

2016

Time : 2 hours

Full Marks : 40

The figures in the right-hand margin indicate marks.

*Answer any **four** questions.*

(CELL BIOLOGY AND GENETICS)

1. (a) Write the structure of golgi apparatus.
What is the role of golgi network in protein
sorting and transport for secretory
proteins ? 5
- (b) Describe molecular mechanism of vesicular
transport. 5
2. (a) Define critical concentration and treadmilling
for actin and microtubules. 2
- (b) Write the structure of sarcomere and explain
the mechanism of muscle contraction. 8

3. (a) Mendel crossed pea plants that produced round seeds with those that produced wrinkled seeds. From a total of 7324 F₂ seeds, 5474 were round and 1850 were wrinkled. Using symbols W and w for genes, calculate the expected, phenotypic ratio. On the basis of the hypothesis, diagram the cross and compare observed results with those expected. 4
- (b) What is crossing over and summarize the important features of the concept of crossing over? What is the relationship between crossing over and linkage? 6
4. (a) What is Hardy-Weinberg Principle? Three genotypes were observed at the Adh (alcohol dehydrogenase) locus in a drosophila population. In a sample of 250 flies, the three genotypes occurred in the following number. (Fast-F and slow-S in a gel electrophoresis). Calculate observed genotypic and gene frequency. Assuming random mating, calculate expected genotypic frequency. 5

Genotypes	FF	FS	SS
Number	168	80	2

- (b) What is Inversion? How a single crossing over takes place in paracentric and pericentric inversion condition a homologous chromosome? 5
5. (a) Name different stages of mitosis. Describe the role of Cdk1/Cyclin B in regulate mitosis phase transition from prophase to metaphase. 5
- (b) What will happen to cell cycle progression when cell encounters DNA damage and how cell control this process? 5
6. (a) What is apoptosis and what its significance? What is the difference between extrinsic and intrinsic pathway of apoptosis? 5
- (b) Cancer cells exhibit a number of unusual properties that distinguish them from normal cells. What are the general properties of Cancer Cells? 5

