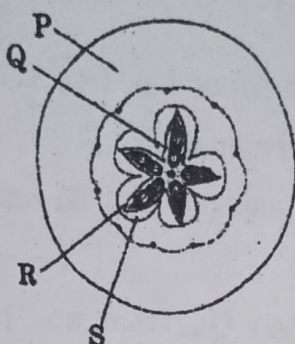


## SECTION-(A)

Select the option that correctly matches with the labelling in the given diagram of T.S of an apple which categorizes it as false fruit :



- (a) P-Thalamus, Q-Seed, S-Mesocarp, R-Endocarp  
 (b) P-Thalamus, S-Seed, Q-Mesocarp, R-Endocarp  
 (c) P-Endocarp, S-Seed, Q- Mesocarp, R-Thalamus  
 (d) P-Endocarp, S-Seed, Q-Mesocarp, R-Endocarp

Genotypic ratio of 1:2:1 is obtained in a cross between :

- (a)  $AB \times AB$  (b)  $Ab \times ab$   
 (c)  $Ab \times Ab$  (d)  $ab \times ab$

The pyramid of biomass will be inverted for a :

- (a) Grassland ecosystem .  
 (b) Smaller food chain  
 (c) ecosystem where a big fish prey on large no of smaller organisms  
 (d) ecosystem where a single tree feeds a larger population.

Which one of the following options is not the function of human placenta ?

- (a) Supply of oxygen and nutrients to the embryo  
 (b) Production of oestrogen  
 (c) Removal of carbon di oxide and waste materials from the embryo  
 (d) Secretion of relaxin hormone .



5. Oestrogen is secreted by :

- (a) Corpus Leuteum
- (b) Membrane Granulosa of Graffian Follicle
- (c) Pituitary Gland
- (d) Germinal epithelium

6. The interdependent evolution of flowering plants and pollinating insects together is known as :

- (a) mutualism
- (b) co-evolution
- (c) commensalism
- (d) co-operation

7. Which of the following codons has dual function ?

- (a) AUG
- (b) AUC
- (c) ACU
- (d) ACA

8. Which of the following options gives the correct temperature condition and the mixture of the gaseous components that were used by S.L. Miller in 1953 to prove abiogenesis of life ?

- (a)  $\text{CH}_4$ ,  $\text{H}_2$ ,  $\text{NO}_2$  and water vapour at  $1800^\circ \text{C}$
- (b)  $\text{CH}_4$ ,  $\text{H}_2$ ,  $\text{NH}_3$  and water vapour at  $1800^\circ \text{C}$
- (c)  $\text{CO}_2$ ,  $\text{H}_2$ ,  $\text{NH}_3$  and water vapour at  $800^\circ \text{C}$
- (d)  $\text{CH}_4$ ,  $\text{H}_2$ ,  $\text{NH}_3$  and water vapour at  $800^\circ \text{C}$

9. Amniocentesis is a technique that is used to :

- (a) Determine any disease of the heart
- (b) Determine any genetic disorder of the foetus
- (c) Determine any disorder of brain
- (d) Detect any abnormality in the bone formation

10. In Human, non-disjunction of the 21<sup>st</sup> pair of chromosomes lead to :

- (a) Acquired Immune Deficiency Syndrome
- (b) Syndrome



- (c) Turner's Syndrome  
(d) Down's Syndrome

J1.

The most primitive ancestor of human is :

- (a) Homo habilis (b) Australopithecus  
(c) Ramapithecus (d) Homo neanderthalensis

J2.

The gene that controls the ABO blood group system in human being has three alleles,  $I^A$ ,  $I^B$  and  $i$ , A child has blood group O. His father has blood group A and mother has blood group B. Genotype of other offspring can be :

- (i)  $I^B I^B$  (ii)  $I^A i$  ✓  
(iii)  $I^B i$  ✓ (iv)  $I^A I^B$  ✗  
(v)  $i i$  ✓ (vi)  $I^A I^A$  ✓  
(a) (i), (ii), (iii), (v) (b) (ii), (iii), (iv), (v)  
(c) (iii), (iv), (v) (d) (i), (iii), (vi)

**Question 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.

Assertion (A) : Gross primary productivity is always less than net primary productivity.

Reason (R) : Rate of synthesis of organic matter by consumers is known as secondary productivity.

Assertion (A) : Periodic abstinence is a method in which couple avoid coitus from day 10 to 17 of menstrual cycle.



Reason (R) : Periodic abstinence has limited effectiveness because menstrual cycles are not always regular.

15. Assertion (A) : Adaptive ability has a genetic basis and is inherited.

Reason (R) : Fitness is the end result of the ability to adapt and get selected by nature.

16. Assertion (A) : Insect show male heterogamy.

Reason (R) : In insect female have XO sex chromosomes and males have XX sex chromosomes.

### SECTION-(B) 17 to 21 (6 questions)

17. Comment on the interaction between a fig tree and wasp. Mention the phenomenon that operates in their relationship.

OR

Explain "brood parasitism" with the help of an example.

