

2015

BIOCHEMISTRY

Paper – BCT – 104

(Cell Biology)

Full Marks – 25

The figures in the margin indicate full marks

Candidates are required to give their answers in their own words as far as practicable

1. (a) The mitochondrial Succinate dehydrogenase cytochrome b560 subunit has 6 transmembrane helices and is a nuclear coded polypeptide. With a diagram indicate the mechanism of its transport from synthesis to actual location. 2
- (b) How would helical wheel projection of Mitochondrial target sequence look like. 2
- (c) Give two examples of folded protein entry in organellar transport. 2

Or

2. (a) Cytochrome b2 is an intermembrane space protein in mitochondria. It has two signal sequences that are sequentially cleaved for translocating the protein to its right location. With a diagram indicate the mechanism of its transport from synthesis to actual location. 3
- (b) How will you prove that proteins are transported in mitochondria in their unfolded form ? 3
3. (a) How does phosphorylation affect palmitoylation of proteins ? 2
- (b) Why NLS containing cargoes have better affinities for importin $\alpha\beta$ complexes than importin α ? $2\frac{1}{2}$
- (c) In a nuclear export assay what is the role of protein synthesis blocker ? 2

Or

4. (a) What are FXFG repeats ? 2
- (b) Some peroxisomal proteins can re-enter but others cannot. Explain. 2
- (c) Why protein transport to mitochondrial matrix but not chloroplast stroma is affected by CCCP ? $2\frac{1}{2}$

[Turn Over]

5. (a) A protein from goat brain is believed to be localized in the in a cellular biomembrane. How do you show by biochemical and microscopic techniques in which membrane it is enriched ? 4+3

(b) Eukaryotic flagella need ATP for movement — Justify. Longer the flagella more is the amount of ATP spent for its motion — Justify. 3+2½

Or

6. (a) Define marker protein for an organelle with an example. 2+1

(b) What is subcellular fractionation ? How do you demonstrate that your protein of interest is enriched in an organelle but not in others ? 2+3

(c) Briefly compare the tensile strengths of actin, microtubule and intermediate filaments. Cellular stress induces formation of a cytoskeletal fiber. What is it ? Show a diagrammatic view of this event. 2+½+2