# FIRST TERM EXAMINATION

# MAY 2018

# CLASS XII

## Marking Scheme – BIOLOGY [THEORY]

| Q.NO. | Answers | Marks (with split up) |
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| 1 | Name an organism where cell division is itself is a mode of reproduction?<br>Cell division among amoeba, act as mode of reproduction. | 1 |
| 2 | Mention the pollinating agent of an inflorescence of small dull coloured flowers with well exposed stamens and large feathery stigma. Give any one characteristic of pollen grains produced by such flowers.<br>wind, light/nonsticky | ½ + ½ |
| 3 | What is the terminology for the concept of group immortality?<br>Reproduction | 1 |
| 4 | The spermatogonia of an animal contains 32 chromosomes. What will be the number of chromosomes in its:<br>a) Primary spermatocytes b) Spermatids<br>32, 16 | ½ + ½ |
| 5 | State the fate of a pair of autosomes during gamete formation.<br>Ans. Segregate / separate | 1 |
| | **SECTION B** | |
| 6 | Where do signals of parturition originate in human from? Why is it important to feed the new born baby with breast milk?<br>From the fully developed foetus which starts mild uterine contractions called foetal ejection reflex. ½ x 2<br>The colostrum in the milk consists of antibodies which give immunity 1 | 2 |
| 7 | When multiplication of species can occur with the help of asexual methods, then why the organisms adopt to sexual methods of multiplication?<br>Variation, and can adapt to changing environment | 1+1 |
| 8 | Mention the combination(s) of sex chromosomes in a male and a female bird. Which sex shows heterogamety?<br>Ans. Male-ZZ = ½ , Female-ZW = ½, Female 1<br>OR<br>A male honeybee has 16 chromosomes while its female honeybee has 32 chromosomes. Give one reason.<br>Solution1. A male honeybee is produced by parthenogenesis and hence is haploid (n=16) while its female is produced by fertilized egg, the product of fusion of drone's sperm (n=16) and female's egg (n=16), and hence is diploid (2n=32). | 1 + 1 |

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| 9 | Define external fertilization. Mention its disadvantages.<br>Fertilization outside the body. Offsprings are extremely vulnerable to predators threatening their survival upto adulthood. | 1+1 |
| 10 | Mention the relationship between concentration of luteinising hormone and maintenance of endometrium in the human uterus.<br>Ans. (Mid cycle) LH surge □formation of corpus luteum □ progesterone, maintain the growth of Endometrium | ½ x 4 |
| 11 | A single pea plant in your kitchen garden produces pods with viable seeds, but individual papaya plant does not. Explain.<br>Pea plant is a dioecious plant and produce bisexual flowers bearing both stamen and pistel on the same flower. Therefore, self fertilization between pollen and ovule of same flowers produce viable seeds. Papaya is a monoecious plant and produce unisexual flowers which in turn facilitate only cross fertilization. Hence, single papaya plant cannot produce viable seeds. | 1+1 |
| 12 | Explain codominance with the help of one example.<br>Ans. When the dominant alleles of the same gene which are contributed by both parents are expressed is<br>(called codominance) // F1 genration resembles both the parentss = ½<br>F1 - IA IB = ½ dominant , when IA & IB are present<br>together in an individual both are<br>expressed as IA IB<br>(AB blood group) = ½ + ½ [½ × 4 =2 Marks] | 2 |
| | **SECTION C** | |
| 13 | Name the organic material the exine of pollen grain is made up of. How is the material advantageous to pollen?<br>(b) Still it is observed that it does not for a continuous layer around the pollen grain. Give reason.<br>(c) How are "pollen banks" useful?<br>Exine is the outer covering of pollen grain which is highly sculptured with sporopollenin; a chemically inert polymer of carotenoid ester which is highly resistant to degradation by any enzyme, as known so far. It can withstand extremes of temperature and desiccation. It protects the pollen from any damage.<br>b. The regions of exine where sporopollenin is absent are known as germ pores. These pores serve as site for formation of pollen tube or germ tube after germination.<br>c. Pollen banks store the pollen grains of different crops in liquid nitrogen (-196 degree Celsius) and serve as reservoir of germplasm to be used for plant breeding programmes. | 1+1+1 |
| 14 | Explain the following phases in the menstrual cycle of" a human female:<br>(i) Menstrual phase<br>(ii) Follicular phase<br>(iii) Luteal phase | 1+1+1 |

