2022 XI 21 **0230** **Seat No.** | | | | | |

Time : 1½ Hours **FIRST-TERM** **BIOLOGY**

Subject Code

H	4	7	0	4

Total No. of Questions : 40 (Printed Pages : 16) **Maximum Marks : 40**

***INSTRUCTIONS* :** (*i*) Every question has *four* choices for its answers (A), (B), (C), (D) and only one of them is the correct answer.

(*ii*) On the OMR sheet, for each question number, darken with a ball point pen **ONLY ONE** bubble corresponding to what you consider to be the most appropriate answer, from among the four choices.

(*iii*) Please note that it is not possible to change the answer once you have filled up the bubble with ball point pen. Hence sufficient care must be taken while darkening the bubbles.

(*iv*) For each question, you will be awarded **ONE MARK** if you have darkened only the bubble corresponding to the correct answer. In all other cases, you will get zero mark. There is no negative mark.

(*v*) Only one OMR sheet will be provided.

(*vi*) Use only **black or blue** ball point pen.

1. Transfer of pollen grains from the anther to the stigma of another flower of the same plant is called ..... .

(A) Geitonogamy

(B) Karyogamy

(C) Xenogamy

(D) Autogamy

2. A patient is suspected to be suffering from AIDS. Which diagnostic technique will you recommend for its detection ?

(A) WIDAL

(B) MRI

(C) CT

(D) ELISA

3. The average temperature in hydrothermal vents found in deep sea is one of the following :

(A) 20–30°C

(B) Sub-zero level

(C) >50°C

(D) Exceeds 100°C

4. To isolate a DNA from a plant cell a biologist will use all the following enzymes, *except* ..... .

(A) Cellulase

(B) DNAase

(C) RNAase

(D) Protease

5. Malnourishment ultimately contributes to diseases such as Rickets and Kwashiorkor amongst the children in the developing countries. Therefore, genetically modified crops are developed to ..... .

(A) Reduce dependency on chemical pesticides

(B) Make plants more tolerant to abiotic stress

(C) Increase efficiency of mineral usage

(D) Enhance nutritional value of food

6. Researchers in Netherland have discovered a gene "PAR" from *Dandelion* species that will make it possible to produce seeds from the crops that are genetically identical to the mother plant and do not need pollinators. The technique probably used must be ..... .

(A) Apomixis

(B) Triple fusion

(C) Parthenocarpy

(D) Syngamy

7. First artificial *r*DNA was constructed by ..... .

(A) Gregor Mendel and T.H. Morgan

(B) T.H. Morgan and Alfred Sturtevant

(C) Stanley Cohen and Alfred Sturtevant

(D) Stanley Cohen and Herbert Boyer

8. In the life cycle of a malarial parasite, where would you look for the mature sporozoites of the parasite ?

(A) Saliva of a female *Anopheles* mosquito

(B) Liver of a healthy human

(C) RBCs of infected human

(D) Intestine of a female *Anopheles* mosquito

9. A population of 200 zebras was living without any carnivores in savannah woodlands with abundant food resources. The population experience 5 natural deaths and 30 births during one-year period. If the population maintains the current growth pattern in the next two years, the plot of its growth would resemble ..... .

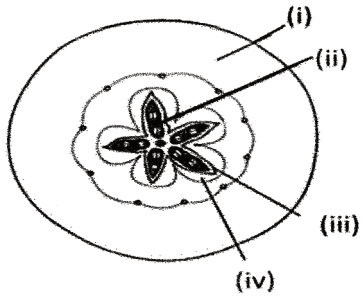
(A) Logistic growth

(B) Exponential growth

(C) K selected growth

(D) Fluctuating growth

10. The figure given below shows the T.S. of an apple. Select the option which is correctly identified.



(A) (*i*) thalamus (*ii*) seeds (*iii*) endocarp (*iv*) mesocarp

(B) (*i*) mesocarp (*ii*) seeds (*iii*) endocarp (*iv*) epicarp

(C) (*i*) epicarp (*ii*) seeds (*iii*) endocarp (*iv*) mesocarp

(D) (*i*) thalamus (*ii*) endosperm (*iii*) seeds (*iv*) endocarp

11. A Biology student of XI standard was amazed to see in his garden that some plants had tendrils arising from the stem while in others it was from the leaf tip as well as petiole. This is an example of ..... .

