | (*c*) Chromosome 1 and Y | | **d.** | Chromosome X and Y | | |
| **4.** | In a cereal grain, the single cotyledon of embryo is represented by | | | | | | |
|  | **a.** | coleoptile | | **b.** | coleorhiza | | |
|  | **c.** | scutellum | | **d.** | hypocotyl | | |
| **5.** | There is a restriction endonuclease called**BamHI** . What does “am” part in it stand for? | | | | | | |
|  | **a.** | amyloliquefaciens | | **b.** | amylose | | |
|  | **c.** | amide | | **d.** | ampicillin | | |
| **6.** | A cross is made between tall pea plants having green pods and dwarf pea plants having yellow pods. In the F2 generation, out of 80 plants how many are likely to be tall plants? | | | | | | |
|  | **a.** | 15 | | **b.** | 20 | | |
|  | **c.** | 45 | | **d.** | 60 | | |
| **7.** |  | Peptide A and peptide B is linked by how many disulphide linkages in insulin . | | | | | |
|  | **a.** | 1 | | **b.** | 2 | | |
|  | **c.** | 3 | | **d.** | 4 | | |
| 8 |  | Identify the correct statement from the following | | | | | |
|  | **a.** | High levels of estrogen triggers the ovulatory surge. | | **b.** | Spermiation is the process of the release of sperms from prostrate glands | | |
|  | **c.** | Sperms released from seminiferous tubules are non-motile. | | **d.** | Progesterone level is high during the post ovulatory phase of menstrual cycle | | |
| 9 |  | DNA fragments are visualized by staining DNA with | | | | | |
|  | **a.** | ethidium bromide | | **b.** | Methylene bromide | | |
|  | **c.** | Chromogenic substrate | | **d.** | Acetocarmine | | |
| 10 |  | Given below is a flow chart showing ovarian changes during menstrual cycle. Fill in the space a with the hormonal factor(s) responsible for the events shown.  Diagram  Description automatically generated | | | | | |
|  | **a.** | FSH and estrogen | | **b.** | LH and FSH | | |
|  | **c.** | ACTH and LH | | **d.** | Progesterone and LH | | |
| 11 | From the sexually transmitted diseases mentioned below, identify the one which does not  specifically affect the sex organs | | | | | | |
|  | **a.** | Syphilis | | **b.** | AIDS | | |
|  | **c.** | Gonorrhea | | **d.** | Genital warts | | |
| **12** | Study the pedigree chart given below. What does it show? | | | | | | |
|  | **a.** | Inheritance of a condition like phenylketonuria as an autosomal recessive trait. | | **b.** | The pedigree chart is wrong as this is not possible. | | |
|  | **c.** | Inheritance of a recessive sex-linked disease like haemophilia | | **d.** | Inheritance of a sex-linked inborn error of metabolism like phenylketonuria. | | |
|  | Question No. 13 to 16 consists of two statement 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 but 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 : Hypocotyl develops into radicle on root tip.  Reason : A dicot embryo consist of two cotyledons. | | | | | | |
| **14** | Assertion : The endometrium undergoes cyclical changes during the menstrual cycle.  Reason : Perimetrium contracts strongly during delivery of the baby. | | | | | | |
| **15** | Assertion : IUT is the transfer of embryo with more than 8 blastomeres into the uterus.  Reason : IUT is a very popular method of forming embryos *in vivo*. | | | | | | |
| **16** | Assertion : Stem cells are undifferentiated biological cells found in multicellular organisms.  Reason :They are obtained from only umbilical cord blood just after birth. | | | | | | |
|  | **SECTION B** | | | | | | |
| **17** | Linkage and crossing-over of genes are alternatives of each other. Justify with the help of an  example | | | | | | |
| **18** | (*a*) List any two characteristic features of wheat flowers that make it a good example of wind  pollination.  (*b*) It is observed that plant breeders carrying out wheat hybridisation often take pollen grains  from the ‘pollen banks’. Do you agree ? Give one reason in support of your answer. | | | | | | |
| **19** | Write the location and functions of myometrium and endometrium. | | | | | | |
| **20** | Explain the zygote intra-fallopian transfer technique (ZIFT). How is intra-uterine transfer  technique (IUT) different from it**?** | | | | | | |
| **21** | The following photograph shows the result of a technique showing the separation of DNA.  Diagram, engineering drawing  Description automatically generated   1. Name the technique. 2. DNA fragments of size 500 bp, 1600 bp and 2000 bp are separated by this process. Which fragment will migrate fast? Why?   **OR**  Do eukaryotic cells have restriction endonucleases? Justify your answer. | | | | | | |
|  | **SECTION C** | | | | | | |
| **22** | DNA separated from one cell, when introduced into another cell is able to bestow some of the  properties of former to the latter. What is this change called in technical terms? Describe the  experimental evidences which led to the discovery of the above phenomenon | | | | | | |
| **23** | A cross is made between different homozygous pea plants for contrasting flower positions.  (*a*) Find out the position of flowers in F1 generation on the basis of genotypes.  (*b*) Work out the cross upto F2 generation.  (*c*) Compute the relative fraction of various genotypes in the F2 generation? | | | | | | |