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| | (i) Menstrual phase - first 3-5 days of the cycle where menstrual flow occurs due to break down of endometrial lining of uterus, if the released ovum is not fertilised = ½ +½<br>(ii) Follicular phase - from 5th to 14th day of the cycle where the primary follicles grow to become a fully mature Graafian follicle , endometrium of uterus regenerates , Graafian follicle ruptures to release ova (ovulation on 14th day) = ½ × 2<br>(iii) Luteal Phase - During 15th to 28th day remaining parts of graafian follicle transform into corpus luteum , secretion of progesterone (essential for maintenance of endometrium) = ½ × 2 | |
| 15 | Identify each part in a flowering plant and write whether it is halploid (n) or diploid (2n).<br>a) Ovary 2n<br>b) Anther 2n<br>c) Egg n<br>d) Pollen n<br>e) Male gamete n<br>f) Zygote 2n | 6 x ½ |
| 16 | a) Identify the special characteristic in Pollen grains of water pollinated plants for protection from water.<br>b) In a young anther a group of compactly arranged homogenous cells were observed in the centre of each microsporangium. What is the name given to these cells?<br>c) What technique is employed to preserve pollen grains for future use?<br>Sporopollenin, sporogenous tissue, cryopreservation | 1+1+1 |
| 17 | What is a test cross? How can it decipher the heterozygosity of a plant?<br>A test cross is performed to determine the genotype of a dominant parent if it is a heterozygous- or homozygous-dominant. For the purpose, the dominant parent is crossed with homozygous recessive parent. Presence of recessive progeny confirms presence of recessive allele in otherwise dominant parent; it is heterozygous dominant. All dominant progeny confirms that the dominant parents is homozygous and does not carry the recessive allele. For example: a dihybrid test cross between TtRr and ttrr gives 1:1:1:1 ratio while a dihybrid test cross between TTRR and ttrr gives all TtRr progeny. | 1+1+1 |
| 18 | What kind of gametes would be produced by the organisms having the following genotypes?<br>a) AaBB - AB, aB ½<br>b) aaBB – aB ½<br>c) Aabb – Ab, ab ½<br>d) AaBBCc – ABC, aBC, aBc ½ x3 | 3 |
| 19 | Trace the development of female gametophyte in a flower.<br>nucellus, MMC, meiosis, 4megaspores, degeneration, functional megaspore, nuclear division, wall formation, cells | all points3. |
| 20 | A man with blood group A married a woman with B blood group. They have a son with AB blood group and a daughter with O group. Illustrate the inheritance with suitable cross. | 1+2 |
| 21 | Draw a labelled diagrammatic sectional view of a human seminiferous tubule.<br>diagram with four correct labelling<br>**OR**<br>Draw a labeled diagram of the diagrammatic sectional view of female reproductive system.<br>six correct labelling | 1+2 |
| 22 | Mention three strategies involved to prevent self pollination in flowers.<br>any three points | 1+1+1 |

