

PGCET-2014

BT

| DAY and TIME | | COURSE | SUBJECT |
|-------------------------------|----------------|---|---------------|
| DAY-1 10.30 am to 12.30 pm | | ME/M.Tech/M.Arch courses offered by VTU/UVCE/UBDTCE | BIOTECHNOLOGY |
| SESSION : FORENOON | | | |
| MAXIMUM MARKS | TOTAL DURATION | MAXIMUM TIME FOR ANSWERING | |
| 100 | 150 MINUTES | 120 MINUTES | |
| MENTION YOUR PGCET NO. | | QUESTION BOOKLET DETAILS | |
| | | VERSION CODE | SERIAL NUMBER |
| | | A - 4 | 190008 |

DOs :

1. Check whether the PGCET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. Ensure whether the circles corresponding to course and the specific branch have been shaded on the OMR answer sheet.
3. This Question Booklet is issued to you by the invigilator after the 2nd Bell i.e., after 10.25 a.m.
4. The Serial Number of this question booklet should be entered on the OMR answer sheet.
5. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
6. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts :

1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**
2. The 3rd Bell rings at 10.30 a.m., till then;
 - Do not remove the paper seal / polythene bag of this question booklet.
 - Do not look inside this question booklet.
 - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 75 (items) questions and each question will have one statement and four answers. (Four different options / responses.)
2. After the 3rd Bell is rung at 10.30 a.m., remove the paper seal / polythene bag of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
3. During the subsequent 120 minutes:
 - Read each question (item) carefully.
 - Choose one correct answer from out of the four available responses (options / choices) given under each question / item. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **only one response** for each item.
 - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALLPOINT PEN against the question number on the OMR answer sheet.**
4. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
5. After the last Bell is rung at 12.30 pm, stop marking on the OMR answer sheet and affix your left hand thumb impression on the OMR answer sheet as per the instructions.
6. Hand over the OMR ANSWER SHEET to the room invigilator as it is.
7. After separating the top sheet, the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
8. Preserve the replica of the OMR answer sheet for a minimum period of ONE year.
9. Only Non-programmable calculators are allowed.

| Marks Distribution | |
|--------------------|--|
| PART-1 | : 50 QUESTIONS CARRY ONE MARK EACH (1 TO 50) |
| PART-2 | : 25 QUESTIONS CARRY TWO MARKS EACH (51 TO 75) |

BT-A4



[Turn Over



BIOTECHNOLOGY

PART - 1

Each question carries one mark.

(50 × 1 = 50)

1. A pointer when incremented always points to
 - (A) Last location of its type
 - (B) Middle location of its type
 - (C) Immediately next location of its type
 - (D) First location of its type
2. While initializing an 2-dimensional array it is necessary to mention; Eg int stud [] []=
 - (A) First column dimension
 - (B) Second column dimension
 - (C) Second Row dimension
 - (D) None of the above
3. 'Molecular scissors' used in genetic Engineering
 - (A) DNA polymerase
 - (B) DNA ligase
 - (C) Restriction enzymes
 - (D) Helicase
4. The following are the scientist who got noble prize for invention of PCR
 - (A) Karry Mullis
 - (B) Watson & Crick
 - (C) Paul Berg
 - (D) H.O. Smith
5. Which of the following is PCR-based molecular marker ?
 - (A) RAPD
 - (B) SSR
 - (C) RFLP
 - (D) All of the above
6. According to Wobble Hypothesis
 - (A) First base is unstable.
 - (B) Second base is unstable.
 - (C) Third base is unstable.
 - (D) The process of polypeptide chain elongation has been established.

Space For Rough Work

7. The enzymatic method for DNA sequencing
(A) Sanger's dideoxy method
(B) Maxam-Gilbert method
(C) Shot-Gun method
(D) None of the above
8. The codon for anti codon 3'-UUA-5' is
(A) 5'AAU 3' (B) 3'AAU 5'
(C) 5'AAT 3' (D) 3'AAC 5'
9. The tuberculin skin test is an example of
(A) Type IV delayed hypersensitivity
(B) Allergy reaction
(C) Serum sickness
(D) Precipitation reaction
10. To prevent hemolytic disease of the new born from occurring in a successive pregnancy and Rh negative women giving birth to an Rh positive child will receive shortly after birth an injection of
(A) Type 'O' blood (B) Rh Antibody
(C) Rh genes (D) 'A' and 'B' factors
11. T-cells originate from stem cells located in
(A) Liver (B) Thyroid gland
(C) Bone marrow (D) Gastro intestinal tract
12. Which of the following is not a precipitation reaction ?
(A) Rocket Immuno electrophoresis
(B) Ouchterlony's double diffusion
(C) Radial Immuno diffusion
(D) Blood Grouping

