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| **B** | | |
| **HY/BIAK/1220/B 19/11/2020** | | |
| **HALF YEARLY EXAMINATION (2021-21)**  **BIOLOGY – ANSWER KEY** | | |
|  | **SECTION A** |  |
| Ans 1 | In malaria, the parasites attack the red blood cells which causes rupture of these cells and release of a toxic substance hemozoin which causes chills recurring every 3 to 4 days. | 1m |
| Ans 2 | The DNA replication enzyme DNA polymerase has a special quality that is the proofreading which prevents the mutations as it eliminates them. whereas in the RNA viruses they don't have this property as they have RNA polymerase and they dont have his tendency and thus the mutation is faster. | 1m |
| Ans 3 | Restriction endonucleases | 1m |
| Ans 4 | 1. Test cross. The purpose of a test cross is to determine if this individual is homozygous dominant or heterozygous. | ½+1/2 |
| Ans 5 | 1. Stigma; pistil has the capability of recognizing the pollen whether it is of right type or not. | ½+1/2 |
| Ans 6 | 1. 61, 3 | ½+1/2 |
| Ans 7 | GM seeds use [genetic engineering](https://gmoanswers.com/glossary#Genetic_Engineering) resulting in a seed that has a specific [gene](https://gmoanswers.com/glossary#Gene) of known function from another plant or organism. Hybridization is a traditional breeding technique where, commonly in plants, the pollen from one plant is used to fertilize another related or unrelated plant species | 1m |
| Ans 8 | * 1. Meiosis 2- mitosis | 1m |
| Ans 9 | Bacterial DNA, A is the circular DNA(plasmid which is used to transfer the gene of interest | ½+1/2 |
| Ans 10 | 1. Multicarpelllary-syncarpous; apocarpous | ½+1/2 |
| Ans 11 | 1. Both assertion and reason are true, and the reason is the correct explanation of the assertion   OR   1. Assertion is true but reason is false. | 1m |
| Ans 12 | 1. Both assertion and reason are false. | 1m |
| Ans 13 | 1. Both assertion and reason are true, and the reason is the correct explanation of the assertion. | 1m |
| Ans 14 | 1. Both assertion and reason are true, but the reason is not the correct explanation of the assertion. | 1m |
| Ans 15 | 1. (b) White blood cells called T cells 2. (a) When many people get sick from an illness in the same area at the same time, it is called an epidemic 3. (c) The disease spreads through blood transfusions, and from mother to the baby as well during pregnancy and lactation. 4. (d) All of the above 5. (a) HIV is a virus that only affects human beings and AIDS is a late stage of HIV disease   **ANY FOUR** | 1x4 |
| Ans 16 | 1. (a) P and E suppress the release of FSH and LH 2. (c)Constant high levels of P and E which are seen in normal pregnancy 3. (d) all of the above 4. (b) Drop in FSH and LH causes ovulation causes endometrium lining to break and result in bleeding 5. (b) 28, 14 | 1X4m |
|  | ANY FOUR |  |
|  | **SECTION B** |  |
| Ans 17 | Drugs like barbiturates, amphetamines, benzodiazepines, lysergic acid diethylamides(LSD) and other similar drugs, that are normally used as medicines to help patients coping with mental illnesses like depression and insomnia. Morphine is a very effective sedative and painkiller and is very useful in patients who have undergone surgery. Misuse of plant metabolites fruits and seeds in amounts/frequency more than prescribed form medicinal purposes can impair one's physical, physiological, or functional behavior creating problem for the society and slowly moves towards the death | 2m |
| Ans 18 | 1. Some of the salient Observations drawn from human genome project are as follows: 1.The human genome contains 3164.7 million nucleotide bases. 2.The average gene consists of3000 bases, but sizes vary greatly, with the largest known human gene being dystrophin at 2.4 million bases. 3.The total number of genes is estimated at 30,000-much lower than previous estimates of 80,000 to 1,40,000 genes. Almost all (99.9 per cent) nucleotide bases are exactly the same in all people. 4.The functions are unknown for over 50 per cent of the discovered genes. 5.Less than 2 per cent of the genome codes for proteins. 6.Repeated sequences make up a very large portion of the human genome**.(ANY FOUR)** | 1/2x4=2m |
