UNIVERSITY OF NORTH BENGAL

B.Sc. Honours Part-II Examination, 2020

ZOOLOGY

PAPER-IV (New Syllabus)

Time Allotted: 2 Hours | Full Marks: 45

The figures in the margin indicate full marks.

GROUP-A

(CELL BIOLOGY)

1. Answer any ***four*** as directed: 1×4 = 4

   (a) Cytosolic pH is regulated by—

   (K^+- driven antiport / Na^+- driven antiport / K^+- driven symport) (Choose the correct option)

   (b) Egg cells contain voltage gated cation channel. (True or False)

   (c) Phosphorylation causes _____ (assembly/disassembly) of nuclear lamina. (Choose the correct option)

   (d) _____ is the building block of microfilament. (Fill in the blank)

   (e) _____ is known as professional phagocyte. (Fill in the blank)

   (f) Kinesin moves towards _____ end of a microtubule. (Fill in the blank)

   (g) Microtubules are destabilized by the hydrolysis of _____. (Fill in the blank)

   (h) Glycophorin is an integral membrane protein present in RBC. (True or False)

   (i) Transport of $Na^+ - H^+$ for regulation of intracellular pH is an example of uniport / symport / antiport. (Choose the correct option)

   (j) _____ is the first compound formed in Kreb's cycle. (Fill in the blank)

2. Answer any ***two*** questions: 3×2 = 6

   (a) Write a note on signal hypothesis.

   (b) Write a short note on endocytosis.

   (c) Mention the function of peroxisome.

   (d) Write short note on nuclear pore complex.

   (e) Differentiate between carrier protein and channel protein.

3. Answer any ***one*** question: 5×1 = 5

(a) Describe briefly the regulation of MPF. Explain the mechanism by which Rb regulates cell cycle. What is cdk? 2+2+1

(b) Describe $F_0 - F_1$ complex. Discuss Boyer's model for synthesizing ATPs. $2\frac{1}{2}+2\frac{1}{2}$

GROUP-B

(MOLECULAR BIOLOGY)

4. Answer any ***three*** as directed: 1×3 = 3

(a) Purine is joined to pentose sugar in nucleotide by _____ bond. (Fill in the blank)

(b) Prokaryotic mRNA is Monocistronic / Polycistronic. (Choose the correct option)

(c) Consensus sequence for TATA box is _____. (Fill in the blank)

(d) DnaB protein _____ DNA strand. (Fill in the blank)

(e) DNA synthesis in lagging strand takes place in _____ direction. (Fill in the blank)

(f) _____ loop of tRNA binds with the mRNA. (Fill in the blank)

5. Answer any ***one*** question: 3×1 = 3

(a) Describe the intrinsic mechanism of transcription termination in prokaryotes.

(b) Describe the mechanism of splicing of mRNA.

(c) Write a short note on EF-Tu / EF-Ts cycle.

(d) Describe the mechanism by which Uracil containing DNA damaged is repaired.

6. Answer any ***one*** question: 4×1 = 4

(a) Describe the mechanism of formation of initiation complex during protein synthesis in prokaryotes. What is DnaA Box? What is Shine-Dalgarno Sequence? 2+1+1

(b) Describe the mechanism of transcription initiation process in prokaryotes. Write a note on mismatch repair mechanism. 3+1

GROUP-C

(LABORATORY AND ANALYTICAL TECHNIQUE)

7. Answer any ***three*** as directed: 1×3 = 3

(a) In gel electrophoresis, DNA molecule migrates from _____ to _____ end of the gel. (Fill in the blank)

(b) Plasmid always contains an origin of replication. (True or False)

(c) Agarose gels are used for electrophoresis of _____. (Fill in the blank)

(d) _____ is used in density gradient centrifugation to isolate RNA. (Fill in the blank)

(e) pBR 322 is a _____. (Fill in the blank)

(f) _____ detect the amino acids separated by chromatography. (Fill in the blank)

8. Answer any ***two*** questions: $1\frac{1}{2} \times 2 = 3$

(a) Mention the uses of Biosensors.

(b) Mention the steps of tissue culture.

(c) Write a short note on SDS-PAGE.

(d) Write a note on application of gene cloning.

9. Answer any ***one*** question: $4 \times 1 = 4$

(a) What is restriction endonuclease? Describe various vectors used in genetic engineering. What is cDNA library? 1+2+1

(b) Describe the principle and steps of differential centrifugation. Write the applications of colorimetry. 3+1

GROUP-D

(BIOCHEMISTRY)

10. Answer any ***three*** as directed: $1 \times 3 = 3$

(a) Cellulose is a _____. (Fill in the blank)

(b) The bond angle for $N - C_\alpha$ is:

(i) ϕ (ii) ψ (iii) ε (Choose the correct option)

(c) Citrulline is an amino acid. (True or False)

(d) Reduced form of coenzyme Q is known as Ubiquinone/Ubiquitin/Ubiquinol. (Choose the correct option)

(e) The major site of gluconeogenesis is _____. (Fill in the blank)

(f) Aspartate is a glucogenic amino acid. (True or False)

(g) In lactose, galactose is joined to glucose by $\alpha-1,4/\alpha-4,1/\beta-1,4/\beta-4,1$ glycosidic linkage. (Choose the correct option)

(h) _____ is a reducing sugar. (Fill in the blank)

11. Answer any ***one*** question: $3 \times 1 = 3$

(a) Write a note on Glycerol-3-phosphate shuttle mechanism.

(b) Derive Lineweaver-Burk plot.

(c) Write a note on Carnitine Cycle.

(d) Classify enzymes based on catalysis.

(e) Write briefly electron transport system.

12. Answer any ***one*** question: $4\times1 = 4$

(a) Describe the metabolic pathway of β-oxidation of saturated fatty acid. Give the overall reaction of β-oxidation of palmitic acid. 3+1

(b) Describe the process of glycolysis. How many molecules of ATP are produced after complete breakdown of one molecule of glucose (give a balance sheet)? 3+1

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