

## BIOLOGY

- Which of the following amino acids is coded by Single Codon ?
  - Phenylalanine
  - Tryptophan
  - Valine
  - Tyrosine
- In Prokaryotes, the transcription of DNA is initiated with the help of
  - Elongation factor
  - Termination factor
  - Rho factor
  - Sigma factor
- According to Human Genome Project (HGP), the total number of genes in human genome is estimated at 30,000, the number of genes present on Y-chromosome are
  - 242 genes
  - 2898 genes
  - 2968 genes
  - 231 genes
- In a crime investigation, the investigating officer collects different biological samples from the crime spot for DNA Finger - Printing Analysis. Which of the following samples is not helpful in this analysis ?
  - Erythrocytes
  - Hair Follicle
  - Skin Shreds
  - Semen Sample
- A mature mRNA consists of 900 bases without any stop codon in between. Calculate the number of amino acids coded by this mRNA during translation.
  - 299
  - 450
  - 900
  - 300

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6. Which one of the following ecosystem has the highest annual net primary productivity ?
- (A) Tropical deciduous forest  
(B) Temperature evergreen forest  
(C) Desert  
(D) Tropical rain forest
7. Of the total incident solar radiation the percentage Photosynthetically Active Radiation (PAR) captured by the plants
- (A) 2 – 10% of PAR only  
(B) 30 – 40% of PAR only  
(C) 10 – 20% of PAR only  
(D) 0 – 10% of PAR only
8. The historic convention related to conservation of biological diversity is also known as
- (A) Kyoto Protocol  
(B) Montreal Protocol  
(C) Earth Summit  
(D) World Summit
9. Which one of the following human activity has contributed to deforestation in north-eastern states of India ?
- (A) Industrialisation  
(B) Jhum cultivation  
(C) Urbanisation  
(D) Mono cropping
10. In an area where DDT has been used extensively, the population of birds declined significantly because –
- (A) Birds stopped laying eggs.  
(B) Earthworms in the area got eradicated.  
(C) Birds became vulnerable to predators.  
(D) Many of the eggs laid by birds showed pre-matured breaking.
11. Which of the following protozoan parasites causes sleeping sickness ?
- (A) Entamoeba  
(B) Trypanosoma  
(C) Plasmodium  
(D) Leishmania

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12. Which of the following phyla possess body cavity as shown in the diagram below ?



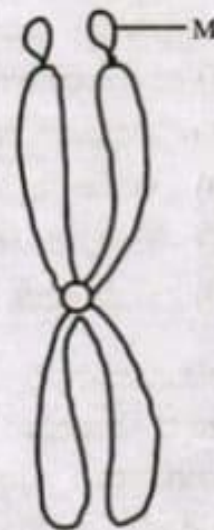
- (A) Porifera  
 (B) Coelenterata  
 (C) Annelida  
 (D) Aschelminthes
13. Testa and Tegmen of the seed coat represent

- (A) Dried Sepals  
 (B) Dried Petals  
 (C) Dried Integuments  
 (D) Dried Tepals

14. The trees growing in temperate regions show clear demarcation between spring wood and autumn wood. This is because

- (A) The water stress is more.  
 (B) The climatic conditions are not uniform throughout the year.  
 (C) The climatic conditions are uniform throughout the year.  
 (D) The temperature is high.

15. Identify the part labelled as 'M' in the diagram given below :



- (A) Kinetochore  
 (B) Satellite  
 (C) Chromatid  
 (D) Centromere

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16. Which of these is not an advantages in Genetically modified crops ?

- (A) Reduces the reliance on chemical pesticides.
- (B) Increases the post harvest losses
- (C) Increases efficiency of mineral usage in plants.
- (D) Enhances the nutritional value of food.

17. Some multinational companies have exploited the traditional knowledge of the indigenous people to produce commercially important bio products, without their consent. This is an example for

- (A) Bioprospecting
- (B) Bioremediation
- (C) Biopatent
- (D) Biopiracy

18. In Amphibians and reptiles, the body temperature changes corresponding to external temperature. The organisms which show this kind of response is termed as –

- (A) Regulators
- (B) Conformers
- (C) Partial Regulators
- (D) Thermophiles

19. **Assertion (A)** : The Monarch butterfly feeds on poisonous weeds during its Caterpillars stage.

**Reason (R)** : It helps butterfly to become distasteful to its predator.

- (A) (A) is true and (R) is its correct explanation.
- (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (C) (A) is true, (R) is false.
- (D) Both (A) and (R) are false.