(A) Homology

(B) Analogy

(C) Adaptive radiation

(D) Branching descent

12. A person likely to develop tetanus is immunised by administering ..... .

(A) Preformed antibodies

(B) Dead germs

(C) Wide spectrum antibiotics

(D) Weakened germs

13. A blonde-haired, blue-eyed families from Swedan move to India where their children grow up, marry Indians and produce offspring, who now have blonde-haired, blue-eyed alleles. The phenomenon depicts ..... .

(A) Genetic drift

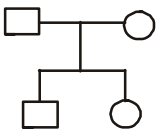
(B) Gene migration

(C) Mutation

(D) Artificial selection

14. Identify the symbol with *incorrect* representation.

(A)  = Unaffected male

(B)  = Parents below and children above

(C)  = affected individuals

(D)  = mating between the relatives

15. The Colorado potato beetle, a severe pest of potato has developed resistance to almost every insecticide. The only possible way to eradicate these pests was to introduce a specific toxin gene into potato plants, so that it produces an insecticidal protein that will kill the pest.

The source organism of the toxin gene is ..... .

(A) *Bacillus thuringiensis*

(B) *Meloidegyne incognitia*

(C) *Agrobacterium tumefaciens*

(D) *Escherichia coli*

16. The type of organic compound formed in an experiment, conducted by S.L. Miller on chemical evolution was ..... .

(A) Sugars

(B) Amino acids

(C) Pigments

(D) Lipids

17. The blank spaces (*i*), (*ii*), (*iii*) from the table given below are ..... .

Animals	**Response to abiotic factors**
Shrews	(*i*)
(*ii*)	Hibernation
Siberian crane	(*iii*)

(A) (*i*) Conformers (*ii*) Bear (*iii*) Migration

(B) (*i*) Migration (*ii*) Zooplanktons (*iii*) Conformers

(C) (*i*) Conformers (*ii*) Fish (*iii*) Aestivation

(D) (*i*) Migration (*ii*) Humming bird (*iii*) Conformers

18. A very old viable seed that has been found during archaeological excavation at King Herod's Palace near the Dead Sea is ..... .

(A) *Phoenix dactylifera*

(B) *Lupinus arcticus*

(C) *Pisum sativum*

(D) *Oxalis*

19. On the island of Puerto Rico, the two species of Lizard, *Anoles evermanni* and *A. gundalchi* eats the same type of food resource–insects. However, species *gundalchi* feeds on the insect found on the forest floor while *evermanni* on higher up in the habitat, on trees.

The above adaptations shown by the species is ..... .

(A) Intraspecific competition

(B) Symbiosis

(C) Competition exclusion

(D) Resource partitioning

20. In an experiment, 1:1:1:1 phenotypic ratio was obtained crossing the two pea plants for the seed shape and colour. The genotypes of the parent is ..... .

(A) RR YY X RRyy

(B) RrYy X rryy

(C) RRYY X rryy

(D) rryy X Rryy

21. Which one of the following options gives the correct matching of a disease with its causative organism and mode of infection ?

	Disease	**Causative Organism**	**Mode of Infection**
(A)	Elephantiasis	*Wuchereria bancrofti*	With inspired air
(B)	Typhoid	*Entamoeba histolitica*	With infected water and food
(C)	Pneumonia	*Haemophilus influenzae*	With inhaling droplets from infected person
(D)	Amoebiasis	*Salmonella typhi*	With bite of a female mosquito

22. An American company "Eli Lily" successfully discovered "humulin" in 1983, by preparing DNA sequences coding for polypeptide chains of human insulin namely ..... .

(A) A and B chain

(B) A, B and C chain

(C) B and C chain

(D) A and C chain

23. In a horse population, the allele of bay coat colour (A), the allelic frequency is 0.17 while the allele of black coat colour (a) has an allelic frequency of 0.83. According to the Hardy-Weinberg equation, the frequency of heterozygous (Aa) individuals in a population will be ..... .

