Test Booklet No. :

39861

DEPT. OF HIGHER EDUCATION, GOVT. OF ODISHA
TEST BOOKLET

Subject Code **12**

Subject **BIOTECHNOLOGY**

Time Allowed : 90 Minutes

Full Marks : 70

: INSTRUCTIONS TO CANDIDATES :

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET **DOES NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.

2. You have to enter your **Hall Ticket No.** on the Test Booklet in the Box provided alongside. **DO NOT** write *anything else* on the Test Booklet.

3. **YOU ARE REQUIRED TO FILL UP & DARKEN HALL TICKET NO. & TEST BOOKLET NO. IN THE ANSWER SHEET AS WELL AS FILL UP TEST BOOKLET SERIAL NO. & ANSWER SHEET SERIAL NO. IN THE ATTENDANCE SHEET CAREFULLY. WRONGLY FILLED UP ANSWER SHEETS ARE LIABLE FOR REJECTION AT THE RISK OF THE CANDIDATE.**

4. **This Test Booklet contains 70 items (questions). Each item (question) comprises four responses (answers). You have to select the correct response (answer) which you want to mark (darken) on the Answer Sheet. In case, you feel that there is more than one correct response (answer), you should mark (darken) the response (answer) which you consider the best. In any case, choose ONLY ONE response (answer) for each item (question).**

5. You have to mark (darken) all your responses (answers) **ONLY** on the **separate Answer Sheet** provided by **using BALL POINT PEN (BLUE OR BLACK)**. See instructions in the Answer Sheet.

6. All items (questions) carry equal marks. All items (questions) are compulsory. Your total marks will depend only on the number of correct responses (answers) marked by you in the Answer Sheet. **There is no negative marking.**

7. **After you have completed filling in all your responses (answers) on the Answer Sheet and after conclusion of the examination, you should hand over to the Invigilator the *Answer Sheet* issued to you. You are allowed to take with you the candidate's copy / second page of the Answer Sheet along with the Test Booklet, after completion of the examination, for your reference.**

8. Sheets for rough work are appended in the Test Booklet at the end.

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

1. Peroxysome is involved in :
   (A) Cell death by Apoptosis
   (B) Detoxification from free radicals
   (C) Cell plate formation in cytokinesis
   (D) Nutrient recycling by Autophagy

2. Which is wrong about plasma membrane ?
   (A) It divides the internal space into discrete compartments
   (B) It organizes complex reaction sequences and conserves biological energy
   (C) It allows free movement of all nutrients for growth and division
   (D) It has central role in cell-to-cell communication

3. Which is not a part of prokaryotic ribosome ?
   (A) 16S r-RNA
   (B) 5S r-RNA
   (C) 23S r-RNA
   (D) 18S r-RNA

4. Which organelle is not associated with Photorespiration ?
   (A) Lysosome
   (B) Mitochondria
   (C) Peroxysome
   (D) Chloroplast

5. The triggering of the intrinsic pathway of apoptosis involves a balance between pro-apoptotic and anti-apoptotic proteins. Which of the following is anti-apoptotic ?
   (A) Bax
   (B) Bad
   (C) Bcl-2
   (D) Cyt-C

6. Enzyme immobilization is :
   (A) Conversion of an active enzyme into inactive form
   (B) Providing enzyme with protective covering
   (C) Changing a soluble enzyme into insoluble state
   (D) Changing pH so that enzyme is not able to carry out its function

