ROLL NUMBER				

SET	A

INDIAN SCHOOL MUSCAT
HALF YEARLY EXAMINATION 2022
044 BIOLOGY

CLASS : XII
DATE: 20/09/2022

TIME ALLOTED : 3 HRS.
MAXIMUM MARKS: 70

GENERAL INSTRUCTIONS:

(i) *All questions are compulsory.*

(ii) The question paper has four sections: Section A, Section B, Section C and Section D. There are 33 questions in the question paper.

(iii) Section–A has 14 questions of 1 mark each and 02 case-based questions. Section–B has 9 questions of 2 marks each. Section–C has 5 questions of 3 marks each and Section–D has 3 questions of 5 marks each.

(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION – A

1. To overcome incompatible pollinations so as to get desired hybrids, a plant breeder must have the knowledge of 1

   (a) pollen-nucellar interaction
   (b) pollen-egg cell interaction
   (c) pollen -pistil interaction
   (d) pollen - embryo sac interaction

2. During human embryonic development, the heart in the embryo is formed after 1
   (a) 15 days of pregnancy
   (b) 30 days of pregnancy
   (c) 45 days of pregnancy
   (d) 60 days of pregnancy

3. The cause of Klinefelter's syndrome in human beings is 1
   (a) Absence of X chromosome
   (b) Absence of Y chromosome

(c) Extra copy of an autosome
(d) Extra copy of X chromosome

4. Identify the animals showing male heterogamety? 1
(i) Fruit fly (ii) Fowl (iii) Honey bee (iv) Human being
(a) (i) and (iii)
(b) (ii) and (iv)
(c) (i) and (iv)
(d) (ii) and (iii)

5. Charging of t RNA during translation is necessary for 1
(a) Binding of anticodon of tRNA to the codon on the mRNA
(b) Peptide bond formation between two amino acids
(c) Movement of ribosome from codon to codon
(d) Binding of ribosomes to the mRNA

6. If E.coli were allowed to grow in the culture medium for 80 minutes by Matthew Meselson and Franklin Stahl, in their experiments, the proportion of light and hybrid density DNA molecule would have been 1
(a) 87.5% of light density DNA and 12.5% of hybrid density DNA
(b) 75% of light density DNA and 25% of hybrid density DNA
(c) 50% of light density DNA and 50% of hybrid density DNA
(d) 12.5% of light density DNA and 87.5% of hybrid density DNA

7. Name one IUD recommended to promote the cervix hostility to the sperms. 1

8. Identify the nature of the meiosis happening during the oogenesis is human females. 1

9. The histone proteins are acidic due to the presence of _____ and _____ amino acid residues. 1

10. A region of coding strand of a DNA has the following nucleotide sequences 1
5' TACGCCG 3'
Write the sequence of the m RNA that would be transcribed from this given sequence.

Questions 11-14 consists of two statements. Assertion (A) and Reason (R). Answer these questions selecting the appropriate reasons given below:
(a) Both Assertion (A) and Reason (R) are true and (R) is the correct explanation of the (A).
(b) Both Assertion (A) and Reason (R) are true but (R) is not the correct explanation of the (A)
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

11. **Assertion**: Lactational amenorrhea is the natural method of contraception. 1
Reason: It increases the phagocytosis of sperm.

12. **Assertion**: Saheli, an oral contraceptive for females, contains a steroidal preparation. 1
Reason: It is a "once a week" pill with very few side effects.

13. **Assertion**: Very often persons suffering from sexually transmitted diseases do not go for timely detection and proper treatment. 1
Reason: Absence or less significant symptoms in the early stages of STDs and the social stigma attached to the disease.

14. **Assertion**: Vasectomy is a sterilization procedure advised for females as terminal method. 1
Reason: In vasectomy a small part of the vas deferens is tied or removed by blocking gamete transport thereby preventing conception.

15. **Read the following and answer the questions given below.** 4
The average length of the menstrual cycle is 28-29 days, but this can vary between woman and from one cycle to the next. The menstrual cycle is controlled by many different glands and the hormones that these glands produce. The menstrual cycle is a biofeedback system, which means each structure and gland is affected by the activity of the others. Menstruation is the elimination of the thickened lining of the uterus from the body through vagina, menstrual fluid contains blood cells from the lining of the uterus and mucus.
The average length of a period is between three days and one week. The four phases of the menstrual cycle include menstruation, the follicular phase, ovulation and the luteal phase.