Space For Rough Work

13. Solenoid is the structure of :
- (A) Nucleosomal organization with 10 nm diameter.
 - (B) Condensed chromatic fiber with 30 nm diameter.
 - (C) Highly condensed form of chromatin with 300 nm diameter.
 - (D) Well organized chromosome with 1400 nm thickness.
14. Bacterial transformation was discovered by
- (A) Avery et al
 - (B) Beadle and Tatum
 - (C) Robert Brown
 - (D) Hargobind Khorana
15. In a double helix model of DNA, how far is each base pair from the next base pair ?
- (A) 3.4 mm
 - (B) 0.34 nm
 - (C) 2.0 mm
 - (D) 34 nm
16. Okazaki fragments are formed in
- (A) The splicing of mRNA
 - (B) The synthesis of lagging strand of DNA
 - (C) The neurons of vertebrates
 - (D) The oocytes of amphibians
17. The chemical substance that enters the Krebs cycle for further metabolism is
- (A) Ethyl alcohol
 - (B) Pyruvic acid
 - (C) Acetyl Co-A
 - (D) Adenosine tri phosphate
18. Co-enzymes
- (A) Alter the equilibrium of reactions.
 - (B) Are consumed by reactions.
 - (C) Usually consists of polypeptides.
 - (D) Often transfer activated groups.

Space For Rough Work

19. Which co-enzyme does not contain nucleotide ?
 (A) FAD (B) NADH
 (C) Co-Q (D) Co-A
20. Which class of amino acids contains only non-essential amino acids ?
 (A) Aromatic (B) Basic
 (C) Acidic (D) Sulphur containing amino acids
21. One kW is equal to
 (A) $3.6 \times 10^8 \text{J}$ (B) $3.6 \times 10^6 \text{J}$
 (C) $3.6 \times 10^7 \text{J}$ (D) $3.6 \times 10^5 \text{J}$
22. Phase rule is applicable to non-reacting system is given by
 (A) $F = 2 + \pi + N$ (B) $F = 2 - \pi + N$
 (C) $F = 2 - \pi - N$ (D) $F = 2 + \pi - N$
 Where, F – degree of freedom
 π – Number of phases
 N – Number of chemical species
23. Which of the following has the form of a Reynold's Number (N_{Re}) ?
 (A) $\frac{DV\mu}{\rho}$ (B) $\frac{DV}{\mu}$
 (C) $\frac{DV\rho}{\mu}$ (D) $\frac{D\rho\mu}{V}$
24. According to film theory the mass-transfer co-efficient is directly proportional to
 (A) D_{AB} (B) $D_{AB}^{0.5}$
 (C) D_{AB}^2 (D) $D_{AB}^{1.5}$
25. Different methods of sterilization
 (A) Heat sterilization (B) Ultra violet ray sterilization
 (C) Filter sterilization (D) All the above

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26. Heat transfer by conduction is given by
(A) Fourier's law (B) Newton's law of cooling
(C) Stefan-Boltzmann law (D) Fick's law
27. A process for separation of soluble products is
(A) Filtration (B) Centrifugation
(C) Reverse Osmosis (D) Coagulation and Flocculation
28. Gram staining was introduced by
(A) Alfred gram (B) Robert Cook
(C) Louis Pastuer (D) Christian Gram
29. Anthrax is caused by
(A) Bacillus subtilis (B) Bacillus anthraxis
(C) Clostridium tetani (D) Clostridium anthracis
30. The drug isoniazid is widely used for treatment of
(A) H1N1 (B) Tuberculosis
(C) Cancer (D) Gastroenteritis
31. The penicillin family of antibiotics is used primarily against
(A) Gram negative (B) Gram positive
(C) Viruses (D) Fungi
32. A differential medium is one in which
(A) Fungi and virus grow differently.
(B) Two different bacteria can be distinguished.
(C) A particular nutrient is used in differently by two different bacteria.
(D) Two different temperatures are utilized in the incubation period.
33. The identification of drugs through genomics
(A) Pharmacogenetics (B) Genomics
(C) Pharmacogenomics (D) Chemi-informatics