7. Genetic engineering is possible, because :

   (A) We can cut DNA at specific sites by endonucleases like DNAase I

   (B) Restriction endonucleases purified from bacteria can be used in vitro

   (C) The phenomenon of transduction in bacteria is well understood

   (D) We can see DNA by electron microscope

8. A plasmid cloning vector should contain all of the following sequences except :

   (A) Origin of replication

   (B) Selectable marker gene

   (C) Inducible promoter

   (D) Multiple cloning site

9. Which of the following DNA sequences is recognized and cleaved by a restriction enzyme ?

   (A) ATGCAC
       TACGTG

   (B) GATATC
       CTATAG

   (C) TAGATA
       ATCTAT

   (D) AATATA
       TTATAT

10. BT cotton is widely cultivated. BT cotton means :

    (A) Bigger thread variety

    (B) Cotton seeds treated with barium

    (C) Produce by biotechnological enzymes restriction endonucleases

    (D) Contains endotoxin gene of B.T

11. The transgenic plant flavr savr tomato carries an artificial gene for :

    (A) Delay ripening process

    (B) Longer shelf life

    (C) Added flavours

    (D) All of these

12. Genome is :
    (A) Genes on nuclear DNA
    (B) Nuclear DNA + mitochondrial DNAs
    (C) Nuclear DNA + chloroplast DNA
    (D) Nuclear DNA + Mitochondrial DNA + Chloroplast DNA

13. Reverse transcriptase is :
    (A) RNA-dependent RNA polymerase
    (B) RNA-dependent DNA polymerase
    (C) DNA-dependent RNA polymerase
    (D) DNA-dependent DNA polymerase

14. If a hybrid DNA molecule labelled with 15N is allowed to replicate twice in normal culture medium, the percentage of hybrid DNA after second replication will be :
    (A) 50%
    (B) 2.5%
    (C) 25%
    (D) 75%

15. Tm (melting temperature) value of DNA is high when it contains :
    (A) $A + T > G + C$
    (B) $G + C > A + T$
    (C) $A + T = G + C$
    (D) $A + G = T + C$

16. Proteomics is the study of :
    (A) Entire set of expressed proteins in a cell
    (B) Set of proteins
    (C) Set of proteins in a specific region of the cell
    (D) All of these

17. The genetic code is called a degenerate code because :
    (A) One codon has many meanings
    (B) More than one codon has the same meaning
    (C) One codon has one meaning
    (D) There are 64 codons present

XL – 24/9   (5)   (Turn over)

18. Possible blood group in children from the parents with B and O blood group are :

(A) All B

(B) All O

(C) Both B and O

(D) A and B

19. Gynandromorph or sex mosaic is produced by :

(A) Loss of X-chromosome

(B) Non-disjunction of Y-chromosome

(C) Disjunction of X-chromosome

(D) Disjunction of autosomes

20. Embryonic stem cells are derived from :

(A) Undifferentiated inner cellmass of embryo

(B) Differentiated inner cell mass of embryo

(C) Undifferentiated trophoblast cells

(D) Differentiated trophoblast cells

21. After which cleavage Blastocyst is formed and how many cells are found in it ?

(A) After 4th cleavage, 16 cells

(B) After 3rd cleavage, 8 cells

(C) After 5th cleavage, 32 cells

(D) After 2nd cleavage, 4 cells

22. Synovial fluid contains :

(A) Heparin

(B) Hyaluronic acid

(C) Chondroitin sulphate

(D) Keratin sulphate

23. Which of the following hormone(s) is/are helpful to regulate blood pressure ?

(A) Aldosterone

(B) ANH

(C) ADH & ANH

(D) Aldosterone & ANH

24. Tricuspid valve is found in between :

    (A)   Sinus venosus and right auricle

    (B)   Right auricle and right ventricle

    (C)   Left ventricle and left auricle

    (D)   Ventricle and aorta

25. Antigen-antibody reactions are :

    (A)   Reversible

    (B)   Irreversible

    (C)   Specific

    (D)   Both (A) and (B)

26. The reaction of soluble antigen with antibody is known as :

    (A)   Precipitation

    (B)   Flocculation

    (C)   Agglutination

    (D)   Complement fixation

27. Monoclonal antibodies are produced by :

    (A)   Hybridoma technology

    (B)   Biotechnology

    (C)   Fermentation technology

    (D)   Cloning

28. Antibodies in our body are produced by :

    (A)   B-lymphocytes

    (B)   T-lymphocytes

    (C)   Monocytes

    (D)   RBC's

29. The cellular immune response is mediated by :

    (A)   B cells

    (B)   T cells

    (C)   BT cells

    (D)   Endothelial cells

30. Tautomerisation is :
    (A) Shift of hydrogen
    (B) Shift of carbon
    (C) Both (A) and (B)
    (D) None of these

