विद्या सर्वार्थ साधिका

ANANDALAYA
PRE-BOARD EXAMINATION
Class: XII

Subject: Biology (044) MM :70
Date : 11-12-2023 Time: 3 hrs

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 5 questions of 2 marks each; Section– C has 7 questions of 3 marks 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 alternatives in such questions.
(v) Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION A

1. One advantage of cleistogamy is _____ . (1)
(A) it leads to greater gametic variability
(B) seed dispersal is widespread
(C) seed set is not dependent on pollinators
(D) Each visit of pollinators results in transfer of hundreds of pollen grains

2. Select the odd one out from the following structures with reference to male reproductive system. (1)
(A) Rete testis (B) Epididymis
(C) Vasa efferentia (D) Isthmus

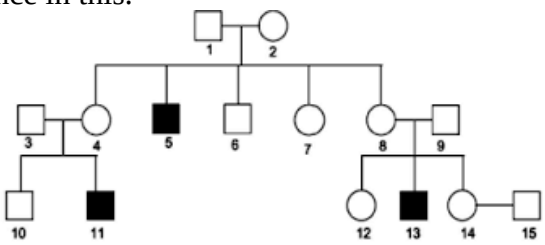
3. Saheli is an oral contraceptive pill that has very high contraceptive value with little side effects. It is because _____. (1)
(A) it is taken once in a week
(B) it contains synthetic progesterone
(C) it contains centchroman
(D) it decreases chances of cancer

4. In Snapdragon, a plant with red flower was crossed with another plant with white flower. The F_1 had pink flowers. When the F_1 was selfed, F_2 showed white and red flowers. Choose the incorrect sentence regarding the above cross. (1)
(A) The ratio of F_2 is ¼ red: $^2/_4$ pink; ¼ white
(B) Law of segregation does not apply here
(C) The inheritance does not follow principle of segregation
(D) Pink colour in F_1 is due to incomplete dominance

5. AGGTATCGCAT is a sequence from the coding strand of a gene. What will be the corresponding sequence of the mRNA transcribed? (1)
(A) UCCAUAGCGUA (B) AGGUAUCGCAU
(C) ACCUAUGCGAU (D) UCGTUTCGCAT

6. Which one of the following is not a nitrogen fixing organism?
(A) *Anabaena* (B) *Nostoc* (C) *Azatobacter* (D) *Pseudomonas*

7. In the human pedigree chart shown below, the filled symbols represent the affected individuals. Identify the type of inheritance in this. (1)

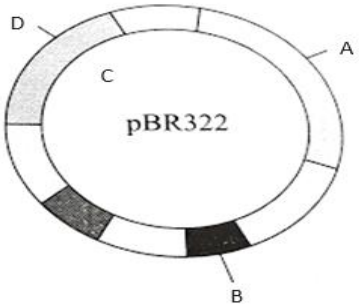


(A) X- linked dominant type
(B) Autosomal dominant type
(C) X- linked recessive type
(D) Autosomal recessive type

8. Which is the specific type of drug obtained from the plant, the figure of which is given below? (1)

(A) Hallucinogen (B)depressant (C) stimulant (D)Pain killer

9. The figure given below is the diagrammatic representation of the E.Coli vector pBR 322. Which one of the given options correctly identifies its certain component(s)? (1)



(A) ori- original restriction enzyme
(B) rop-reduced osmotic pressure
(C) Kary Mullis
(D) amp^r, tet^r- antibiotic resistant gene

10. Decline in the population of Indian native fishes due to the introduction of *Clarius gariepinus* in the river Yamuna can be categorised as _____ . (1)
(A) Co-extinction
(B) habitat fragmentation
(C) overexploitation
(D) alien species invasion

11. The main function of the corpus luteum in human is to produce _____ . (1)
(A) Estrogen only
(B) progesterone
(C) human chorionic gonadotropin
(D) relaxin only

12. The test tube baby program employs the technique _____. (1)
(A) intracytoplasmic sperm injection
(B) intrauterine insemination
(C) gamete intrafallopian transfer
(D) zygote intrafallopian transfer

Questions 13 to 16 consists of two statements- Assertion(A) and Reason(R). Answer these questions selecting the appropriate options 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 and R is false.
D. A is false but R is true.

13. Assertion: Meiosis and sexual fusion are essential for sexual reproduction. (1)
Reason: Meiosis and sexual fusion are not essential for asexual reproduction.