| Ans 19 | There are 61 codons and 20 amino acids. It was proposed that a codon for an amino acid is made up of 3 nucleotides. It was also seen that one codon codes for only one amino acid (unambiguous and specific). Some amino acids are coded by more than one codon (degeneracy of codon). It can be said that there is only one possible sequence of amino acids when deduced from a given set of nucleotides. But multiple nucleotides sequence can he deduced from a single amino add sequence. | 2m |
| Ans 20 | Strength of linkage between genes is higher in cross A than that of cross B because the two genes YW are located closely on the same chromosome. ... Therefore, in the latter cross the chances of recombination are higher due for crossing over because lesser the distance between genes greater the strength of linkage. | 2m |
|  | OR |  |
| Ans 20 | 1. Serine, tRNA 2. translation | ½+1/2  1 |
| Ans 21 | a) Positive terminal - ‘B’  Negative terminal - ‘A’  b) DNA being negatively charged, moves towards the positive electrode (anode)  c) By elution - separated bands of DNA are cut out from the agarose gel and extracted from the gel piece | ½ x 2 = 1  ½ x 2 = 1  ½ x 2 = 1 |
| Ans 22 | Draw a T.S. of a Young Anther of an Angiosperm. Label the Different Layers  of the Wall and Write Their Functions. - Biology | Shaalaa.com | 2m |
|  | OR |  |
|  | DRGP Institute: January 2015 |  |
| Ans 23 | 1. Mature functional insulin is obtained by the processing of pro-hormone which contains an extra peptide called C-peptide or connecting peptide. It connects the A and B chains in proinsulin. This C-peptide is removed during the maturation of pro-insulin to insulin and A and B chains gets linked by disulphide linkage | 2m |
| Ans 24 | Enclosed within the integuments of the megasporangium is a mass of cells called the nucellus whereas endosperm surrounds the embryo in the seeds of angiosperms. | 2m |
| Ans 25 | Gene Therapy ADA (Adenosine deaminase) deficiency Lymphocytes from the blood of the patient are grown in a culture, a functional ADA cDNA is introduced into these lymphocytes, which are subsequently returned to the patient. The permanent cure is done by introducing ADA cDNA into cells at early embryonic stages. | 2m |
|  | **SECTION C** |  |
| Ans 26 | 1. Chemical treatment and exposure to cold and high temp. (42°C) alternatively. (Bacterial cell) 2. Biolistics or gene gun. (Plant cell) 3. Micro-injection. (animal cell) |  |
| Ans 27 |  |  |
| Ans 28 | a) Bt corn ½ 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. ½ x 5 = 2½ |  |
| Ans 29 | (a) Release of pollen and stigma receptivity is not synchronized in some species  (b) Anther and stigma are at different position/heights in some plants  (c) Self-incompatibility a genetic mechanism. |  |
| Ans 30 | A-Denaturation: The two DNA strands are separated in the DNA fragment at high temperatures.  B- Annealing: The temperature is lowered and primers attach to the template DNA strands.  C- Extension: The DNA polymerase extends the two strands to form 2 copies of the DNA that was begun with. | 1x3m |
|  | OR |  |
| Ans 30 | 1. EcoRI      1. These are named sticky ends, because they form hydrogen bonds with their complementary cut parts |  |
|  | **SECTION D** |  |
| Ans 31 | 1. The term homogametic and heterogametic refers to the organism depending upon whether all the gametes contain one type of sex chromosome (homo same) or two different types of sex chromosomes (hetero different).. Humans show XX/XY type of sex determination, i.e., females contain 2 copies of X-chromosome and males contain 1 X and 1 Y-chromosome. Therefore, ova produced by females contain the same sex chromosome, i.e. X. On the other hand the sperms contain 2 different types of chromosomes, i.e.,50% sperms have X and 50% have Y-chromosomes (meiosis). Therefore, the sperms are different with respect to the composition of sex chromosome. In case of humans, females are considered to be homogametic while males are heterogametic. 2. In some birds the mode of sex determination is denoted by ZZ a-(males)and ZW (females). 3. As a rule the heterogametic organism determines the sex of the unborn child. In case of humans, since males are heterogametic it is the father and not the mother who decides the sex of the child. 4. In some animals like crocodiles, lower temperature favour hatching of female off springs and higher temperatures lead to hatching of male off springs. | 2  1  1  1 |