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| 23 | Describe the embryonic development of a zygote upto its implantation in humans.<br>Ans. Zygote moves through isthmus and undergoes cleavage ( forming morula) , morula continues to<br>divide and transform into blastocyst (as it moves further into uterus) , Blastomeres in the blastocyst<br>are arranged into an outer layer trophoblast , and inner cell mass , the trophoblast layer gets attached<br>to endometrium , uterine cells divide and cover the blastocyst = ½ × 6 | ½ x 6 |
| 24 | Give reasons for the following:<br>a) Human testes are located outside the abdominal cavity.<br>b) Only one sperm fertilizes an ovum<br>c) The edge of infundibulum has finger like projections called fimbriae.<br><br>a) To maintain a lower temperature for sperm formation<br>b) Sperm coming in contact with the zona pellucid layer of the ovum induces changes in the membrane that block the entry of additional sperms.<br>c) To collect the ovum during ovulation | 1 x3 |
| | **SECTION D** | |
| 25 | What is triple fusion? Where and how does it take place? Name the nuclei involved in triple fusion. Mention the resultant nuclei formed from triple fusion and its fate.<br>fusion of male gamete with two polar nuclei, in the central cell ( gametophyte), male gamete and polar nuclei. Primary Endosperm Nuclei (PEN), develop into endosperm<br>OR<br>Explain different types of pollination. Describe the mechanism of pollination in Vallisnaria and Zostera.<br>Auto gamy, geitonogamy and xenogamy (3)<br>Vallisnaria and Zostera correct explanation (2) | 5 x 1 |
| 26 | Arrange the following hormones in sequence of their secretion in a pregnant woman.<br>(b) Mention their source and the function they perform : hCG ; LH ; FSH ; Relaxin<br>Ans. (a) FSH , LH , hCG , relaxin (all four hormones in correct sequence = 1 if less than four correct<br>= ½) = 1<br>(b) FSH : anterior pituitary , = ½<br>stimulates follicular development = ½<br>LH : anterior pituitary , = ½<br>rupture of Graafian follicle to release ovum / ovulation / dev. of corpus luteum<br>= ½<br>hCG : placenta , = ½<br>supports foetal growth / metabolic changes in mother and / maintenance of pregnancy = ½<br>Relaxin : ovary , = ½<br>secreted during (later stage) of pregnancy / softens symphysis pubis = ½<br>[1 + 4 = 5 marks]<br><br>OR<br><br>Explain the hormonal regulation of spermatogenesis in humans.<br>(b) Draw the diagram of a human sperm. Label and write the functions of the components of its head. | 5 |

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| | Ans. (a) - Initiation by GnRH from hypothalamus which acts on Anterior Pituitary to release FSH &<br>LH (Gonadotropins) = 1<br>-LH acts on cells of Leydig / Interstitial cells to secrete androgens = ½<br>-Androgens in turn stimulate the process of spermatogenesis = ½<br>-FSH acts on Sertoli cells and stimulates the secretions of some factors that stimulate spermio genesis = 1<br>Diagram any two correct labeling ½ x 2 =1<br>Function of plasma membrane :Envelopes the whole body of sperm.<br>Acrosome- contains enzymes for fertilization<br>Nucleus : Contains haploid chromosomal material<br>(Any two =½ + ½ = 1) | |
| 27 | State and explain the "law of independent assortment" in a typical Mendelian dihybrid cross.<br>Ans. Law of Independent Assortment : when two pair of traits are combined in a hybrid , inheritance of<br>one pair of characters is independent of the other pair of characters / when two pairs of contrasting<br>characters or genes or traits are inherited together in a dihybrid cross (in a pea plant ) the inheritance<br>of one pair of character is independent of inheritance of the other character in the progeny = 1<br>Explanation : Mendel took homozygous pea plant producing yellow and round seeds and crossed<br>them with homozygous pea plant producing green and wrinkled seeds / shown in a flow chart of a<br>dihybrid cross given<br>Cross = ½ x 8<br><br>OR<br><br>Explain the genetic basis of blood grouping in human population.<br>Blood group in human population determined by gene 'I ' , which has three allele IA and IB and i (multiple allelism) = ½ + ½ (ii) IA IB are dominant allele (codominance) each forming different type of sugar polymer on the surface of RBC , while allele 'i' is recessive and does not produce any sugar = ½ + ½ I A IA , IA i – A group = ½ I B IB , IB i – B group = ½<br>A IB – AB group = ½ ii – O group = ½ (iii) Since humans are diploid / each person possesses any two of three 'I' gene alleles, resulting into six different genotypic combination and four phenotypic expression = ½ + ½ [5 Marks] | 5 |