(A) 0.50

(B) 0.35

(C) 0.42

(D) 0.28

24. Read the following statements given below on predation and select only the *correct* ones out of them.

(1) Lion eating deer and a sparrow feeding on grains are the examples of predation

(2) Predator star fish "*Pisaster*" help in maintaining species diversity of invertebrates in its habitat

(3) Predation leads to the extinction of prey species

(4) Production of nicotine and strychnine by plants attracts predators

Options :

(A) (1) and (2)

(B) (2) and (3)

(C) (1) and (4)

(D) (2) and (4)

25. The genetic defect adenosine deaminase (ADA) deficiency can be cured permanently by ..... .

(A) Administering ADA activators

(B) Enzyme replacement theory

(C) Introducing the gene isolated from marrow cells producing ADA into cells at early embryonic stages

(D) Periodic infusion of genetically engineered lymphocytes having functional ADA *c*DNA

26. T.H. Morgan carried out several dihybrid crosses in *Drosophila* that were sex linked. To his surprise, F_2 results got completely deviated from that of Mendelian ratio, as shown below :

Cross I : parental type – 98.7%; recombinant types – 1.3%

Cross II : parental type – 62.8%; recombinant type – 37.2%

The correct inference drawn by T.H. Morgan was that ..... .

(A) In Cross I the genes are loosely linked

(B) In Cross I the genes are tightly linked

(C) In Cross II the genes are tightly linked

(D) In Cross II the genes are located on two separate chromosomes

27. A typical fruit has sixteen seeds. How many number of meiotic divisions are required to give pollens involved in the formation these seeds ?

(A) 16 meiotic divisions

(B) 4 meiotic divisions

(C) 3 meiotic divisions

(D) 20 meiotic divisions

28. Identify the hominid species with respect to the following brain sizes :

(1) 650–800cc

(2) 900cc

(3) 1400cc

	1	2	3
(A)	*Homo habilis*	*Homo erectus*	*Neanderthal*
(B)	*Homo erectus*	*Homo habilis*	*Australopithecus*
(C)	*Neanderthal*	*Homo erectus*	*Homo habilis*
(D)	*Homo erectus*	*Australopithecus*	*Homo habilis*

29. A disorder of haemoglobin which is controlled by a gene HBB present on Chromosome 11 is ..... .

(A) Sickle cell anaemia

(B) $\hat{a}$ Thalassemia

(C) a' Thalassemia

(D) Haemophilia

30. Identify the plant shown below and select the right option with the drug it produces.

(A) *Papaver somniferum*–Morphine

(B) *Cannabis sativa* – Hashish

(C) *Papaver somniferum* – Charas

(D) *Cannabis sativa* – Crack

31. Hind II cuts a DNA molecule between the two nitrogen bases "G and C" after recognising a specific sequence.

↓

5'–GTCGAC–3

3'–CAGCTG–5'

↑

How many number of DNA fragments will be formed, if this enzyme is subjected to the DNA molecule given below ?

5'- AACGTGTCGACAACTCCGGTCGACCGCCTTC -3'

3'-TTGCACAGCTGTTGAGGCCAGCTGGCGGAAG -5'

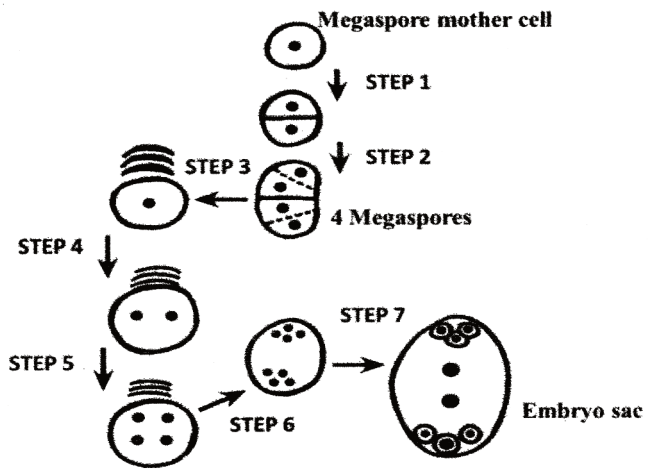
(A) 2

(B) 3

(C) 4

(D) 5

32. Observe the various steps in the following diagrammatic representation. At which step does the reductional division occur ?



(A) Step 1

(B) Step 3 and 4

(C) Step 5

(D) Step 4 and 5

33. A man and a woman with normal vision have two sons, one is colour-blind while the other with normal vision. If the couple had daughters, then the expected phenotypes would be ..... .