15 i The shortest phase in menstrual cycle is
(a) Menstrual phase
(b) Ovulatory phase
(c) Luteal phase
(d) Proliferative phase

15 ii Main function of corpus Luteum is
(a) Facilitate fertilization
(b) Facilitate ovulation
(c) Secrete progesterone
(d) Facilitate passage of ova in oviduct

15 iii Which hormone level reaches peak during luteal phase of menstrual cycle?

(a) Leutinizing hormone

(b) Progesterone

(c) Follicle stimulating hormone

(d) Oestrogen

15 iv The area that experiences the greatest change during menstrual cycle is

(a) Vagina

(b) Perimetrium

(c) Cervix

(d) Endometrium

16. In court, a woman of O blood group claims that a man of AB blood group is the father of her son having O blood group. The judge orders to take the help of a geneticist to solve the problem. Finally, it was concluded that man of AB blood group was not the father of woman's son. 4

16 i Which of the following phenomenon is seen in blood group inheritance in human?

(a) Pleiotropy

(b) Polygenic inheritance

(c) Codominance

(d) Epistasis

16 ii A person with blood group A can show genotype

(a) I^AI^A (b) I^AI^B (c) I^BI^A (d) I^BI^B

16 iii ABO blood group system is seen in human which is controlled by

(a) B gene (b) C gene (c) I gene (d) n gene

16 iv Out of the three alleles of gene I, the sugar polymers on the plasma membrane of RBCs is controlled by how many alleles?

(a) All three (b) two (c) one (d) zero

SECTION – B

17. Differentiate between convergent and divergent evolution. 2

18. LH is secreted by the anterior pituitary in human males and females. Discuss the difference in their roles in both the sexes. 2

19. Give four reasons for choosing Drosophila for genetic researches. 2

20. Differentiate between Euchromatin and Heterochromatin. 2

OR

Draw the structure of a t-RNA adaptor molecule for AUG codon on m-RNA.

21. Write the functions of Acrosome and Fimbriae. 2

22. State Hardy-Weinberg principle and give the algebraic equation for the distribution of genotypes. 2

23. What is triple fusion? Where does it take place? Name the nuclei involved in this process. 2

24. What is apomixes? Write its significance. 2

OR

Draw a neat labelled diagram of a pollen grain.

25. How is a polypeptide chain synthesis terminated during protein synthesis? 2

SECTION - C

26. Describe the process of oogenesis in human female. 3

27. If a true breeding homozygous pea plant with green pod and axial flowers as dominant characters is crossed with a recessive homozygous pea plant with yellow pods and terminal flowers, then what would be the: 3

(a) Genotypes of the two parents

(b) Phenotypes and genotypes of the F1 offspring

(c) Phenotypic distribution ratio in F2 population.

28. DNA is considered a better genetic material than RNA. Justify giving 3 reasons. 3

29. Explain the experiment done by Frederick Griffith and the conclusion he arrived at. 3

OR

Explain incomplete dominance with the help of an example.

30. How does industrial melanism support Darwin's theory of natural selection explain? 3

SECTION – D

31. Explain the process of Spermatogenesis. Mention the role of FSH in males. 5

OR

A flower of tomato plant following the process of sexual reproduction produces 320 viable seeds. Answer the following questions giving reasons.

(a) What is the minimum number of pollen grains that must have been involved in the pollination of its pistil?

(b) What would have been the minimum number of ovules present in the ovary?

(c) How many megaspore mother cells were involved?

(d) What is the minimum number of microspore mother cells involved in the above case?

(e) How many male gametes were involved in this case?

32. (a) Why hemophilia is generally observed in human males? Explain the conditions under which a human female can be haemophilic. 5

(b) Write any two differences between hemophilia and sickle cell anemia.

OR

(a) State the cause and two symptoms of Down syndrome. Explain the event responsible for causing this syndrome.

(b) Give the karyotype of a woman suffering from Turner's syndrome.

33. Describe the process of transcription in prokaryotes. 5

OR

Who proposed the concept of lac operon? Draw a schematic labelled illustration of lac operon in 'switched on' state. Describe the role of lactose in lac operon.

******END OF THE QUESTION PAPER******

ROLL NUMBER					

SET	B

INDIAN SCHOOL MUSCAT
HALF YEARLY EXAMINATION 2022
044 BIOLOGY

CLASS : XII
DATE: 20/09/2022

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SECTION – A

1. A region of coding strand of a DNA has the following nucleotide sequences 1

   5' AATCTCG 3'

   Write the sequence of the m RNA that would be transcribed from this given sequence.

