**MARKING SCHEME**
**SAMPLE QUESTION PAPER**
**2019-20**
**CLASS XII (BIOLOGY)**

**TIME 3 HOURS** **MM 70**

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| | **Section – A** | |
| 1. | b) Leydig cells<br>**OR**<br>b)Amniocentesis | 1 |
| 2. | d) Cell-mediated immune response<br>**OR**<br>d) ii and iv | 1 |
| 3. | d) P enzyme is Restriction endonuclease and Q enzyme is ligase | 1 |
| 4. | a) Sal I | 1 |
| 5. | b) Habitat loss and fragmentation | 1 |
| | **Section B** | |
| 6. | Encysted *Amoeba* divides by multiple fission / produces amoeba or pseudopodiospores /cyst wall bursts out/spores are liberated to grow as amoebae(sporulation) (½X4=2 Marks)<br>**OR**<br>Gemmule-asexual reproductive structure in sponges ( ½+½=1Mark)<br>Conidia-asexual reproductive structure in *Penicillium*.(or any other correct example) (½+½ = 1Mark) | 2 |
| 7. | CuT,Cu7,Multiload 375 (Any two) (½ and ½ =1Mark )<br>Cu ions released suppresses sperm motility and the fertilizing capacity of sperms. (½ +½ =1 Mark ) | 2 |
| 8. | Control crosses cannot be performed in human beings, Alternate method-Pedigree analysis (study of the traits in several generations of a family). (1+1=2 Marks) | 2 |
| 9. | A is more reactive ½ Mark<br>**2′-OH group present in the pentose sugar** ½ Mark<br>Makes it more labile/ catalytic and easily degradable. ½+½ =1 Mark | 2 |
| 10. | • Tissue culture ½ Mark<br>• Meristem apical or axillary is excised. ½ Mark<br>• Explant grown in a test tube under sterile condition/special nutrient medium ½+½ = 1 Mark | 2 |

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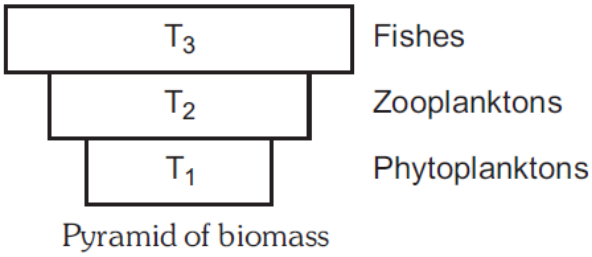
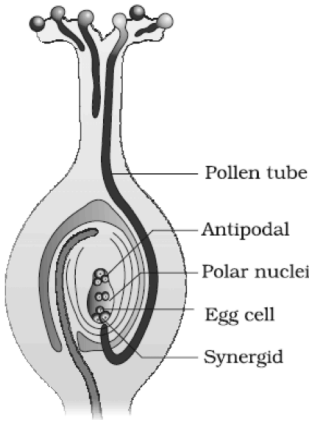
| 11. | • RNA interference ½ Mark<br>• silencing of a specific mRNA due to a complementary RNA ½ Mark<br>• dsRNA/Introduction of DNA was such that it produced both sense/ and anti-sense RNA in the host cells/these two RNAs formed dsRNA that initiated RNAi 1 Mark | 2 |
| 12. |  <br>The pyramid is inverted because the biomass of fishes is much more than that of the zooplankton and phytoplankton. 1+1= 2 Marks | 2 |
| | **Section C** | |
| 13. |  <br>(Diagram =1 Mark )<br>(Any four labellings ½ x 4=2) | 3 |
| 14. | Failure of segregation of chromatids during cell division cycle results in the gain or loss of a chromosome(s) ( **aneuploidy)** (1 Mark)<br>Autosomes:-<br>**Down's Syndrome:** The cause is the presence of an additional copy of the chromosome number 21 (trisomy of 21). (½ Mark)<br><br>The affected individual is<br>• short statured with small round head,<br>• furrowed tongue and partially open mouth<br>• Palm is broad with characteristic palm crease.<br>• Physical, psychomotor and mental development is retarded.<br>(Any one symptom ½ Mark)<br>Sex chromosomes:-<br>**Klinefelter's Syndrome** : This is caused due to the presence of an additional copy of X-chromosome resulting into a karyotype of 47, XXY. ½ Mark | 3 |