(A) All will be carrier of the trait

(B) 50% normal and 50% carrier of the trait

(C) All will be colour-blind

(D) 50% colour-blind and 50% carrier of the trait

34. An individual has XXY sex chromosome along with 22 pairs of autosomes will show :

(A) Rudimentary ovaries

(B) Poor development of breasts

(C) Gynaecomastia

(D) Broad flat face

35. Sweat, tears and salvia contain enzyme lysozyme that prevents the growth of invading bacteria or viruses in our body. These defence elements are called as ..... .

(A) Physical barriers

(B) Cellular barriers

(C) Cytokine barriers

(D) Physiological barriers

36. How many primer/s are used in each polymerase chain reaction ?

(A) One

(B) Four

(C) Three

(D) Two

37. Match column I with column II and select the correct option.

(I)	Obtaining foreign gene product	(*a*)	Heat shock treatment
(II)	Separation and isolation of DNA	(*b*)	Down streaming
(III)	Transfer of *r*DNA in hosts cells	(*c*)	Gel electrophoresis
(IV)	Separation and purification of a recombinant protein	(*d*)	Bioreactors

Options :

(A) (I*a*) (II*c*) (III*d*) (IV*b*)

(B) (I*d*) (II*b*) (III*a*) (IV*c*)

(C) (I*d*) (II*c*) (III*a*) (IV*b*)

(D) (I*c*) (II*d*) (III*b*) (IV*a*)

38. Ring worm is the most common infectious disease in man and is caused by a ..... .

(A) Hook worm

(B) Bacteria

(C) Fungi

(D) Protozoa

39. When two black-white speckled cats were mated, the offspring obtained were 5 black cats, 12 black-white speckled cats and 4 white cats. Name the pattern of inheritance.

(A) Polygeny

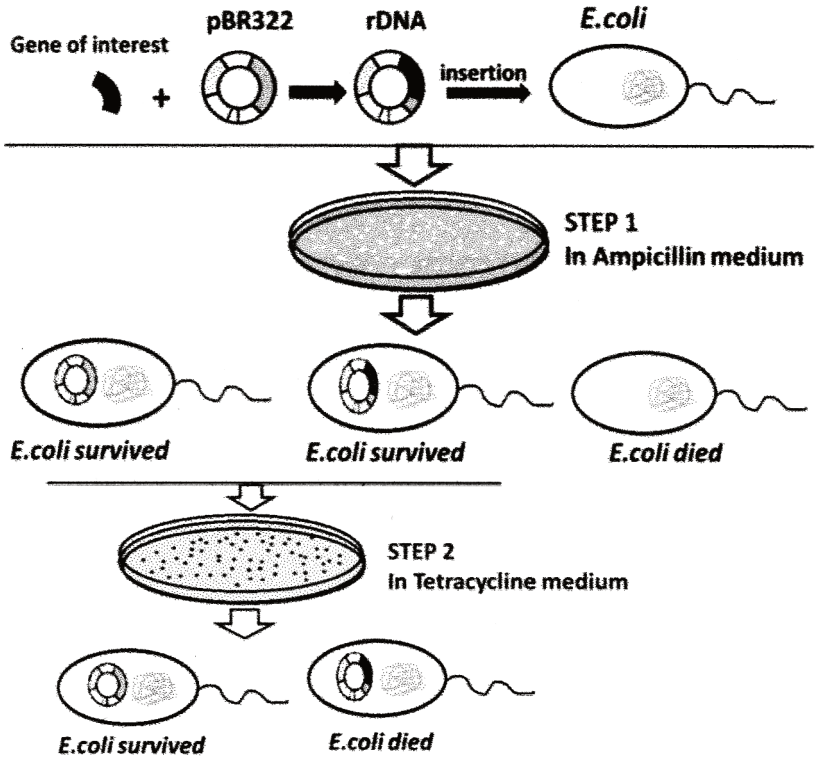
(B) Incomplete dominance

(C) Co-dominance

(D) Pleiotropy

40. A gene of interest was ligated at tetracycline resistant gene of pBR322. These plasmid vectors were then transferred into *E. coli* and were allowed to grow in two different media as shown below.

Now observe the diagrammatic representation carefully. Some *E.coli* have survived in both the media. The reason for their survival could be that they are :



(A) Transformants and recombinants

(B) Non-transformants

(C) Having natural resistance to both antibiotic

(D) Transformants but not recombinants