20. From the given options, identify the correct combination of population interactions that correspond to the symbols given here

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- (A) Predation   Competition   Commensalism
- (B) Mutualism   Parasitism   Amensalism
- (C) Parasitism   Competition   Mutualism
- (D) Mutualism   Competition   Commensalism

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21. Identify the incorrect statement with reference of Biocontrol agents :

- (A) They help to increase the use of synthetic pesticides.
- (B) They do not affect non-target pests.
- (C) They do not show any negative impact on crop plants.
- (D) They are significant in treating ecologically sensitive area.

22. A Farmer has applied chemical fertilisers in his crop field for many successive seasons. In the next season, the crop growth was poor as soil lost its fertility. Suggest the suitable micro-organism that replenishes the fertility of soil in his field.

- (A) Nostoc
- (B) Spirogyra
- (C) Spirulina
- (D) Chlorella

23. In cloning vectors, antibiotic resistant genes are helpful for

- (A) Selection of recombinants
- (B) Cleaving of vector by REN
- (C) Transfer of foreign gene to the host
- (D) Making the host cells competent

24. A student while extracting DNA from Aspergillus fungus requires \_\_\_\_\_ enzyme to break open the cell wall.

- (A) Lysozyme
- (B) Chitinase
- (C) Cellulase
- (D) Pectinase

25. Identify the DNA sequence which can be cut using EcoRI.

- (A) 5'ACGAATTCAT3'  
3'TGCTTAAGTA5'
- (B) 3'ACGAATTCAT5'  
5'TGCTTAAGTA3'
- (C) 5'TGCTTAAGTA3'  
3'ACGAATTCAT5'
- (D) 5'TACTTAAGCA3'  
3'ATGAATTCGT5'

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26. The brain capacity of Homo habilis
- (A) between 650 cc – 800 cc
  - (B) 1400 cc
  - (C) 1800 cc
  - (D) 900 cc
27. In Bougainvillea and Cucurbita, the axillary bud is modified into thorn and tendril respectively. This is an example of
- (A) Divergent Evolution
  - (B) Convergent Evolution
  - (C) Co-evolution
  - (D) Micro Evolution
28. Identify the incorrect statement.
- (A) Pneumonia is a bacterial disease.
  - (B) Ringworm is a fungal disease.
  - (C) HIV is transmitted by mosquito bite.
  - (D) Cancer is a non-infectious disease.
29. A person shows symptoms like Sneezing, Watery eyes, running nose and difficulty in breathing, on exposure to certain substances in air. Which type of antibody is produced during such condition ?
- (A) IgE
  - (B) IgA
  - (C) IgG
  - (D) IgM
30. A man was suffering from mental illness like depression and insomnia. Identify the drug which is normally used as medicine in such cases.
- (A) Lysergic Acid Diethylamides (LSD)
  - (B) Heroin
  - (C) Morphine
  - (D) Nicotine
31. What is the function of Protein GLUT-4 ?
- (A) Enables glucose transport into cells.
  - (B) Functions as intercellular ground substance.
  - (C) Acts as an enzyme.
  - (D) Fights infectious agents.

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32. Cells in the quiescent stage ( $G_0$ )
- (A) show indefinite proliferation.
  - (B) remain metabolically active
  - (C) always become cancerous
  - (D) remain metabolically inactive
33. Consider the following statements  
i, ii and iii regarding criteria for  
essentiality of the nutrients in plants :
- i. The presence of elements is must  
for plants to complete their life  
cycle.
  - ii. The role of the element can be  
replaced by another element.
  - iii. The element must be directly  
involved in the metabolism of the  
plant.

Choose the correct statement/s :

- (A) i and ii
- (B) ii and iii
- (C) i and iii
- (D) iii only

34. During chemiosmotic synthesis of ATP  
in photosynthesis :

- (A) The proton gradient is not  
required.
- (B) The protons accumulate within  
the lumen of the thylakoids.
- (C) The protons accumulate in the  
intermembrane space of  
chloroplast.
- (D) The protons accumulate in the  
intermembrane space of  
mitochondrion.

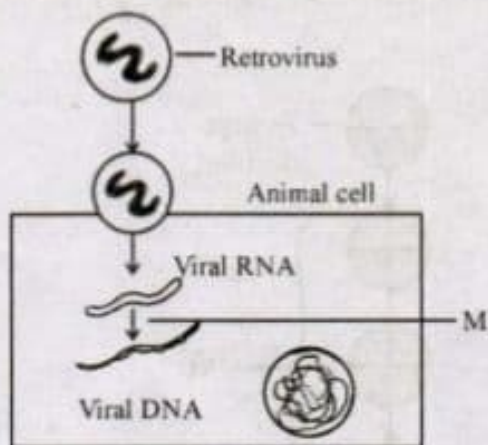
35. When tripalmitin is used as respiratory  
substrate in aerobic respiration, the  
process consumes 145 molecules of  
Oxygen and releases 102 molecules of  
 $CO_2$ , then RQ value would be

- (A) 0.7
- (B) 1.0
- (C) 0.5
- (D) 1.4

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36. Identify the enzyme that catalyses the step labelled as 'M' in the given Schematic representation of Replication of retrovirus.



