Ph.D. COMMON ENTRANCE TEST AUGUST 2024

SUBJECT: BIOTECHNOLOGY

Roll No:

PART B

Duration: 60 minutes **Maximum Marks: 50**

Instructions:

1. **This entrance test question paper is not to be taken out of the examination hall**
2. **Part B Question paper consists of Section A and Section B**
3. **Section A consists of 30 MCQs carrying 1 Mark each. Put a tick (√) mark against the correct answer in the box given.**
4. **Section B consists of Descriptive questions carrying 5 marks each. Restrict your answer to 500 words. Additional plain sheets have been attached to the question paper to answer Section B**

SECTION – A

Answer the following by ticking (√) against the correct answer in the box given: 30 X 1 = 30

1. DNA replication occurs in

a) G2 phase ☐
b) G1 phase ☐
c) S phase ☐
d) M phase ☐

2. The importance of the correlation co-efficient lies in the fact that

a) It is one of the most valid measures of statistics ☐
b) It is a non-parametric method of statistical analysis ☐
c) There is a linear relationship between the correlated variables ☐
d) It allows one to determine the degree or strength of the association between two variables ☐

3. Water having excess of OH- is said to be

a) Neutral ☐
b) Alkaline ☐
c) Acidic ☐
d) all of the above ☐

4. Which takes the majority of the composition of cell

a) Water ☐
b) Gas ☐
c) Air ☐

d) Salt ☐

5. Greenpeace is

a) Governmental policy ☐
b) Non-governmental organization ☐
c) Process ☐
d) None of the above ☐

6. The variables calculated according to the weight, height and length of a population is known as?

a) Continuous variables ☐
b) Discrete variables ☐
c) Measuring variables ☐
d) Flowchart variables ☐

7. Yeast is an example of

a) Unicellular prokaryote ☐
b) Unicellular eukaryote ☐
c) Dicot ☐
d) Monocot ☐

8. Biofertilizer can either be added directly to soil or it can be added to the seeds before sowing them. This process is also known as ----------

a) Cultivation ☐
b) Radiation ☐
c) Bacterization ☐
d) Afforestation ☐

9. Some microorganisms secrete slimy substances called ---------- to protect themselves from drying out

a) Calcium dipicolinate ☐
b) Endotoxin ☐
c) Xanthan ☐
d) Chitin ☐

10. The gene of interest is restricted using appropriate ----------

a) Aldolases ☐
b) Hydroxylases ☐
c) Restriction enzymes ☐
d) Reductases ☐

11. Cotton is made pest resistant by incorporating a ---------- gene from *Bacillus thuringenesis*

a) Weep toxin ☐

b) Laugh toxin
c) Cry toxin
d) Heat toxin

12. Undesirable accumulation of microorganisms, plant and animals on artificial surfaces contributes to ----------

a) Biodiesel
b) Biofuel
c) Biofouling
d) Bio-lithosphere

13. One of the most common pathogen that may seep from sewage to soil ----------, a causative agent for typhoid

a) Bacillus anthrax
b) *Hepatitis*
c) Vibrio cholerae
d) Salmonella

14. **Which of the following is wrongly paired with respect to the subunits of ribosome?**

a) Ribosome = rRNA + protein
b) Large subunit = decoding center
c) Small subunit = decoding center
d) Subunit sedimentation unit = Svedberg

15. The main function of tRNA is to ……

a) Inhibit protein synthesis
b) Proof reading
c) Transport the amino acids to ribosomes
d) All of these

16. The Golden Rice variety is rich in

a) Vitamin C
b) B-carotene
c) Biotin
d) Lysine

17. Protoplasm fusion can be done by _____

a) Polyethylene glycol
b) Glycerol
c) Ethylene
d) Nitrogen

18. RAPD molecular markers are

a) Recessive ☐
b) Co dominant ☐
c) Dominant ☐
d) Neutral ☐

19. Where does oxidative phosphorylation take place?

a) Ribosomes ☐
b) Nucleus ☐
c) Mitochondria ☐
d) Cell membrane ☐

20. Which type of metabolic fuel is utilized for generating glucose under severe starvation?

a) Glycogen ☐
b) Starch ☐
c) Ketone bodies ☐
d) Fat ☐

21. Amino acids consist of the element (s): ----------

a) H only ☐
b) C, N, O and H ☐
c) C only ☐
d) C, N and O only ☐

22. Homology modelling involves an elaborate procedure of: ----------

a) template selection, sequence alignment correction ☐
b) backbone generation, loop building ☐
c) side chain modeling, model refinement and evaluation ☐
d) all of the above ☐

23. The two main categories of phylogenetic tree-building methods are: -------- and--------

a) sequence based; character based ☐
b) distance based; character based ☐
c) nucleotide based; protein based ☐
d) none of the above ☐

24. An mRNA bearing multiple ribosomes is known as…….

a) Small subunit-mRNA-initiator tRNA complex ☐
b) mRNA ribosome complex ☐
c) Polyamine-ribosome complex ☐
d) Polysome ☐

25. ……. is called as an error prone repair

a) Photoreactivation ☐

b) Excision repair ☐
c) Dark repair ☐
d) SOS repair ☐

26. If a DNA molecule contains 30% 'A', approximately, what % of 'G' is present

a) 20% ☐
b) 30% ☐
c) 25% ☐
d) 15% ☐

27. Barr body is

a) Inactive Y chromosome ☐
b) Inactive X chromosome ☐
c) Active X chromosome ☐
d) Active Y chromosome ☐

28. If we throw two dice simultaneously, what would be the probability that we get a 10 or 11?

a) 5/36 ☐
b) 5/12 ☐
c) 1/7 ☐
d) 1/3 ☐

29. In the plasma membrane, carbohydrates

a) directed to all sides in the membrane randomly ☐
b) always faces to the lumen of cells ☐
c) always faces outwards, towards extracellular space ☐
d) always faces inward to the nonpolar portion of the membrane ☐

30. In RBC cells, the plasmolysis occurs in _____

a) Hypertonic solution ☐
b) Hypotonic solution ☐
c) Isotonic solution ☐
d) Water solution ☐

SECTION – B

Answer any four of the following: 5 X 4 = 20

1. What is the quaternary structure of a protein? Explain with suitable examples.
2. Summarize the transcription process in prokaryotes and eukaryotes with an example.
3. How can one ensure a sterile plant tissue culture lab environment?
4. Explain the different types of Gene therapy and its applications in cancer treatment.
5. Explain the difference between a scatter plot and a line graph. Provide examples where one would be more suitable than the other and explain the insights gained from each.
6. Describe the process of construction of genomic and cDNA libraries.