2. Charging of t RNA during translation is necessary for 1

   (a) Binding of anticodon of tRNA to the codon on the mRNA

   (b) Peptide bond formation between two amino acids

   (c) Movement of ribosome from codon to codon

   (d) Binding of ribosomes to the mRNA

3. During human embryonic development, the limbs and digits in the embryo is formed after 1

   (a) 15 days of pregnancy

(b) 30 days of pregnancy

(c) 45 days of pregnancy

(d) 60 days of pregnancy

4. Identify the animals showing male homogamety? 1

(i) Fruit fly (ii) Fowl (iii) Honey bee (iv) Human being

(a) (i) and (iii)

(b) (iii) only

(c) (i) and (iv)

(d) (ii) only

5. Identify the nature of the meiosis happening during the oogenesis is human females. 1

6. If E.coli were allowed to grow in the culture medium for 60 minutes by Matthew Meselson and Franklin Stahl, in their experiments, the proportion of light and hybrid density DNA molecule would have been 1

(a) 87.5% of light density DNA and 12.5% of hybrid density DNA

(b) 75% of light density DNA and 25% of hybrid density DNA

(c) 50% of light density DNA and 50% of hybrid density DNA

(d) 12.5% of light density DNA and 87.5% of hybrid density DNA

7. Name one IUD recommended to make the uterus unsuitable for implantation. 1

8. The cause of Klinefelter's syndrome in human beings is 1

(a) Absence of X chromosome

(b) Absence of Y chromosome

(c) Extra copy of an autosome

(d) Extra copy of X chromosome

9. The histone proteins are acidic due to the presence of _____and _____ amino acid residues. 1

10. To overcome incompatible pollinations so as to get desired hybrids, a plant breeder must have the knowledge of 1

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Reason: It is a "once a week" pill with very few side effects.

13. **Assertion**: Very often persons suffering from sexually transmitted diseases do not go for timely detection and proper treatment. 1
Reason: Absence or less significant symptoms in the early stages of STDs and the social stigma attached to the disease.

14. **Assertion**: Vasectomy is a sterilization procedure advised for females as terminal method. 1

Reason: In vasectomy a small part of the vas deferens is tied or removed by blocking gamete transport thereby preventing conception.

15. Read the following and answer the questions given below. 4

The average length of the menstrual cycle is 28-29 days, but this can vary between woman and from one cycle to the next. The menstrual cycle is controlled by many different glands and the hormones that these glands produce. The menstrual cycle is a biofeedback system, which means each structure and gland is affected by the activity of the others. Menstruation is the elimination of the thickened lining of the uterus from the body through vagina, menstrual fluid contains blood cells from the lining of the uterus and mucus.

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(a) Facilitate fertilization

(b) Facilitate ovulation

(c) Secrete progesterone

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16. In court, a woman of O blood group claims that a man of AB blood group is the father of her son having O blood group. The judge orders to take the help of a geneticist to solve the problem. Finally, it was concluded that man of AB blood group was not the father of woman's son. 4

16 i Which of the following phenomenon is seen in blood group inheritance in human?

(a) Pleiotropy

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(d) Epistasis

16 ii A person with blood group A can show genotype

(a) IAIA (b) IAIB (c) IBIA (d) IBIB

16 iii ABO blood group system is seen in human which is controlled by

(a) B gene (b) C gene (c) I gene (d) n gene

16 iv Out of the three alleles of gene I, the sugar polymers on the plasma membrane of RBCs is controlled by how many alleles?

(a) All three (b) two (c) one (d) zero

SECTION – B

17. Differentiate between Darwin's and deVries' theories of evolution. (any two points) 2

18. FSH is secreted by the anterior pituitary in human males and females. Discuss the difference in their roles in both the sexes. 2

19. Mention four reasons why Drosophila was chosen by Morgan for his experiments in genetics. 2

20. Differentiate between Euchromatin and Heterochromatin. 2

OR

Draw the structure of a t-RNA adaptor molecule for AUG codon on m-RNA.

21. Write the functions of Acrosome and Fimbriae. 2

22. State Hardy-Weinberg principle and give the algebraic equation for the distribution of genotypes. 2

23. What is double fertilization? 2

24. What is polyembryony? Name one plant showing polyembryony. 2

OR

Draw a neat labelled diagram of a typical anatropous ovule.

25. How is a polypeptide chain synthesis terminated during protein synthesis? 2

SECTION – C

26. (a) Identify three hormones secreted by placenta. 3
(b) Which hormone is involved in the induction of parturition?
(c) Define foetal ejection reflex.

27. If a true breeding homozygous pea plant with green pod and axial flowers as dominant characters is crossed with a recessive homozygous pea plant with yellow pods and terminal flowers, then what would be the: 3

(a) Genotypes of the two parents
(b) Phenotypes and genotypes of the F1 offspring
(c) Phenotypic distribution ratio in F2 population.