18. State the cellular nature and function of myometrium and endometrium.

19. How do implants act as an effective method of contraception in human females ? Mention their one advantage over contraceptive pills.

20. Australian marsupials exhibit adaptive radiation". Justify the statement.

21. By using Punnett square depict the genotypes and phenotypes of test crosses where green pod colour (G) is dominant over yellow pod colour(g) in garden pea with unknown genotype.

### SECTION-(C) 22 to 28 (6 questions)

22. What is Co-dominance ? Briefly explain with a suitable example.

23. What does central dogma state in molecular biology ? Name the steps that involves Central dogma. Write an example where it is not applicable.

24. Differentiate between the explanation given by Darwin and de Vries respectively on the mechanism of evolution. Write any three differences.\_\_\_\_\_



25.

Differentiate between :

(a) Grazing food chain and detritus food chain

(b) Upright pyramid and inverted pyramid

26. (i) Draw a labelled diagram of an initiator tRNA charged with its respective amino acid.

(ii) Mention the role of initiator tRNA in initiation of protein synthesis.

27.

Draw a labelled diagram of a fertilised embryo sac of an angiosperm. (label any four part)

OR

Mention the important steps that are carried out during artificial hybridisation technique to obtain superior varieties of desired plants. Explain briefly the steps.

28.

Mention the three phases of menstrual cycle along with the changes in uterus, hormonal levels and ovary during menstrual cycle.

## SECTION-(D)

29.

Among the 1.9 billion women of reproductive age group (15-49 years) worldwide in 2019, 1.1 billion have a need for planning. Of these, 842 million are using contraceptive methods and 270 million have an unmet need for contraception. The proportion of the need for family planning satisfied by modern methods, Sustainable Development Goals(SDGs) was 70-75% globally in 2019, yet less than half of the need for family planning was met in middle and Western Africa. Only one contraceptive method, i.e. condoms can prevent both a pregnancy and the transmission of sexually transmitted infection . Another issue is infertility which is rapidly growing. To overcome the issue, the childless couple who prefer IVF to have their own children.

(i) Which of the birth control measures can be considered as the safest ?

(ii) Name any two examples of Sexually Transmitted disease.

(iii) Give a brief about ZIFT and GIFT.



OR

Explain the mode of action of  $\text{Cu}^{++}$  releasing IUD as a good contraceptive pills. How is it different from other hormone releasing IUDs.

The lac operon consists of a regulation gene and three structural gene. In the presence of a lactose the repressor is inactivated during the interaction. This allows RNA polymerase access to the promoter and transcription proceeds. The repressor is synthesized which in turn binds with the operator region of the operon and prevents RNA polymerase from transcribing the operon.

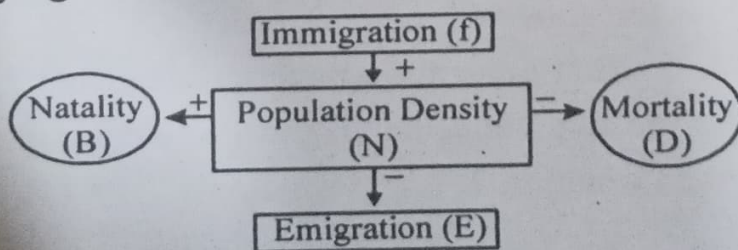
- (i) Why is lac operon's regulation referred to as negative regulation ?  
 (ii) Identify the regulatory gene in the lac operon.  
 (iii) Name the products of genes  $z$ ,  $y$ ,  $a$  of the lac operon. Write the function of these gene products.

OR

What is termed as operon? Name the inducer in this case.

## SECTION-(E)

31. (j) Study the flow chart given below and complete the equation that follows by identifying 1,2,3, and 4



$$N_{t+1} = N_t + [(1 + 2) - (3 + 4)]$$

- (ij) Mention the difference between ways by which the population density of different species could be measured. Mention the equations.



OR

- (i) Explain the pollination mechanism involved in co-evolution of the two species, namely *Ophrys* (orchid) and its insect pollinator bees (& bumble bees).
- (ii) (a) Compare giving results, the VJ-shaped and 'S'-shaped models of population growth of a species.
- (b) Why did the Abingdon tortoise in Galapago island become extinct ?

32. Trace the development of a megaspore mother cell to the formation of mature embryo sac in a flowering plant.

OR

- (i) Explain the embryonic development from fertilized ovum up to its implantation.
- (ii) When and where do chorionic villi appear in human ? State their function.
33. (i) Draw and Explain the observation of Melsons and Stahl when :
- (a) they cultured *E. coli* in a medium containing for a few generations and centrifuged the content.
- (b) they transferred one such bacterium to the normal medium containing  $^{14}\text{NH}_4\text{Cl}$ .
- (ii) What does the above experiment prove?
- (iii) Which is the first-generation material identified ?
- (iv) What did the two bands signify in these experiments and what is the reason for formation ?

OR

- (i) Mention the dual role of deoxyribose nucleoside triphosphate during DNA replication.
- (ii) Expand VNTR and describe its role in DNA fingerprinting.
- (iii) List the any two important goals of Human Genome Project.