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| **B** | | | | |
| **PB/BIAK/1220/A 09/10/2020** | | | | |
| **PRE BOARD EXAMINATION (2020-21)**  **MARKING SCHEME** | | | | |
| **SUBJECT: BIOLOGY**  **GRADE: XII** | | | MAX. MARKS: 70TIME: 3 HRS | |
|  |  | SECTION A | |  |
| 1 |  | a) sex-linked ½ b) Haemophilia/ Colour blindness ½ | | 1 |
| 2 |  | A polypeptide containing 14 different amino acid = 14x3=42 base pairs | | 1 |
| 3 |  | i) Semi conservative ii) Semi discontinuous iii) Unidirectional | | 1 |
| 4 |  | It is called negative regulation as it involves constitutive (all the time) repressor. The operon is always in off position due to presence of repressor and is switched on only in presence of an inducer. Inducer Lactose or allolactose interacts with repressor making it inactive. | | 1 |
| 5 |  | Replication and Transcription . (½ + ½ a mark each) | | 1 |
| 6 |  | First exposure to the infection works as vaccination, the immune system of the body gets familiar with the nature of microorganisms and specific antibodies can be produced against infection whenever encountered with | | 1 |
| 7 |  | a) Source – Trichoderma polysporum Reason – Immuno suppressive agent ½ + ½ | | 1 |
| 8 |  | It indicates the addition of lot of organic matter; microorganisms involved in the  biodegradation of organic matter in the water body consume a lot of oxygen and as a  result, there is a sharp decline in the dissolved oxygen content downstream from the  point of addition of effluent from the factory | | 1 |
| 9 |  | Transgenic animals produced human protein alpha antitrypsin to treat emphysema | | 1 |
| 10 |  | Since insulin produced from non-human sources causes allergy or other reactions to the  foreign protein, genetically engineered insulin is preferred. | | 1 |
| 11 |  | b | | 1 |
| 12 |  | a | | 1 |
| 13 |  | a | | 1 |
| 14 |  | a | | 1 |
| 14 |  | D (OR qs ) | |  |
| 15 |  | I) c  II) b  III) a  IV) a  V) a | | 4 |
| 16 |  | I) a  II)a  III)c  IV)d | | 4 |
|  |  | SECTION B | |  |
| 17 |  | a) 240 pollen grains are required. One pollen grain participates in the fertilization of one ovule  b) 480 male gametes are involved. Each pollen carries two male games . so 240x2 =480  c)240 MMC are involved . each MMC forms four megaspores out of which only one will be functions  d) 60 MMC.240/4=60 Each microspore mother cell meiotically divides to form four pollen grains  ½ + ½ + 1=2  OR  Black pepper or beet- perisperm. 1The moth deposits its eggs in locule of ovary and flower, in turn, gets pollinated 1 | | 2 |
| 18 |  | i)The ratio of a typical monohybrid cross is 1: 2: 1 where 50% are homozygous and  50% are heterozygous populations.1  ii) The genotypes of both the parents would be HbA HbS and HBAHbS.1 | | 2 |
| 19 |  | Test cross and show the cross | | 2 |
| 20 |  | Name the device/method which can prevent contraception in the following ways.  i) By increasing phagoytosis of sperm within the uterus.-IUD  ii) By suppressing sperm motility and thereby the fertilizing ability-CuT  iii) By making uterus unsuitable for implantation-hormone releasing IUDs  iv) Inhibit ovulation and implantation -progestogen or progestogen and estrogen combination ½ x4 | | 2 |
| 21 |  | This program take care of uncontrolled population growth , STD , social evils like sex abuse and sex related crimes ½ x4 | | 2 |
| 22 |  | Malignant Malaria- (Pathogen).Plasomodium falciparum 1  Reasons for symptoms.- Parasite attack the RBCs and rupture then with the release of a toxin –haemozoin which is responsible for chill and high fever . ½ x2 | |  |
| 23 |  | Ans. Anaerobic, methane producing bacteria = 1  methanogens generate biogas, when act on cellulose rich biowaste ( anerobically) = ½ × 2 | | 2 |
| 24 |  | In plants the tumor inducing Ti plasmid of agrobacterium tumefaciens has been modified into cloning vector which is nor more pathogenic to the plants , but is still able to use the mechanism to deliver genes of our interest into a variety of plants 1+1 | | 2 |
| 25 |  | We can predict the following  Status of the population in a habitat  Outcome of competition with other species  Impact of predator or pesticides  Increase or decrease of population size  Effect of pesticide application ½ x4  Or  Co evolution is observed in wasp and fid plant . Female wasp uses the fruit for oviposition and egg laying.. it uses the developing seeds for nourishing its larvae. In turn it pollinated the fig inflorescence the given fig species can be pollinated only by its partner wasp species | | 2 |
