NORTH-EX PUBLIC SCHOOL

(Senior Secondary, Affiliated To CBSE)

School Block, Jain Nagar, Sector-38, Rohini, Delhi – 81

HALF YEARLY EXAMINATION, 2023-24

SUBJECT – BIOLOGY

CLASS - XII

TIME : 3 hrs MM : 70

General instructions:

i. All questions are compulsory.

ii. The question paper has five sections and 33 questions. All questions are compulsory .

iii. Section -A has 16 questions of 1 mark each ; section-B has questions of 2 marks each; section-C has 7 questions of 3marks each; section -D has 2 case based questions of 4 marks each ; and section -E 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 alternative in such questions.

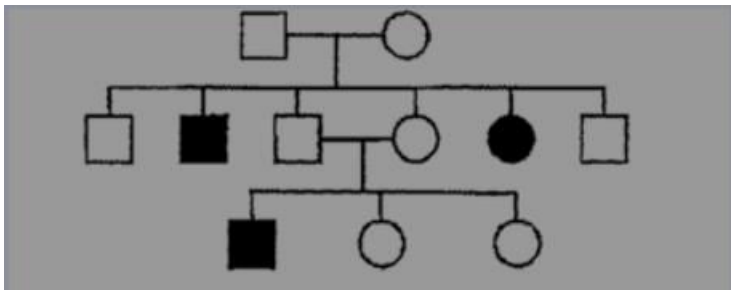
v. Wherever necessary, neat and properly labeled diagrams should be drawn .

Section -A

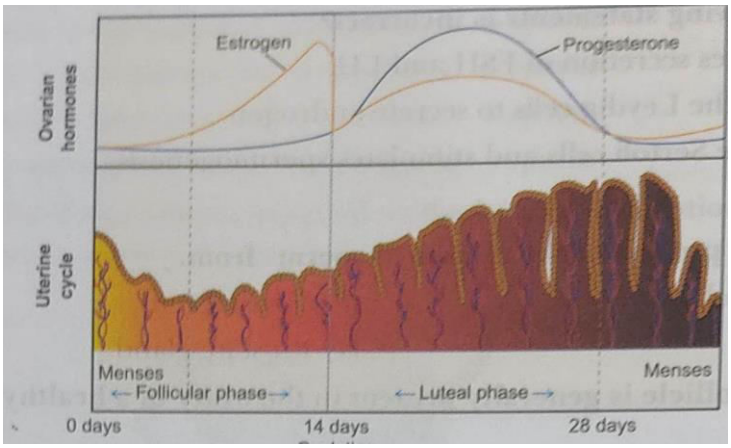
1. Remnants of nucleus are persistent during Seed development in:
    a) Black pepper
    b) Wheat
    c) Pea
    d) Groundnut
2. In a fertilised embryo sac , the haploid, diploid and triploid structures are
    a) Synergid, zygote and primary endosperm nucleus
    b) Synergid , antipodal and polar nuclei.
    c) Antipodal, synergid and primary endosperm nucleus.
    d) Synergid, polar nuclei and zygote .
3. At a particular locus ,the frequency of allele A is 0.8 and that of allele a is 0.2 . What would be the frequency of heterozygous in a random mating population at equilibrium?
    a) 0.32
    b) O.48
    c) 0.16
    d) O.24
4. The average Guanine content in yeast is found to be 18%.
   Which of the following represents the nitrogeneous base content percentages correctly from the above data?
    a) A:18%; T: 18%; C : 36%
    b) A:36%; T: 32%; C : 32%
    c) A:32%; T: 32%; C : 18%
    d) A:18%; T: 18%; C : 18%
5. In a certain taxon of insects some have 17 chromosomes and the other have 18 chromosomes. The 17 and 18 chromosome bearing organisms are
    a) Males and females respectively
    b) Females and males respectively