| **24** | What is *Ti* plasmid? Name the organism where it is found. How does it help in genetic  engineering? | | | | | | |
| **25** | (*a*) How does cleistogamy ensure autogamy?  (*b*) State one advantage and one disadvantage of cleistogamy to the plant. | | | | | | |
| **26** | (*a*) How are parthenocarpic fruits produced by some plants and apomictic seeds by some  others? Explain.  (b)When do farmers prefer using apomictic seeds?  **OR**  Draw a diagram of L.S. of an anatropous ovule of an angiosperm and label the parts. | | | | | | |
| **27** | When and where do chorionic villi appear in humans? How does blastocyst get implanted in the uterus? | | | | | | |
| **28** | Why is ‘*Saheli*’ considered to be an improved form of oral contraceptive for human female? How does it prevent pregnancy?. | | | | | | |
|  | **SECTION D** | | | | | | |
| **29** | Read the following passage and answer the questions that follows.  Introduced by Eli Lily and company in 1982, Humulin U-100 insulins are affordable choices that celebrate over 30 years of helping people manage type 1 and type 2 diabetes. Prior to its development, diabetics used insulin isolated from pig and cow pancreas. Humulin is created through rDNA technology. Its licensing by the FDA in 1982 also made it the first recombinant pharmaceutical approved for the use in the United States. Recombinant pharmaceuticals are created by inserting genes from one species into a host species, often yeast or bacteria, where they do not occur naturally. The genes code for a desired product and therefore the GMOs can be grown and used as a kind of living factory to produce the product. In this case, genes coding for human insulin are inserted into the bacteria. Bacteria produce insulin, which is harvested and used as active ingredient in Humulin.  i) How is genetically engineered human insulin prepared?  ii)Which method is used to prepare cDNA in insulin preparation?  iii)Why is the insulin obtained from genetically engineered organism more useful  iv) How would you differentiate between a mature and an immature insulin?  **OR**  (v) What will be the main challenge to produce insulin using recombinant DNA technology? | | | | | | |
| **.30** | A woman was unable to conceive after many years of regular unprotected coitus went to specialised infertility clinic . On complete examination woman was found to be normal while male partner was diagnosed with infertility. . the male partner can inseminate normally but the mobility of sperms is below 40 percent. Couple was advised to opt for assited reproductive technology.   1. Which ART could have been useful for this couple ? 2. ZIFT b) IUT c )ICSI d) GIFT 3. which among the folloing techniques issuggested for correcting infertility caused due to very low sperm counts of a male partner? 4. GIFT b) Test tube baby c) IUT d) AI 5. A large number of married couples the world over are childless. It is shocking to know that in India the female partner is often blamed for the couple being childless.   **(***a*) Why in your opinion the female partner is often blamed for such situations in India?  (*b*) State any one reasons responsible for the cause of infertility. | | | | | | |
|  | **SECTION E** | | | | | | |
| **31** | *a*) How are Mendelian inheritance, polygenic inheritance and pleiotropy different from each  other?  (*b*) Explain polygenic inheritance pattern with the help of a suitable example.  **OR**  Write the symptoms of haemophilia and sickle-cell anaemia in humans. Explain how the  inheritance pattern of the two diseases differs from each other. | | | | | | |
| **32** | Study the schematic representation of the genes involved in the *lac* operon given below and  answer the questions that follow:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **p** | **i** | **p** | **o** | **z** | **y** | **a** |   (*i*) Identify and name the regulatory gene in this operon. Explain its role in ‘switching off’ the  operon.  (*ii*) Why is *lac* operon’s regulation referred to as negative regulation?  (*iii*) Name the inducer molecule and the products of the genes ‘*z*’ and ‘*y*’ of the operon. Write  the functions of these gene products  **OR**  Answer the following questions based on Hershey and Chases’s experiments:  (*a*) Name the kind of virus they worked with and why?  (*b*) Why did they use two types of culture media to grow viruses in? Explain.  (*c*) What was the need for using a blender and later a centrifuge during their experiments?  (*d*) State the conclusion drawn by them after the experiments. | | | | | | |
| **33** | Study the flow chart given below. Name the hormones involved at each stage and explain their role.  Diagram  Description automatically generated  **OR**  (*a*) Name the hormones secreted and write their functions:  (*i*) by corpus luteum and placenta (any two).  (*ii*) during follicular phase and parturition.  (*b*) Name the stages in a human female where:  (*i*) Corpus luteum and placenta co-exist.  (*ii*) Corpus luteum temporarily ceases to exist. | | | | | | |
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