31. Which one of the following is a rate limiting enzyme of gluconeogenesis ?
    (A) Hexokinase
    (B) Phsophofructokinase
    (C) Pyruvate carboxylase
    (D) Pyruvate kinase

32. Electron transport and phosphorylation can be uncoupled by compounds that increase the permeability of the inner mitochondrial membrane to :
    (A) Electrons
    (B) Protons
    (C) Uncouplers
    (D) All of these

33. Substrate level phosphorylation in TCA cycle is catalyzed by :
    (A) Isocitrate dehydrogenase
    (B) Malate dehydrogenase
    (C) Aconitase
    (D) Succinate thiokinase

34. Synthesis of Glucose from amino acids is termed as :
    (A) Glycolysis
    (B) Gluconeogenesis
    (C) Glycogenesis
    (D) Lipogenesis

35. The correct sequence of cell organelles during photorespiration is :
    (A) Chloroplast-peroxisome-mitochondria
    (B) Chloroplast-vacuole-peroxisome
    (C) Chloroplast-Golgi bodies-mitochondria
    (D) Chloroplast-rough endoplasmic reticulum-dictyosomes

36. When the leaf of the 'touch-me-not' plant is touched, the leaf drops because :
   (A) A nerve signal passes through the plant
   (B) The temperature of the plant increases
   (C) Water is lost from the cells at the base of the leaf
   (D) The plant dies

37. Velamen cells are found in :
   (A) Epiphytes
   (B) Xerophytes
   (C) Hydrophytes
   (D) Halophytes

38. The condition of Polyadelphous is found in family :
   (A) Rutaceae
   (B) Leguminosae
   (C) Compositae
   (D) Liliaceae

39. Which of these is not a function of auxin ?
   (A) Inducing callus formation
   (B) Inducing dormancy
   (C) Enhancing cell division
   (D) Maintaining apical dominance

40. Nitrite are oxidized to nitrates by microorganism :
   (A) Nitrosomonas
   (B) Nitrosococcus
   (C) Nitrobacter
   (D) Azatobacter

41. The difference between Gram positive and Gram negative bacteria is shown to reside in the :
   (A) Cell wall
   (B) Nucleus
   (C) Cell membrane
   (D) Mesosomes

42. Which symbiotic bacteria is N_2 fixative with the root nodule of leguminous plant ?

(A) Azospyrillium

(B) Clostridium

(C) Azobactor

(D) Rhizobium

43. The mocroorganism used for alcoholic fermentation is :

(A) Aspergillus

(B) Saccharomyces

(C) Pencillium

(D) Pseudomonas

44. The bacterial cells are at their metabolic peak during :

(A) Lag phase

(B) Log phase

(C) Stationary phase

(D) Decline phase

45. When the power of ocular lens is 10X and objective lens is 20X, the magnification is :

(A) 30 times

(B) 20 times

(C) 200 times

(D) 2000 times

46. Which of the following is used to visualize live cells ?

(A) SEM

(B) TEM

(C) Phase contrast microscope

(D) All of these

47. In gas chromatography, the basis for separation of the components of volatile material is the difference in :

(A) Partition coefficients

(B) Conductivity

(C) Molecular weight

(D) Molarity

48. Ion exchange chromatography is based on the :
    (A) Electrostatic attraction
    (B) Electrical mobility of ionic species
    (C) Adsorption chromatography
    (D) Partition chromatography

49 If proteins are separated according to their mobility then the type of electrophoresis is :
    (A) SDS PAGE
    (B) Affinity electrophoresis
    (C) Electro focusing
    (D) Free flow electrophoresis

50. $t_{1/2}$ of an irreversible 1st order reaction (S to P) is 1 day. Time required in days for the completion of 75% is :
    (A) 1.5
    (B) 2
    (C) 2.5
    (D) 3