- (A) RNA polymerase  
 (B) DNA ligase  
 (C) Reverse transcriptase  
 (D) Recombinase
37. In animal breeding, the maximum genetic variations can be achieved through
- (A) Outcrossing  
 (B) Crossbreeding  
 (C) Inbreeding  
 (D) Interspecific hybridization

38. The oil content and quality of a groundnut variety was improved by plant breeding technique. This is an example of

- (A) Biomagnification  
 (B) Biofortification  
 (C) Bioremediation  
 (D) Biodegradation

39. Microbes like Spirulina can be good alternate to the conventional sources of proteins for human nutrition, because ...

- (A) they give more biomass in less time.  
 (B) they are produced using synthetic fertilisers.  
 (C) their proteins are different from plant proteins.  
 (D) they have high fibre content.

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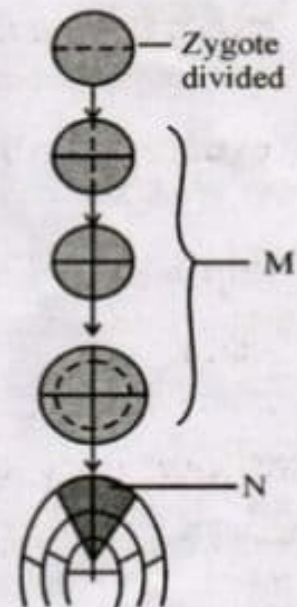
40. Consider the following morphological, biochemical or physiological characteristics of plants.

- i. Presence of hairy leaves.
- ii. Production of more nectar in flower.
- iii. High sugar content in plant parts.
- iv. Presence of higher aspartic acid concentration.

Choose the correct combination of statements which give natural resistance to plants against insect pests :

- (A) i and ii
- (B) ii and iii
- (C) iii and iv
- (D) i and iv

41. In the following diagrammatic representation showing stages of embryonic development, identify the type of growth phase labelled as M and N :



- (A) Both M and N are arithmetic phases.
- (B) Both M and N are geometric phases.
- (C) M is geometric phase and N is arithmetic phase.
- (D) M is arithmetic phase and N is geometric phase.

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42. Indigestion of fats in humans may be an indication of

- (A) Under-secretion of saliva
- (B) Under-secretion of amylase
- (C) Intestinal ulcers
- (D) Inflammation of liver

43. Choose the correct statement from the following :

- (A) Histamine, Serotonin and Heparin are secreted by basophils.
- (B) Person with blood group AB can donate blood to person with blood group A.
- (C) Erythroblastosis foetalis may result when foetus is Rh<sup>-ve</sup> and mother is Rh<sup>+ve</sup>
- (D) Atherosclerosis is often referred as angina pectoris.

44. In blind spot of the human eye

- (A) Only cones are absent.
- (B) Only rods are absent.
- (C) Both cones and rods are absent.
- (D) Both cones and rods are present.

45. A boy after attaining sexual maturity shows muscular growth, growth of facial and axillary hair, aggressiveness and low pitch of voice. These changes are attributed to \_\_\_\_\_ hormone.

- (A) Testosterone
- (B) Glucagon
- (C) Estrogen
- (D) Secretin



46. Identify the odd one among the following disorders :

- (A) Sickle-cell Anaemia
- (B) Thalassemia
- (C) Haemophilia
- (D) Phenyl Ketonuria

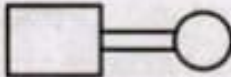
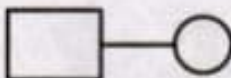
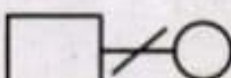
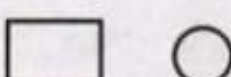
47. From the Chromosomal Complements given below, identify the one which shows female heterogamety.

- (A)  $XX - XY$
- (B)  $ZZ - ZW$
- (C)  $XX - XO$
- (D)  $XX - XXY$

48. In Morgan's experiment with Drosophila, when yellow bodied white eyed female was crossed with brown bodied red eyed male and their  $F_1$  progeny were intercrossed. What was the percentage of recombinants in  $F_2$  generation ?