|  | OR |  |
| Ans 31 | Colour blindness is an X-linked recessive trait caused due to the defective allele on the X chromosome.  Since the father is colour blind, his genotype would be XcY.  Although the woman has colour blind father, her vision is normal. This implies that she is a carrier of the trait.  This carrier woman marries a man with a normal vision.   1. A normal visioned woman, whose father is colour blind, - Sarthaks eConnect  | Largest Online Education Community 2. 50% daughters are normal visioned but 50% will be carries and 50% of sons are likely to be colour blind and 50% are normal visioned. | 1  1  2  1 |
| Ans 32 | The primary transcripts (hn-RNA) contain both the exons and the introns and are non-functional. Hence, it is subjected to a process called splicing where the introns are removed, and exons are joined in a defined order. Intron is the portion of gene which is transcribed but not translated. In prokaryotes hnRNA is absent so splicing in not required. hnRNA undergoes additional processing called as capping and tailing. In capping an unusual nucleotide (methyl guanosine triphosphate) is added to the 5′-end of hnRNA. In tailing, adenylate residues (200-300) are added at 3′-end in a template independent manner. It is the fully processed hnRNA, now called mRNA, that is transported out of the nucleus for translation. | 2+3m |
|  | OR |  |
| Ans 32 | The process of polymerization of amino acid to form a polypeptide is called translation. Thus, the biological process through which protein is synthesized is called translation. The cellular factory responsible for synthesizing proteins is the ribosome. The ribosome consists of structural RNAs and about 80 different proteins. In its inactive state, it exists as two sub units; a large subunit and a small subunit. When the small subunit encounters an mRNA, the process of translation of the mRNA to protein begins. Translation happens in following main steps: Formation of a peptide bond requires energy. Therefore, in the first phase itself amino acids are activated in the presence of ATP and linked to their cognate tRNA–a process commonly called as charging of tRNA or aminoacylation of tRNA Initiation: Ribosome assembles around the target mRNA and we know that ribosome Is the site of protein synthesis. The first tRNA gets attached at the start codon. A codon is a triplet of amino acids.Elongation: The tRNA transfers an amino add to the tRNA corresponding to the next codon. This phase Involves addition of subsequent amino acids to form a long chain. This step forms the bulk of the protein synthesis,Translocation: The ribosome then moves to the next mRNA codon and continues the process. This creates an amino acid chain.Termination: When a stop codon is reached, the ribosome releases the polypeptide. | 5m |
| Ans 33 | 1. The zygote passes through the following stages till implantation 2. (i) The embryo with 8-16 blastomeres is called a morula. 3. (ii) The morula continues to divide and transforms into blastocyst as it moves further into uterus. 4. (iii) The blastomeres in the blastocyst are arranged into a surface layer called trophoblast and a cluster of interior cells attached to trophoblast are called the inner cell mass. 5. (iv) The trophoblast layer then gets attached to the endometrium and inner mass cells get differentiated as embryo. 6. (v) After attachment, the uterine cells divide rapidly to cover the blastocyst. 7. (vi)The blastocyst becomes embedded in the uterine endometrium. This is called implantation | 1/2x6=3  2m |
|  | OR |  |
| Ans 33  OR |  | 3m |
|  | * 1. Ovary   2. Isthmus   3. Endometrium   4. Cervical canal + vagina  1. Fimbriae catch the ovum released ovary and myometrium is muscular and plays a role in contractions during parturition. | 1/2x4=2  1/2x2=1 |

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