2 ½ Hours

Total Marks: 75

1. Attempt **all** questions.
2. **All questions** carry **equal** marks.
3. Draw **neat labeled diagrams** wherever necessary.
4. Use of **log tables** and **non-programmable calculator** is **allowed**.
5. For **Q.2, Q.3 and Q.4** attempt **A and B** OR **C and D**.

Q 1 Do as directed (Any fifteen) **15**

1. Give an example protein associated with microtubules.
2. State true or false:- Taxol is an example of drug targeting microtubules.
3. Give an example of Dynein-driven cargo.
4. State true or false: Tubulin and Fimbrin are the proteins involved in sliding filament theory.
5. State true or false: Cilia and flagella move because of the interactions of a set of microtubules inside. Collectively, called as an "axoneme".
6. An abnormally high level of phosphorylation of one particular MAP called _____, has been associated with several fatal neurodegenerative disorders.
7. Give one example of an intermediate filament.
8. Name one energy dependent transport process used by microbes for uptake of nutrients.
9. Fill in the blank: Adherens junctions and desmosomes are formed by transmembrane adhesion proteins that belong to the _____ family.
10. State true or false: Diffusion involving carrier proteins is called passive diffusion.
11. Define: Connexins.
12. Fill in the blank: The cell coat can be stained with _____ for the light microscope.
13. Define: Antiport.
14. Give an example of facultative heterochromatin.
15. What is a Karyotype?

16. How would you calculate interference value if the coefficient of coincidence is 0.46 ?
17. State true or false: Polytene chromosomes are giant chromosomes common to many dipterans.
18. Which are the group of proteins involved in packing of chromosomes?
19. State true or false: A normal human male individual has one Barr body.
20. What is paracentric inversion?

Q.2 A Explain the role of microtubules in mitosis and locomotion. **08**

Q.2 B What are intermediate filaments? Explain the assembly of intermediate filaments. **07**

OR

Q.2 C Give the overview of the functions of cytoskeleton. **08**

Q.2 D Give the structure and function of myosin. **07**

Q.3 A Describe in detail the working of Na^{+}-K^{+} pump **08**

Q.3 B Explain group translocation in bacterial cells using a suitable example. **07**

OR

Q.3 C Give an account of structural organisation and functions of gap junctions **08**

Q.3 D Elaborate on the significance and types of ionophores with the help of suitable examples. **07**

Q.4 A Diagrammatically explain chromosomal deletions and duplications. **08**

Q.4 B Explain with an example XX-XY mechanism of sex determination. **07**

OR

Q.4 C Solve:- A researcher working on a *Neurospora crassa* strain found that the mutant strain required histidine and tryptophan (his and trp) for growth. He mated this strain to a wild type of strain (his+ and trp+). He scored the obtained products as follows. **08**

	I	II	III	IV
Spore pair 1	his+ trp+	his trp	his+ trp+	his+ trp+
Spore pair 2	his+ trp+	his+ trp+	his+ trp	his trp+
Spore pair 3	his trp	his+ trp+	his trp	his+ trp
Spore pair 4	his trp	his trp	his trp+	his trp
Total	**25**	**08**	**06**	**14**
	V	VI	VII	VIII
Spore pair 1	his+ trp+	his+ trp+	his+ trp+	his+ trp
Spore pair 2	his trp	his trp	his+ trp+	his+ trp
Spore pair 3	his+ trp	his+ trp	his trp	his trp+
Spore pair 4	his trp+	his trp+	his trp	his trp+
Total	**14**	**16**	**15**	**02**

a. Compute the distance between the centromere and two genes.

b. Identify PD, NPD and TT tetrads?

Q.4 D Discuss the cytogenetics and any four characteristics of Turner and Klinefelter syndrome. **07**

Q.5 Write Short notes on **any three** of the following **15**

a. Treadmilling of microfilaments.

b. Facilitated diffusion in prokaryotes.

c. Adherens junctions.

d. Downs Syndrome.

e. Pedigree analysis- Sign, symbols and importance.