- (A) 98.7%
- (B) 37.2%
- (C) 62.8%
- (D) 1.3%

49. In the following symbols, used in human pedigree Analysis, identify the symbol that denotes consanguineous mating.

- (A) 
- (B) 
- (C) 
- (D) 

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50. Which of the following Nitrogen bases is found only in DNA ?

- (A) Adenine
- (B) Guanine
- (C) Cytosine
- (D) Thymine

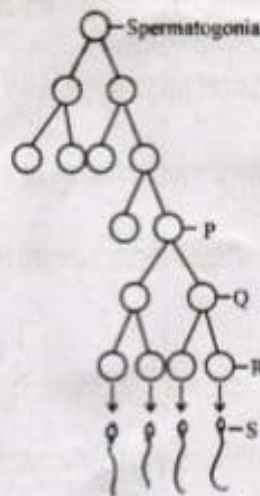
51. The nourishing cells in the Seminiferous tubules are

- (A) Leydig cells
- (B) Spermatogonial cells
- (C) Follicular cells
- (D) Sertoli cells

52. If in a normal Menstruating woman, menses occur on 5<sup>th</sup> April, what will be the expected date of Ovulation ?

- (A) 18<sup>th</sup> April
- (B) 14<sup>th</sup> April
- (C) 10<sup>th</sup> April
- (D) 29<sup>th</sup> April

53. Identify the cells represents as P, Q, R and S in the given schematic representation of spermatogenesis.



- (A) P – Primary Spermatocyte  
Q – Secondary Spermatocyte  
R – Spermatids  
S – Spermatozoa
- (B) P – Secondary Spermatocyte  
Q – Primary Spermatocyte  
R – Spermatozoa  
S – Spermatids
- (C) P – Spermatozoa  
Q – Spermatids  
R – Secondary Spermatocyte  
S – Primary Spermatocyte
- (D) P – Secondary Spermatocyte  
Q – Spermatids  
R – Spermatozoa  
S – Primary Spermatocyte

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54. The method of natural contraception which requires correct knowledge of Menstrual cycle is

- (A) Lactational Amenorrhoea
- (B) Coitus interrupts
- (C) Periodic Abstinence
- (D) IUDs – Intrauterine Devices

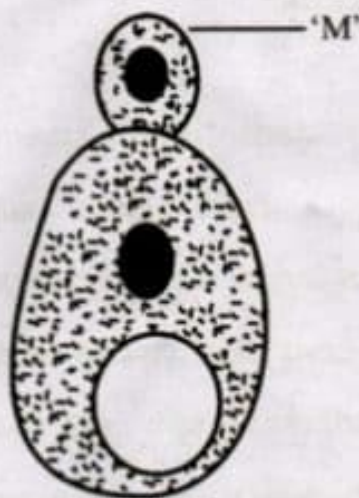
55. A childless couple visit Assisted Reproductive Technologies (ARTs) centre to get assistance to have a child. On diagnosis, it was noticed that there was low sperm count in the male partner. Which of the following strategy of ART is most suitable in this case ?

- (A) Artificial Insemination (AI)
- (B) In vitro Fertilisation (IVF)
- (C) Gamete Intra-Fallopian Transfer (GIFT)
- (D) Zygote Intra-Fallopian Transfer (ZIFT)

56. Plants like Marchantia and Funaria produce gametes by mitosis, because

- (A) Plant body is haploid.
- (B) Gametophyte is diploid.
- (C) They are gametophytes.
- (D) They are dioecious.

57. Identify the asexual reproductive structure 'M' in the following diagram :



- (A) Bud
- (B) Conidium
- (C) Zoospore
- (D) Gemmule

58. In some plants, stigma and anther mature at different times because

- (A) it facilitates self pollination.
- (B) it facilitates cross pollination.
- (C) it attracts pollinators.
- (D) it prevents cross pollination.

59. Now-a-days agricultural practice is expensive to the farmers as they need to purchase hybrid seeds every year. Which of the following strategies can be employed to overcome this problem ?

- (A) Production of Apomictic seeds
- (B) Parthenocarpy
- (C) Synthetic seeds
- (D) Conventional plant breeding

60. Identify the correct order of steps involved in Artificial hybridization in plants :

- (A) Rebagging → Artificial pollination → Bagging → Emasculation
- (B) Bagging → Artificial pollination → Rebagging → Emasculation
- (C) Artificial pollination → Emasculation → Rebagging → Bagging
- (D) Emasculation → Bagging → Artificial pollination → Rebagging