Space For Rough Work

34. Bio-informatics is an inter disciplinary branch which is concerned with the application of
- (A) Engineering techniques in biological studies.
 - (B) Chemistry in understanding the biological phenomenon.
 - (C) Physics in understanding various life processes.
 - (D) Information Science in analyzing the biological data.
35. Haploids are useful for
- (A) Production of callus
 - (B) Production of homozygous diploids
 - (C) Micro-dentistrometic study
 - (D) Induction of giant cells
36. The plant growth regulator responsible for elongation of in vitro shoots :
- (A) Gibberlins
 - (B) Auxins
 - (C) Cytokinin
 - (D) All of the above
37. Hybridization through protoplast fusion is called
- (A) Sexual Hybridization
 - (B) Parasexual Hybridization
 - (C) Parthenogenesis
 - (D) Asexual Hybridization
38. The main technique involved in agricultural biotechnology
- (A) Tissue culture
 - (B) Transformation
 - (C) Plant breeding
 - (D) DNA replication
39. Soft rot of fruits and vegetables is caused by
- (A) Ercoinia
 - (B) Xanthomonas
 - (C) Pseudomonas
 - (D) Bacillus

Space For Rough Work

40. The three 'Rs' of waste management hierarchy are
 (A) Reduce, reuse and recycle.
 (B) Reduce, redox and reoxidation.
 (C) Reuse, reimburse and regain.
 (D) Regain, recycle and resend.
41. The compounds that promote eutrophication of water bodies
 (A) Copper containing compounds
 (B) Nitrogen containing compounds
 (C) Sulphur containing compounds
 (D) Oxygen containing compounds
42. Low levels of BOD in water bodies lead to the death of fishes and other microorganisms due to
 (A) Methane (B) Hydrogen sulphide
 (C) Offensive sludge (D) All of the above
43. The Eigen value of

$$\begin{bmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$$
 are
 (A) $\lambda = 1, 1, 1$ (B) $\lambda = 2, 2, 2$
 (C) $\lambda = 0, 0, 2$ (D) $\lambda = 2$
44. If $W = \log(2x + 3y)$, then
 (A) $\frac{\partial^2 W}{\partial x \partial y} = \frac{\partial^2 W}{\partial x^2}$ (B) $\frac{\partial^2 W}{\partial x \partial y} = \frac{\partial^2 W}{\partial y^2}$
 (C) $\frac{\partial^2 W}{\partial x \partial y} = \frac{\partial^2 W}{\partial y \partial x}$ (D) $\frac{\partial W}{\partial x} = \frac{\partial W}{\partial y}$

Space For Rough Work

45. $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ represents
- (A) Laplace equation (B) Heat equation
(C) Wave equation (D) Cauchy's equation
46. The mean ' μ ' of a Binomial distribution $P(x) = {}^n C_x P^x q^{n-x}$ is
- (A) p/n (B) q/n
(C) p/q (D) np
47. Simpson's $3/8^{\text{th}}$ rule is applicable for
- (A) Even number of intervals
(B) Odd number of intervals
(C) Number of intervals should be multiples of 3
(D) Number of intervals should be multiples of 2
48. Pick the odd one out :
- (A) $a = a + 1;$ (B) $a += 1;$
(C) $a++;$ (D) $a = + 1;$
49. The following program print the value of x as
- ```
main ()
{
 int x;
 x=5;
 x=10;
 printf("\nx=%d",x);
}
```
- (A) 5 (B) 15  
(C) 10 (D) None of the above
50. Array elements are always stored in
- (A) Temporary memory location  
(B) Contiguous memory location  
(C) Random memory location  
(D) ROM

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**Space For Rough Work**



**PART - 2**

**Each question carries two marks.**

**(25 × 2 = 50)**

51. With reference to development of genetics consider the following events :
- (i) Proposal of operon model.
  - (ii) Discovery of first polymerase.
  - (iii) Establishment of complete genetic code.
- (A) (i), (ii), (iii)                      (B) (ii), (i), (iii)  
(C) (i), (iii), (ii)                      (D) (iii), (i), (ii)
52. The gel transfer techniques used to probe DNA and RNA sequence
- (A) Northern and Western Blot
  - (B) Northern and Southern Blot
  - (C) Southern and Western Blot.
  - (D) Western and Dot Blot
53. Histidine is converted to Histamine by
- (A) Transamination                      (B) Hydroxylation
  - (C) Decarboxylation                      (D) Reduction with NADH
54. Which of the following is correct ?
- (A) Holds DNA strands together – Hydrogen bonds.
  - (B) Links nucleosides in RNA to one another – Phosphodiester bond.
  - (C) Joins the base to the pentose sugar – Glycosidic bond.
  - (D) All of the above.
55. tRNA recognizes amino acyl synthetase enzyme by
- (A) Anti codon                              (B) DHU loop
  - (C) T $\psi$  loop                                  (D) AA-site