c) All males
d) All females

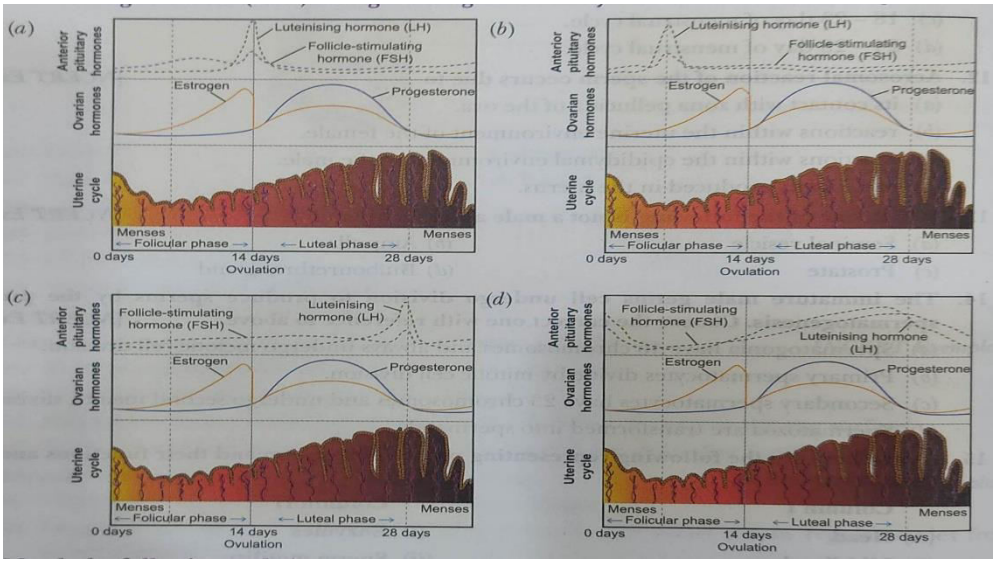
6. All genes located on the same chromosome
   a) Form different groups depending upon their relative distance
   b) Form one linkage group
   c) Will not form any linkage groups
   d) Form interactive group that affect the phenotype
7. How many types of gametes would be produced if the genotype of a parent is AaBB?
   a) 1
   b) 2
   c) 3
   d) 4
8. Study the pedigree given below and select the probable mode of inheritance and a human trait that follows this pattern of inheritance.



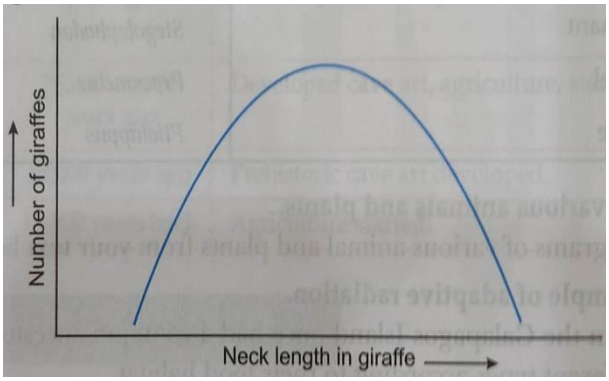
   a) Autosomal recessive, sickle cell anaemia
   b) Sex linked recessive, haemophilia
   c) Autosomal dominant, myotonic dystrophy
   d) Sex linked dominant, colour blindness
9. Shown here is how the levels of hormones estrogen and progesterone change during the menstrual cycle .



Which of these correctly show the levels of lutenising hormone (LH) and follicle stimulating hormone (FSH) change during the same cycle ?



10. Intensely lactating mothers do not generally conceive due to the
    a) Suppression of gonadotropins
    b) Hypersecretion. Of gonadotropins
    c) Suppression of gametic transport
    d) Suppression of fertilisation
11. Select the option that gives the correct description of the process of natural selection with respect to the length of the neck of giraffe.



    a) Stabilizing selection as giraffes with loner neck lengths are selected further.
    b) Disruptive selection as giraffes with smaller and longer neck lengths are selected.
    c) Directional selection as giraffes with longer neck length are selected

d) Stabilizing selection as giraffes with medium neck lengths are selected .

12. Given below are two columns. In column I the names of four contraceptive devices are given and in column II the modes of action of the contraceptives are given .select the option where the contraceptive devices are correctly matched with their respective modes of action.