|  |  | SECTION C | |  |
| 26 |  | a)There will be 138 pink flower bearing plants and 69 white flower bearing plants 1+2   |  |  |  | | --- | --- | --- | | Gamete | R | r | | R | RR | Rr | | r | Rr | rr | | Phenotypic ratio: red:pink :white  1:2:1  Incomplete dominance | | | | | 3 |
| 27 |  | 1) Predation acts as conduits for energy transfer to higher trophic levels .(1)  (2) They keep the prey population under control,which otherwise can reach very high  population density and cause inbalance in the ecosystem (1)  (3) They help in maintaining species diversity in a community by reducing the intensity  of competition among the competing prey species (1)  (3\*1=3 marks) | | 3 |
| 28 |  | * a) Bt corn 1   b) *Cry I Ab*/ Bt toxin gene codes for crystal protein; the Bt toxin protein exists as an inactive protein, but once an insect ingests it, it gets converted into an active form due to the alkaline pH of the gut which solubilizes the crystal. The activated toxin binds to the surface of mid gut and creates pores that cause swelling, lysis and eventually death of the insect. 2  OR  a) *Meloidegyne incognitia* nematode specific gene introduced into host plant, produced ds RNA, RNAi initiated, specific mRNA of the nematode silenced and parasite dies. =1/2x4=2  b)Agrobacterium tumefaciens =1 | |  |
| 29 |  | Aerobic and anaerobic bacteria or fungi exist in sewage water. After the primary treatment of water, aerobic bacteria are added in aeration tanks. Growth of these bacteria reduces BOD as they consume organic matter. Anaerobic bacteria are added in anaerobic sludge digestors, where these digest the sludge and form biogas, etc. | | 3 |
| 30 |  | A epiblast  B radicle  C coleoptile  D Scutellum ( ½ x4 =2)  b) Unisexual is used in reference to the flower (presence of either anther or carpel)  Dioecious is used in reference to the plant (morphologically one plant bearing only one reproductive organ in their flowers) (1 marks ) | | 3 |
| 31 |  | Ans. Pituitary hormones :  (When levels of FSH is high) FSH, induces follicular growth, secretion of estrogen by follicles,  (when LH surge is there in the mid of the cycle) lutinising hormones/LH, along with FSH leads to ovulation , and then formation of corpus luteum = ½ ×6  Ovarian hormone:  Estrogen , repair/proliferation of endometrium,  Progesterone,maintains endometrium for implantation = ½ ×4  ( Low level of progesterone leads to menstrual flow)  OR      (b) Fallopian tube 1  (c ) Zygote undergoes, cleavage to form, blastomeres and develops into 8-16 cell stage morula 2 | |  |
| 32 |  | 2 ½  (b) RNA polymerase III. 1  (c) *t*RNA is called an adaptor molecule because on one end it reads the code on *m*RNA and on other end it binds to specific amino acid. 1 ½  OR  2  (i) **Promoter:** It is the binding site for RNA polymerase for initiation of transcription.  (ii) **Structural gene:** It codes for enzyme or protein for structural functions.  (iii) **Terminator:** It is the region where transcription ends. 3 | |  |
| 33 |  | - Should have ori/ origin of relication.It control the copy number 1  - Has selectable marker, genes encoding for an  antibiotic resistance/ genes encoding for alpha-  galactosidase. 1  - Has cloning site/ recognition site, for the  restriction enzyme to recognise. 1  ii)Why DNA cannot pass through the cell membrane?  Explain. How is a bacterial cell made ‘competent’ to  take up recombinant DNA from the medium?  Ans: DNA is a hydrophilic molecule. ½  Bacterial cell is made competent by treating with  specific concentration of ca ion/divalent ions  incubating them on ice heat shock for a short  period and placing it back on ice again. 1 ½ | |  |
|  |  | Steps involved in genetic engineering  (1)isolation of DNA.  (2)fragmentation of DNA by restriction endonuclease.  (3)isolation of desired DNA fragment.  (4)ligation of DNA fragment into a vector  (5)amplification of gene of interest using PCR.  (6)transferring the recombinant DNA fragment into a host.  (7)culturing the host cells in a medium at large scale and extraction of the desired product  Correct diagram = 1    Any two correct labellings = ½ + ½ | |  |
|  |  | \*\*\* | |  |