28. DNA is more stable and less reactive than RNA. Justify giving 3 reasons. 3

29. Explain the experiment done by Frederick Griffith and the conclusion he arrived at. 3

OR

Explain incomplete dominance with the help of an example.

30. Describe three ways in which natural selection operates in nature. 3

SECTION – D

31. Explain the process of Spermatogenesis. Mention the role of FSH in males. 5

OR

A flower of tomato plant following the process of sexual reproduction produce 320 viable seeds. Answer the following questions giving reasons.

(a) What is the minimum number of pollen grains that must have been involved in the pollination of its pistil?

(b) What would have been the minimum number of ovules present in the ovary?

(c) How many megaspore mother cells were involved?

(d) What is the minimum number of microspore mother cells involved in the above case?

(e) How many male gametes were involved in this case?

32. (a) Why haemophilia is generally observed in human males? Explain the conditions under which a human female can be haemophilic. 5

(b) Write any two differences between haempophilia and sickle cell anaemia.

OR

(a) State the cause and two symptoms of Down syndrome. Explain the event responsible for causing this syndrome.

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33. Describe the process of transcription in prokaryotes. 5

OR

Who proposed the concept of lac operon? Draw a schematic labelled illustration of lac operon in 'switched on' state. Describe the role of lactose in lac operon.

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044 BIOLOGY

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SECTION – A

1. What causes aneuploidy? 1

2. To overcome incompatible pollinations so as to get desired hybrids, a plant breeder must have the knowledge of 1

(a) pollen-nucellar interaction

(b) pollen-egg cell interaction

(c) pollen -pistil interaction

(d) pollen - embryo sac interaction

3. The histone proteins are acidic due to the presence of _____and _____ amino acid residues. 1

4. Name one non medicated IUD recommended to prevent pregnancy. 1

5. If E.coli were allowed to grow in the culture medium for 60 minutes by Matthew Meselson and Franklin Stahl, in their experiments, the proportion of light and hybrid density DNA molecule would have been 1

(a) 87.5% of light density DNA and 12.5% of hybrid density DNA
(b) 75% of light density DNA and 25% of hybrid density DNA
(c) 50% of light density DNA and 50% of hybrid density DNA
(d) 12.5% of light density DNA and 87.5% of hybrid density DNA

6. Identify the nature of the meiosis happening during the oogenesis is human females. 1

7. Identify the animals showing female homogamety? 1

(i) Fruit fly (ii) Fowl (iii) Honey bee (iv) Human being

(a) (i) and (iii)
(b) (iii) only
(c) (i) and (iv)
(d) (ii) only

8. During human embryonic development, the movement of the fetus is felt after 1

(a) First trimester
(b) During 5^{th} month
(c) Second week of pregnancy
(d) 60 days of pregnancy

9. Charging of t RNA during translation is necessary for 1

(a) Binding of anticodon of tRNA to the codon on the mRNA
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SECTION – B

17. Write the functions of Acrosome and Fimbriae. 2

18. State Hardy-Weinberg principle and give the algebraic equation for the distribution of genotypes. 2

19. List the two types of cells present in the seminiferous tubules and mention their functions. 2

20. Name the cells present in the female gametophyte of an angiosperm. 2

21. Mention four reasons why Drosophila was chosen by Morgan for his experiments in genetics. 2

22. Mention any two advantages that seeds offer to plants. 2

OR

Draw a neat labelled diagram of a typical anatropous ovule.

23. How is a polypeptide chain synthesis terminated during protein synthesis? 2

24. Differentiate between Euchromatin and Heterochromatin. 2

OR

Draw the structure of a t-RNA adaptor molecule for AUG codon on m-RNA.

25. Describe any two evidences of evolution. 2

SECTION – C

26. List three salient features of genetic code. 3

27. If a true breeding homozygous pea plant with green pod and axial flowers as dominant characters is crossed with a recessive homozygous pea plant with yellow pods and terminal flowers, then what would be the: 3

(a) Genotypes of the two parents

(b) Phenotypes and genotypes of the F1 offspring

(c) Phenotypic distribution ratio in F2 population.

28. Identify the embryonic stage of human being that gets implanted in the uterus. Name the parts of this embryo. Describe the process of implantation. 3

29. Explain the experiment done by Frederick Griffith and the conclusion he arrived at. 3

OR

Explain incomplete dominance with the help of an example.

30. Define adaptive radiation. Illustrate with one example. 3

SECTION - D

31. Explain the process of Spermatogenesis. Mention the role of FSH in males. 5

OR

A flower of tomato plant following the process of sexual reproduction produce 320 viable seeds. Answer the following questions giving reasons.

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OR

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