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| | Such an individual has overall masculine development<br>• has overall masculine development<br>• feminine development is also expressed by the development of breast/ Gynaecomastia). Such individuals are sterile.<br>(Any one symptom ½ Mark)<br>*If students give the example of Turner's Syndrome, it should be considered and marks given.*<br>**OR**<br>a) i. point mutation/ single base substitution ½ Mark<br>ii. point mutation/ single base deletion ½ Mark<br>b) i 4 aminoacids 1 Mark<br>ii 4 aminoacids 1 Mark | |
| 15. | In some species, the diploid egg cell is formed without reduction division and develops into the embryo without fertilization. 1 Mark<br>In many *Citrus* and *Mango* varieties some of the nucellar cells surrounding the embryo sac start dividing, protrudes into the embryo sac and develops into the embryos. In such species each ovule contains many embryos. 2 Mark | 3 |
| 16. | a.) Chemical evolution – First form of life originated from pre-existing non-living organic molecules.<br>b.) Amino acids<br>c.) $H_2$ 1x3 =3 Mark | 3 |
| 17. | a.)<br>Amino acid / **Phe** / **Val**<br>DNA Code in Gene / AAA / CAC<br>Codon in mRNA / i)UUU / ii)GUG<br>Anticodon in tRNA / iii)AAA / iv)CAC<br>1Mark<br>b.)<br>i) A polypeptide containing 14 different amino acid = 14x3=42 base pairs. 1Mark<br>ii) 14 different types of RNA are needed for the synthesis of polypeptide. 1Mark | 3 |
| 18. | **Advantages**:-Inbreeding is necessary if we want to evolve a pure line in any animal.<br>• It helps in accumulation of superior genes and elimination of less desirable genes<br>• Inbreeding exposes harmful recessive genes that are to be eliminated by selection.<br>• Where there is selection at each step, it increases the productivity of inbred population.<br>**(Any two 1 Mark each)**<br>Disadvantages:-<br>• reduces fertility<br>• decreases productivity.<br>**(Any two ½ x2=1 Mark)** | 3 |
| 19. | Specific Bt toxin genes isolated from ***Bacillus thuringiensis*** is incorporated into cotton is coded by the genes *cryIAc* and *cryIIAb* that control the cotton bollworms (½ + ½ = 1 Mark)<br>• *Bacillus* forms protein crystals that contain a toxic **insecticidal protein**.<br>• once an insect ingest the inactive toxin, it is converted into an active form<br>• The toxin in the form of crystals gets solubilised due to alkaline pH in the gut<br>• The activated toxin binds to the surface of gut epithelial cells and perforate the walls causing the death of insect larva (½ x2=2 Marks) | 3 |

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| 20. | criteria for determining biodiversity hot spots are: –<br>• high levels of species richness (1 Mark)<br>• High degree of endemism. (1 Mark)<br>hotspots In India - Western Ghats, Himalaya (Indo-Burma/Sunderland to be accepted)<br>(Any 2) (½+½ = 1Mark)<br>OR<br>***In-situ* Conservation**– Threatened /endangered plants and animals are provided with urgent measures to save from extinction **within their natural habitat** and they are **protected and allowed to grow naturally.**<br>Example- wildlife sanctuaries/ national parks /biosphere reserves/ sacred groves<br>(Any one example) **(**½ Mark, 1 Mark for difference)<br>***Ex-situ* Conservation** –Threatened animals and plants are **taken out from their natural habitat** and placed in a setting where they can be **protected and given care**<br>Example- in botanical gardens/ zoological gardens/ seed/pollen/gene banks<br>(Any one example) (½ Mark, 1 Mark for difference ) | 3 |
| 21. | (a) To maintain the cells in their physiologically most active log/exponential phase. 1 Mark<br>(b) Temperature, pH, substrate, salts, vitamins, oxygen (Any 4) (½ x4 =2 Mark) | 3 |
| | **Section D** | |
| 22. | a.) Each primary spermatocyte will undergo meiosis-I and meiosis-2 which will result in 4 spermatozoa<br>300 million/4=75 million 1 Mark<br>b) Since replication has occurred by this stage<br>46x2 = 92 chromatids 1 Mark<br>Meiosis –I is completed by this time 92/2 =46 chromatids - 1 Mark | 3 |
| 23. | a) Vigorous growth of useful aerobic microbes into flocs. 1 Mark<br>b) Activated sludge – some of it is pumped back into the aeration tank to serve as the inoculum<br>½ + ½ Mark<br>c) During this digestion, a mixture of gases such as methane, hyrogensulphide is made and carbon dioxide. These gases form biogas. 1 Mark | 3 |
| 24. | Platinum-pallidium Rhodium **(Any two ½ +½ = 1Mark)**<br>$CO_2$,$H_20$ and CO [any 2] ½ + ½=1 Mark<br>Nitric oxide 1 Mark | 3 |
| | **Section E** | |
| 25. | Polygenic inheritance 1 Mark<br>• If we assume skin colour is controlled by three genes A, B, C<br>• Dominant forms (A,B,C) are responsible for dark skin colour and recessive form (a, b, c) for light skin colour 1 Mark<br>• The genotype with all dominant alleles (AABBCC) will be darkest skin colour and with recessive alleles will be light test skin colour (aabbcc) (1+1=2 Marks) | 5 |

