Ph.D. COMMON ENTRANCE TEST AUGUST 2024

SUBJECT – BIOCHEMISTRY

PART B

Roll No:

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

Instructions:

1. **This entrance test question paper is not to be taken out of the examination hall**
2. **Question paper consists of Section A and Section B**
3. **Section A consists of 30 MCQs carrying 1 Mark each. Write the Alphabet of the correct answer in the space 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 questions by writing the Alphabet of the correct answer in the Box given: **30 X 1 = 30**

1. Sucrose is a disaccharide comprising of
   A. Glucose and glucose
   B. Glucose and fructose
   C. Glucose and galactose
   D. Galactose and galactose

2. What is the isoelectric point of amino acid lysine with pK_{a1} = 2.2, pK_{a2} = 9.0 and pK_{a3} = 10.8
   A. 7.3
   B. 9.0
   C. 5.6
   D. 9.9

3. An insulin sample is subjected to SDS-PAGE. How many bands will be seen upon staining the gel?
   A. 2
   B. 3
   C. 4
   D. 0

4. The enzyme involved in eukaryotic translation process is
   A. Aminoacyl t-RNA synthetase
   B. Aminoacyl-m-RNA synthetase
   C. Aminoacyl-t-RNA polymerase
   D. Amino-acyl-m-RNA polymerase

5. When the resting membrane potential becomes less negative, the phenomenon is called as
   A. Hyper-polarization
   B. De-polarization
   C. Semi-polarization
   D. Re-polarization

6. Cellular organelles can be separated by which of the following technique?
   A. Affinity Chromatography
   B. Electrophoresis
   C. Density gradient centrifugation
   D. Ion-exchange chromatography

7. Which of the following is abundantly found in collagen?
   A. Alanine
   B. Glycine
   C. Tryptophan
   D. Serine

8. Which of the following is an example of epimer?
   A. Glucose and ribose
   B. Mannose and glucose
   C. Galactose and mannose
   D. Glucose and galactose

9. Which is the temperature best considered for growth and multiplication of transformed cells?
   A. 25℃
   B. 26℃
   C. 30℃
   D. 37℃

10 Which of these acts as an inducer of lac operon?
   A. Allolactose
   B. Lactose
   C. Galactose
   D. All of the above

11 Which of the following enzyme is used in PCR?
   A. Taq DNA polymerase
   B. EcoR1
   C. EcoRII
   D. HRP

12 Which of the following proteins does not function in cell-cell interaction?
A. Integrin
B. Cadherin
C. N-CAM
D. Cytochrome C

13 The Basic unit of study in ecology is
A. Population
B. Organism
C. Community
D. Species

14 A polynuclear neutrophil (PMN)
A. Is a bone marrow stem cell
B. Is closely similar to a mast cell
C. Contains microbicidal cytoplasmic granules
D. Is not a professional phagocytic cell

15 Which of the following is the attribute that determines high energy status of a molecule?
A. Free energy change of hydrolysis
B. Boiling point
C. Melting point
D. Calorific value

16 Which of the following occurs in meiosis but not in mitosis?
A. Pairing of homologous chromosomes at metaphase plate
B. Separation of sister chromatids at anaphase
C. Attachment of spindle fibers to kinetochore
D. Replication of DNA prior to start of cell division

17 Migration of cancerous cells from the site of origin to other part of the body forming secondary tumors is called
A. Proliferation
B. Diapedesis
C. Apoptosis
D. Metastasis

18 Which of the following is not a flavoprotein?
A. NADH dehydrogenase-Qreductase
B. Succinate dehydrogenase
C. Xanthine oxidase
D. Cytochrome c

19 Example of endogenous fluorophore is
A. Amino acids
B. Enzymes
C. cyanine dyes
D. All of the above

20 A cell organelle that is present in animal cells but not present in plant cells is?
A. Golgi complex
B. Mitochondria
C. Centrosome
D. Vacuoles

21 Which of the following hormone is known to classically activate a receptor tyrosine kinase?
A. Insulin
B. Testosterone
C. Epinephrine
D. Cortisol

22 Carnitine shuttle occurs in which part of the cell?
A. Cytosol
B. Mitochondria
C. Plasma membrane
D. Nucleus

23 Which of the following is not a plant growth regulator?
A. Auxin
B. Cytokinin
C. Gibberellin
D. Phenols

24 Which of the following contains a linear system of conjugated double bonds?
A. β-carotene
B. chlorophyll
C. chloroplast
D. thylakoid

25 Which of the following cells release insulin when glucose levels elevate in the body?
A. beta cells
B. gamma cells
C. alpha cells
D. zeta cells

26 Which of the following does not contribute to synthesis of cAMP?

A. GPCR

B. Alpha subunit of heterotrimeric proteins

C. Adenyate cyclase

D. Phosphodiesterase

27 Name the coenzyme of riboflavin (B2)?

A. NAD or NADP

B. FAD and FMN

C. Coenzyme A

D. Thiamine pyrophosphate

28 The principle behind dialysis is _____

A. Adhesion

B. Cohesion

C. Capillary action

D. Reverse osmosis

29. What is the basic principle of working of AAS?

A. Absorption-Excitation

B. Absorption only

C. Excitation only

D. None of the above

30. Which of the following is not an important precursor of glucose in animals?

A. Pyruvate

B. Glucose 6-phosphate

C. Lactate

D. Glycerol

SECTION - B

Answer any four questions (Each question carry 5 marks) 4*5 = 20

1. Explain glycolysis process in detail.
2. Discuss the classification of enzymes.
3. Differentiate primary and secondary structure of proteins based on examples.
4. Explain the principle, instrumentation and applications of UV-Visible spectrophotometer.
5. Illustrate the MHC complex in detail.
6. Elucidate the pathophysiology and diagnosis of diabetes.