14. Assertion: Only a single female gamete is formed from each primary oocyte cell. (1)
Reason: Meiosis in each primary and secondary oocyte gives rise to only one cell, which functions as the ovum.

15. Assertion: In human the sex of the child depends upon the gamete contributed by the father. (1)
Reason: In human, sex is a polygenic trait which depends upon the cumulative effect of some genes on X and Y chromosomes.

16. Assertion: Number of chromosomes in one genome is equal to the number of linkage groups. (1)
Reason: Linkage groups give important information about the location of genes in the chromosomes.

SECTION B

17. Why is mensural cycle absent during pregnancy? (2)

18. What is test cross? Why is it important in the field of Genetics? (2)

19. How are biofertilizers different from the fertilizers like NPK? Justify the role of Rhizobium as a biofertilizer. (2)

20. Compare and contrast the advantages and disadvantages of production of genetically modified crops. (2)

21. The net primary productivity per square metre of open ocean is relatively low though it produces the highest net primary productivity of Earth's ecosystems. Justify. (2)

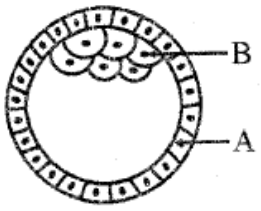
OR

Which rain forest has the highest biodiversity on earth? List the two hypotheses that are proposed by biologists to account for the greater biological diversity?

SECTION- C

22. Fertilization is essential for production of seed, but in some angiosperms, seeds develop without fertilization. (3)
A. Give an example of an angiosperm that produces seeds without fertilization. Name the process.
B. Explain two ways through which it happens.

23. Study the given figure and answer the questions that follow: (3)
A. What do 'A' and 'B' represent?
B. Identify this stage and write the name of its next stage of development.



24. Using a Punnet square, work out the distribution of phenotypic features in the F_1 generation after a cross between a homozygous female and a heterozygous male for a single locus. (3)

25. Differentiate between the following: (3)
A. Repetitive DNA and satellite DNA
B. mRNA and tRNA
C. Template strand and coding strand

26. Draw a labelled sketch of the replication fork of DNA. What is the role of enzymes involved in DNA replication? (3)

OR

Draw the structure of nucleosome and label DNA, Histone and octamer of histone. Explain its structure.

27. Explain the role of the following products in daily life. (3)
A. Penicillin B. Biogas C. Citric acid D. Curd E. SCP D. Statins

28. Differentiate among the following: (3)
A. Grazing food chain and Detritus food chain
B. Production and Decomposition
C. Upright pyramid and Inverted pyramid

SECTION D

29. The treatment of genetic disorder by manipulating gene is called gene therapy. However, gene therapy has not been a proved to be a panacea for genetic disorders. Any genetic disorder caused by a single defective allele can be theoretically set right by replacing or supplementing the defective allele with a normal functional allele through rDNA technology. Such diseases range from SCID to sickle cell anemia. (4)
Based on the above information, answer the following questions.
A. How was the girl with ADA deficiency treated?
B. Why was it not a 100% success?
C. How are polymerase chain reaction useful to genetic engineers?

OR

What is meant by downstream processing?

30. Predators reduce the intensity of competition among competing prey species and in turn, maintain the species diversity. In Washington state, Paine removed the top predator the sea star *Pisaster ochraceus* from the area and found a drastic reduction in the number of remaining species. Control area with *Pisaster supported* some 15 species of marine invertebrates, but the area without the starfish had only 8 species. Gradually more than 10 species of invertebrates became extinct. (4)
Based on this information, answer the following questions.
A. Can we consider herbivores as predators? Justify your answer.
B. How is co-extinction responsible for the loss of biodiversity?
C. How does sixth mass extinction differ from the previous mass extinctions?

OR

Give an example where introduction of a new species led to the removal of the native species.

SECTION E

31. A. What is meant by transforming principle? (5)
B. Who discovered it?
C. Explain the experiment that demonstrated and confirmed transforming principle.

OR

A. What is meant by semiconservative mode of DNA replication?
B. Name the scientists who contributed proof for this type of replication.
C. Explain the experiment with diagrams.

32. A. What are assisted reproductive technology? (5)
B. How are they useful to the couples?
C. Describe any 3 techniques.

OR

Enumerate and describe five reasons for introducing sex education among school going children.

33. Write a brief account on recombinant DNA technology. (5)

OR

A. How can a DNA be cut at a specific location?
B. How is gene amplification done?