Column I		Column II	
S. No.	(Contraceptive devices)	S. No.	(Modes of action)
(P)	Lippes loop	(*i*)	Inhibition of ovulation
(Q)	Multiload 375	(*ii*)	Phagocytosis of sperms in uterus
(R)	Subcutaneous Norplant	(*iii*)	Causes thickening of cervical
(S)	Saheli	(*iv*)	Makes cervix hostile to sperms

(*a*) P—(*ii*), Q —(*iv*), R—(*iii*), S—(*i*) (*b*) P—(*i*), Q—(*ii*), R—(*iii*), S—(*iv*)

(*c*) P—(*iii*), Q—(*i*), R—(*iv*), S—(*ii*) (*d*) P—(*iv*), Q—(*iii*), R—(*ii*), S—(*i*)

Questions no. 13 to 16 consist of two statements – Assertion (A) and Reason (R) .Answer these questions selecting the appropriate option given below:

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true and R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

13. Assertion : the human genome comprises of a large amount of repetitive sequences.
Reason :The repetitive sequences in the genome do not have direct coding functions.
14. Assertion: Genetic drift refers to change in allele frequency.
Reason : heritable variation enable survival of the fittest .
15. Assertion: The maximum frequency of recombination that results from crossing over of linked gene is 50 percent.
Reason: if distance between linked genes is longer, they show higher frequency of crossing over.
16. Assertion: In human beings, ovum is released from the ovary in the ootid stage.
Reason : The secondary oocytes divides into unequal daughter cells , a large ootidand a small polar body.

Section -B

17. Branching descent and natural selection are the two key concepts of Darwinian theory of evolution. Explain each concept with the help of a suitable example.
18. Answer the following question:

a) List any two characteristics features of wheat flowers that make it a good example of wind pollination.
b) It is observed that plant breeders carrying out wheat hybridisation often taken pollen grains from the 'pollen banks'. Do you agree? Give one reason in support of your answer.

19. Answer the following questions
    a) Recently a baby girl has been reported to suffer from haemophilia. How is it possible? Explain with the help of a cross.
    b) Sickle cell anaemia in humans is a result of point mutation Explain.
20.
    a) Draw a labelled diagram of a replication fork showing continuous and discontinuous replication of DNA stands.
    b) State a reason why is the replication continuous and discontinuous in the diagram drawn.
21. A pregnant human female was advised to undergo MTP. It was diagnosed that the foetus she was carrying had developed from a zygote having 45 chromosomes with only one X chromosome.
    a) What is this condition called and how does it arise?
    b) Why was she advised to undergo MTP?

SECTION - C

22. Answer the following question:
    a) Explain the development of a secondary oocyte (ovum) in human female from the embryonic stage upto its ovulation.
    b) Describe the post zygotic events leading to implantation and placenta formation in humans. Mention any two functions of placenta.
23. Answer the following question:
    a) Describe the endosperm development in coconut.
    b) How are pea seeds different from castor seeds with respect to endosperm?
    c) Give reason why apple and cashew are not called true fruits.
24. Answer the following question:
    a) Describe the mechanism of inheritance of ABO system of blood group, highlighting the principles of genetics involved in it.
    b) In one family, the four children each have a different blood group. Their mother has blood group A and their father has blood group B. work out a cross to explain how it is possible.
25. Explain the process of transcription in prokaryotes. How is the process different in eukaryotes.
26. Answer the following questions:
    a) Differentiate between analogous and homologous organ giving one example each of plant and animal respectively.
    b) How they are considered as an evidence in support of evolution?
27. Answer the following questions
    a) A true breeding pea plant, homozygous for inflated green pods are

crossed with another pea plant with constricted yellow pods (ffgg).what would be the phenotypeand genotype of F1 and F2 generations? Give the phenotype ratio of generation.

b) Explain the chromosomal theory of Inheritance.

28. Why did Hershey and chase use radioactive Sulphur and radioactive phosphorous in theirexperiment?

SECTION – D

29. A biology student Advik, read an article on apple being a false fruit. He asked his teacher about how fruit can be called false fruit and was explained about the development of fruits.

