Roll Number		

Code Number 44

INDIAN SCHOOL MUSCAT
HALY YEARLY EXAMINATION

BIOLOGY

CLASS: XII Sub. Code: 044 Time Allotted: 3 Hrs

20.09.2017 Max. Marks: 70

GENERAL INSTRUCTIONS:

(i) There are a total of 26 questions and five sections in the question paper. All questions are compulsory.

(ii) Section A contains questions number 1 to 5, Very Short Answer type questions of 1 mark each.

(iii) Section B contains questions number 6 to 10, Short Answer type I questions of 2 marks each.

(iv) Section C contains questions number 11 to 22, Short Answer type II questions of 3 marks each.

(v) Section D contains question number 23, Value Based Question of 4 marks.

(vi) Section E contains questions number 24 to 26, Long Answer type questions of 5 marks each.

(vii) There is no overall choice in the question paper, however, an internal choice is provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks. In these questions, an examinee is to attempt any one of the two given alternatives.

SECTION A

1 Where are the leydig cells present?what is their role in reproduction? 1

2 Give an example of hormonal IUD. 1

3 Name the respective pattern of inheritance when F1 phenotype 1

a) Doesn't resemble either of the two parents and is in between the two.

b)Resembles only one of the two parents.

4 Mention one application of each. 1

i) DNA fingerprinting

ii) ELISA

5 In case of an infertile couple, the male partner can inseminate normally but the mobility of sperms is below 40 percent. Judge, which kind of ART is suitable in this situation to form an embryo in the laboratory, without involving a donor? 1

SECTION B

6 A relevant portion of β-chain of haemoglobin of a normal human is given below: 2

The codon for the sixth amino acid is GAG. The sixth codon GAG mutates to GAA as a result of mutation 'A' and into GUG as a result of mutation 'B'. Haemoglobin structure did not change as a result of mutation 'A' where as haemoglobin changed because of mutation 'B' leading to sickle shaped RBCs. Explain giving reason how mutation 'B' could change the haemoglobin structure and not mutation 'A'.

OR

Discuss the role of enzyme Ligase during DNA replication.

7 Explain the function of each of the following 2

a) Coleorhizae

b) Germ pores

8 AUG codon has dual function. Explain. Give the sequence of bases it is transcribed from and its anticodon. 2

9 A recombinant vector with a gene of interest inserted within the gene of β-galactosidase enzyme, is introduced into a bacterium.

a) How would you select recombinant colonies from non-recombinant ones?

b) This method of selection referred to as insertional inactivation. Why? 2

10 a) Which body system is affected by ADA deficiency in humans. Mention its cause. 2

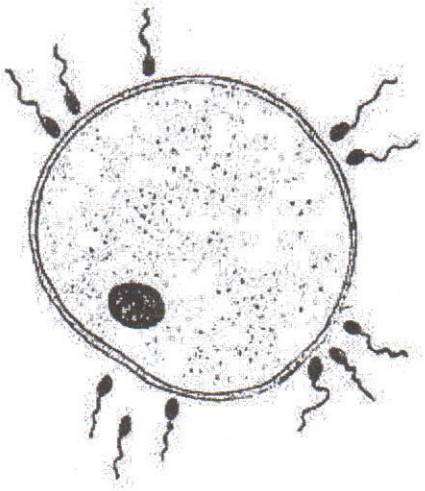
b) Name the vector used for transferring ADA-DNA into the recipient cells in humans. Name the recipient cells.

SECTION C

11 Is it possible for a baby girl to suffer from haemophilia? Discuss the conditions making it possible? Support your answer with the help of a cross. 3

12 Parturition in humans is a neuro endocrine mechanism. Justify the statement. 3

13 Given below is the diagram of a human ovum surrounded by a few sperms. Observe the diagram and answer the following questions: 3



a) What is the role of zona pellucida in this process?

b) Analyze the changes occurring in the ovum during the process.

c) How is the entry of sperm into the ovum facilitated?

14 Explain the phenomena of multiple allelism and codominance taking ABO blood group as an example. 3

15 a) In pBR322, foreign DNA has to be introduced in tetR region. From the restriction enzymes given below, which one should be used and why:
PvuI, EcoRI, BamHI
b) Give reasons, why the other two enzymes cannot be used. 3

16 PCR is used for amplifying a gene of interest. Describe the procedure involved. 3

17 a) Mention any four strategies adopted by flowering plants to prevent self pollination.

b) Geitonogamy is also referred to as genetical autogamy. Give reason. 3

18 Humans and birds show chromosomal sex determination mechanism. Explain human sex determination and also mention how is it different from that of birds?

OR

Discuss briefly any three theories of origin of life. 3

19 Fertilization is essential for production of seed, but in some angiosperms seeds develop without fertilization.
i) Give an example of angiosperm that produces seeds without fertilization. Name the process.
ii) Explain two ways by which seeds develop without fertilization. 3

20 Explain the process of Spermatogenesis in humans. 3

21 (a) In human genome which one of the chromosomes has the maximum genes and which one has the fewest? 3

(b) Scientists have identified about 1.4 million single nucleotides polymorphism in human genome. How is the information of their existence going to help the scientist?

22 a) Draw a schematic diagram of the structure of a **transcription unit** and show the following in it: 3

(i) Direction in which the transcription occurs

(ii) Polarity of the two strands involved

(iii) Template strand

(iv) Terminator gene

(b) Mention the function of promoter gene in transcription.

SECTION D

23 A group of enthusiastic students were disappointed when teacher instructed to observe the demonstration of Gel Electrophoresis of DNA and strictly prohibited them from attempting the procedure. Give two possible reasons why teacher instructed only demonstration and not a student activity? What is the principle of gel electrophoresis? Write one value shown by the teacher. 4

SECTION E

24 Illustrate the stages of development of a pollen mother cell into a mature pollen grain with labeled diagrams. 5

OR

Give reasons for the following statements:

i) Most zygotes in angiosperms divide only after certain amount of endosperm is formed.

ii) Groundnut seeds are exalbuminous and castor seeds are albuminous.

iii) Micropyle remains as a small pore in the seed coat of a seed.

iv) Integuments of an ovule harden and the water content is highly reduced, as the seed matures.

v) Apple and cashew are not considered as true fruits.

25 (a) How did **Griffith** explain the transformation of R strain (non - virulent) bacteria into S strain (virulent)? 5

(b) Explain how Macleod, McCarty and Avery determined the biochemical nature of the molecule responsible for transforming R strain bacteria into S strain bacteria.

OR

(a) How does the Hardy Weinberg's expression ($P^2 + 2pq + q^2 = 1$) explain that genetic equilibrium is maintained in the population?

(b) List any three factors that can disturb the genetic equilibrium.

(c) What is Founder effect?

26 a) Explain a monohybrid cross taking the seed coat colour as a trait in *Pisum sativum.* 5

Work out the cross upto F2 generation.

b) State the laws of inheritance that can be derived from such a cross.

c) How is the phenotypic ratio of F2 generation different in a dihybrid cross?

OR

(i) How are the following formed and involved in DNA packaging in a nucleus of a cell?

a) Histone octamer

b) Nucleosome

c) Chromatin

ii) Differentiate between Euchromatin and Heterochromatin.

End of the Question Paper