- The genotypes (AaBbCc) will be of intermediate skin colour i.e. with three dominant alleles and three recessive alleles 1 Mark

**OR**

- The sequences were arranged based on some overlapping regions present in them (Alignment of these sequences was not humanly possible) 1Mark
- Therefore, specialized computer based programme was developed. 1Mark
- These sequences were subsequently annotated and were assigned to each chromosome-1Mark
- Chromosome 1 1Mark
- *Caenorhabditis elegans* 1Mark

26. a) Inducing mutation **artificially** using **chemicals /radiations** /and **selecting plants** with desirable characters ½ x 2 = 1Mark
Mung Bean 1Mark
Yellow mosaic virus 1Mark

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| b) AQUACULTURE | PISCICULTURE |
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| 1. It involves production and culturing of all types of aquatic organisms in water bodies. | Production and culturing of fishes is called pisciculture. 1x2= 2 Mark |

**OR**

a) AIDS caused by the Human Immuno deficiency Virus (½+½= 1 Mark)

b) Vaccines prevent microbial infections by initiating production of antibodies against these antigens to neutralise the pathogenic agents during later actual infection. (1/2)

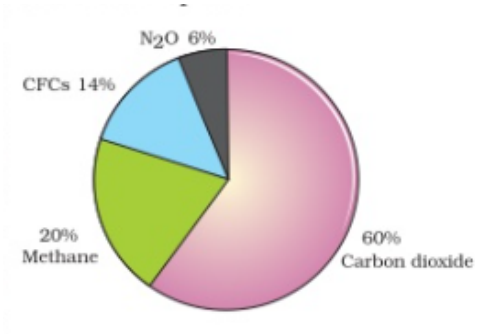
The vaccines also **generate memory** – B and T-cells that recognize the pathogen quickly on subsequent exposure. (1/2) 1 Mark

c) Normal cells show a property called **contact inhibition** by virtue of which contact with other cells inhibits their uncontrolled growth. Cancer cells appear to have lost this property.(1)

These cells grow very rapidly, invading and damaging the surrounding normal tissues. Cells sloughed from such tumors reach distant sites through blood, and wherever they get lodged in the body, they start a new tumor there. This property called **metastasis. (1)**
2 Marks

d) **Physiological barriers :** Acid in the stomach and saliva in the mouth. ½ Mark

27.




(Marks to be given only if relative contribution is correct) (½ x 4 = 2 Marks )

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| | Pie chart - ½ Marks to be detected if not given in form of pie chart<br><br>Clouds and gases reflect one-fourth of incoming solar radiation/absorb some of it/but almost half of incoming solar radiation falls on Earth's surface heating it/while a small is reflected backs/Earth's surface re-emits heat in the form of infra red radiation/but part of this does not escape into space as atmospheric gases absorb a major fraction of it.<br>(½ x 6 points = 3 Marks)<br><br>**OR**<br><br>(a) – Amensalism (1 Mark)<br>(b) – Predation (1 Mark)<br>Justifications-<br>• Nature's way of transferring energy fixed by plants to higher trophic levels/conduits for energy transfer.<br>• Keep prey population under control<br>• Predators help in maintaining species diversity in a community, by reducing the intensity of competition among competing prey species.<br>(1x3 Points = 3 Marks) | |