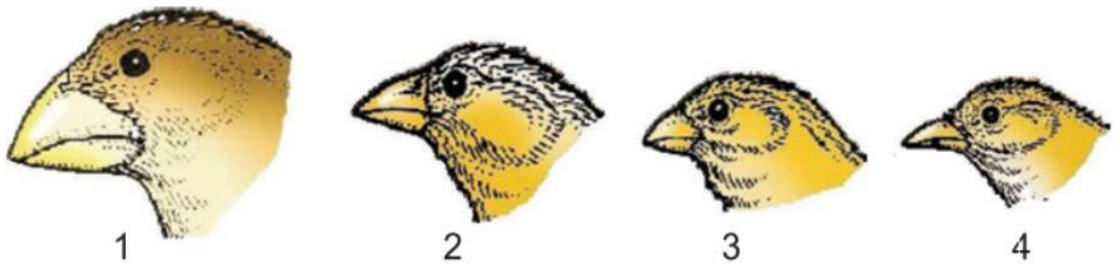
(i) A true fruit is formed from
(a) ovary
(b) ovary and thalamus
(c) ovary and calyx
(d) ovary and receptacle

(ii) Fruit is a
(a) post fertilisation product of pistel
(b) product of flower
(c) body having seeds
(d) product of ovary

(iii) Parthenocarp is a fruit
(a) formed from superior ovary
(b) formed from inferior ovary
(c) consisting of ripened ovary and thalamus
(d) which does not possess seeds

(iv) Schizocarpic fruit splits up into
(a) Achenial fruit
(b) Capsular
(c) Schizocarpic
(d) Drupe

30. Darwin found the varieties of finches that in travelled to Galapagos Islands and observed variations in them.



(i) What role does an individual organism play as per Darwin's theory of natural selection?
(ii) How did Darwin explain the existence of different varieties of

finches on Galapagos Islands?

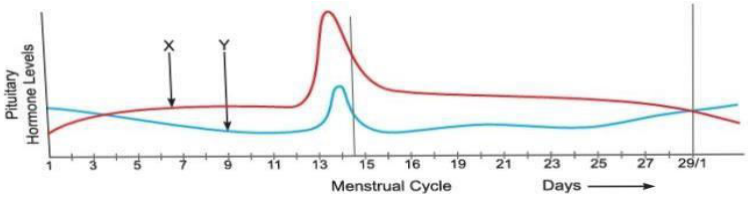
(iii) What is "fitness of an individual" according to Darwin?

SECTION - E

31. Placed below are case studies of some couples who were not able to have kids. These couples are not ready for adoption or taking gametes from donors. After thoroughly examining the cases, which Assisted Reproductive Technology will you suggest to these couples as a medical expert? Explain briefly with justification of each case.

Couple	Test reports of Female partner	Test reports of male partner
Couple 1	Normal reports	Normal sperms in testes, Missing connection in epididymis and Vas deferens
Couple 2	Blockage in the fallopian tube	Normal reports
Couple 3	Normal reports	Poor semen parameters in terms of count, motility and morphology
Couple 4	low ovarian reserve	Normal reports
Couple 5	Sterilization in male	Morphologically abnormal sperms

32. Given below is a stretch of DNA showing the coding strand of a structural gene of a transcription unit? 5'--ATG ACC GTA TTT TCT GTA GTG CCC GTA CTT CAG GCA TAA—3'
    a) Write the corresponding template strand and the mRNA strand that will be transcribed, along with its polarity.
    b) If GUA of the transcribed mRNA is an intron, depict the sequence involved in the formation of mRNA /the mature processed hnRNA strand.
    i. In a bacterium
    ii. In humans
    c) Upon translation, how many amino acids will the resulting polypeptide have? Justify.
33. Study the graph given below and answers the questions that follow:



a) Name the hormone X and Y.
b) Identify the ovarian phases during a menstrual cycle
    i. 5^{th} day to 12^{th} day of the cycle
    ii. 14^{th} day of the cycle
    iii. 16^{th} day to 25^{th} day of the cycle
c) Explain the ovarian event (i). (ii) and (iii) under the influence of hormone X and Y.