51. NMR is based on :
    (A) Nuclear fission
    (B) Charge of nucleus
    (C) Magnetic moment of the nucleus
    (D) Electrical moment of the nucleus

52. Weakest force is :
    (A) van der Waals
    (B) Covalent bond
    (C) Ionic bond
    (D) Hydrogen bond

53. Covalent bonding between two molecules requires :
    (A) Electron with opposite spins
    (B) No effect of spins
    (C) Electron with same spins
    (D) Electron of the same orbital

54. Radioactive substance emits the following rays except :
   (A) Gamma
   (B) Beta
   (C) Alpha
   (D) X-rays

55. Which of the following are used as electrolytes in a dry cell (battery) ?
   (A) Ammonium chloride and Zinc chloride
   (B) Sodium chloride and Calcium chloride
   (C) Magnesium chloride and Zinc chloride
   (D) Ammonium chloride and Calcium chloride

56. If the radius of the earth were to shrink by 1% its mass remaining the same, the value of 'g' on the earth's surface would :
   (A) Increase by 0.5%
   (B) Increase by 2%
   (C) Decrease by 0.5%
   (D) Decrease by 2%

57. Electric current is measures by :
   (A) Voltmeter
   (B) Anemometer
   (C) Commutator
   (D) Ammeter

58. Diffusion of light in the atmosphere takes place due to :
   (A) Carbon dioxide
   (B) Dust particles
   (C) Helium
   (D) Water vapours

59. The body must be lifted to how much height so that the body gains an equal amount of potential energy and kinetic energy moving at a speed of 20 m/s ? Given that : $g = 9.8 \text{ m/s}^2$.
   (A) 20 m
   (B) 20.2 m
   (C) 202 m
   (D) 22 m

60. Two events, A and B, are mutually exclusive and each has a nonzero probability. If event A is known to occur, the probability of the occurrence of event B is :

(A)   One

(B)   Any positive value

(C)   Zero

(D)   Any value between 0 and 1

61. Correlation coefficient is a number between :

(A)   + 1 and + 2

(B)   0 and + 1

(C)   − 1 and 0

(D)   − 1 and + 1

62. The shape of normal distribution curve is :

(A)   Hyperbola

(B)   Bell shaped

(C)   Linear

(D)   Parabolic

63. If a hypothesis is rejected at the 5% level of significance, it :

(A)   Will always be rejected at the 1% level

(B)   Will always be accepted at the 1%

(C)   Will never be tested at the 1% level

(D)   May be rejected or not rejected at the 1% level

64. A list of 5 pulse rates is : 70, 64, 80, 74, 92. What is the median for this list ?

(A)   74

(B)   76

(C)   77

(D)   80

65. How many ways can 8 Indians, 4 Americans and 4 Australian persons can be seated in a row so that all person of the same nationality sit together ?

(A)   3! 4! 8! 4!

(B)   3! 8!

(C)   4! 4!

(D)   8! 4! 4!

66. If $\log(a/b) + \log(b + a) = \log(a + b)$, then :

(A) $a + b = 1$

(B) $a - b = 1$

(C) $a = b$

(D) $a + b = 0$

67. What is the value of x in the logarithmic equation ? $\log(x + 2) - \log(x - 1) = \log 2$:

(A) 2

(B) 5

(C) 3

(D) 4

68. In $\triangle ABC$, right-angled at B, AB = 3 cm, BC = 4 cm. The value of cos C is :

(A) 3/4

(B) 5/4

(C) 4/3

(D) 4/5

69. In an examination, a student scores 4 marks for every correct answer and loses 1 mark for every wrong answer. If he attempts in all 60 questions and secures 130 marks, the number of questions he attempts correctly are :

(A) 35

(B) 38

(C) 40

(D) 42

70. The expected value or _____ of a random variable is the center of its distribution.

(A) Mode

(B) Median

(C) Mean

(D) Bayesian inference

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SPACE FOR ROUGH WORK