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**Space For Rough Work**

56. The complement system which is antibody mediated is  
(A) Properidin pathway (B) Alternative pathway  
(C) Classical pathway (D) Controlled pathway
57. The immunofluorescence test can be used to identify  
(A) Lipid molecules and Nucleic acid molecules.  
(B) Protein molecules and polysaccharide molecules.  
(C) Cytoplasmic molecules and cell wall molecules.  
(D) Antibody molecules and Antigen molecules.
58. Ratio of the bases present in different samples of nucleic acid yielded the following results :  
Among them which one is the double stranded DNA ?  
(A)  $(A + C)/(T + G) = 1$  (B)  $(A + C)/(U + G) = 0.8$   
(C)  $(A + G)/(T + C) = 1.5$  (D)  $(A + U)/(C + G) = 1.8$
59. If one strand of DNA is found to have the sequence 5'AACGTA CTGC3', what is the sequence of nucleotide on the 3'5' strand ?  
(A) 3'TTGCATGACG5' (B) 3'ATGCTACGGG5'  
(C) 3'GCAGTACGTT5' (D) 3'TTCGATGACG5'
60. The important steps in solid waste management are  
(A) Waste generation and collection.  
(B) On-site handling, storage and processing.  
(C) Transport and disposal.  
(D) All of the above.

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Space For Rough Work



61. Hardy-Weinberg equilibrium refers to
- (A) Stable mutation for a factor for speciation and evolution.
  - (B) Population genetic based on Mendilian laws to interpret evolutionary process.
  - (C) Micro geographic races as key contributor to divergent evolutionary tendency.
  - (D) Random distribution of species in time and space.
62. For motion of spherical particle in a stationary fluid, the ratio of wall drag to form drag in the Stoke's law range is
- (A) 1/3
  - (B) 2/3
  - (C) 2
  - (D) 1/2
63. For a given chemical reaction, how many grams of oxygen is required to produce 44 grams of carbon dioxide ?  $C + O_2 \rightarrow CO_2$
- (A) 16 grams
  - (B) 1.6 grams
  - (C) 3.2 grams
  - (D) 32 grams
64. The expression  $a = 30 * 1000 + 2768$ ; evaluates to
- (A) 32768
  - (B) - 32768
  - (C) 113040
  - (D) 0
65. The declaration `int S[5] [2]; S[0]` gives the
- (A) Address of the first one dimensional array.
  - (B) Address of the zeroth one dimensional array.
  - (C) Address of the zeroth 2-dimensional array.
  - (D) Address of the first 2-dimensdional array.

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**Space For Rough Work**

66.  $L\{e^{iat}\} =$

(A)  $\frac{1}{s + ia}$

(B)  $\frac{1}{s - ia}$

(C)  $\frac{ia}{s - a}$

(D)  $\frac{a}{s - i}$

67. The complementary function of

$$\frac{d^2y}{dx^2} + 4y = 5 \text{ is}$$

(A)  $C_1 \cos 2x + C_2 \sin 2x$

(B)  $C_1 \sin 2x + C_2 \sin 3x$

(C)  $C_1 \cos 2x - C_2 \sin 2x$

(D)  $C_1 \sin 2x + C_2 \sin x$

68. Cosmids are

(A) Plasmids

(B) Plasmids + Phages

(C) Phages

(D) Viral vectors

69. The components which helps in termination of reaction in Sanger dideoxy method ?

(A) dNTPs

(B) Taq polymerase

(C) ddNTPs

(D) Primers

70. Which is not correctly matched ?

(A) BHC – Insecticides

(B) Benzene – Petrochemicals

(C) DDT – Petrochemicals

(D) Lead – Heavy Metal

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Space For Rough Work



71. The physical treatment of hazardous wastes include
- (A) Screening and Sedimentation      (B) Floating and Filtration  
(C) Centrifugation and Dialysis      (D) All of the above
72. Oxygen, forest, etc., are the examples of
- (A) Renewable resources  
(B) Non-renewable resources  
(C) Both of the above  
(D) None of the above
73. Botulism caused by \_\_\_\_\_ have \_\_\_\_\_ forms.
- (A) Staptococcus aureus & 2  
(B) Clostridium botulinum & 3  
(C) Stephylococcus aureus & 2  
(D) Clostridium botulinum & 2
74. A Lysogenic virus is one which
- (A) Multiplies immediately after it enters the host cell.  
(B) Contains its own ATP for replication.  
(C) Remains in the host cell nucleus.  
(D) In its viral envelope.
75. Rate controlling steps in citric acid cycle include all of the following, except
- (A) Isocitrate dehydrogenase  
(B) Fumerase  
(C) Citrate synthase  
(D)  $\alpha$ -ketoglutarate dehydrogenase

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Space For Rough Work

A-4

A-4

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