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 any one property of Microfilaments.
2. Define: Myofibrils.
3. State true or False: Actin utilized GTP to form microfilaments.
4. Give an example of a microfilament.
5. Give an example of motor protein.
6. Give the role of Titin in skeletal muscles
7. The movement of Kinesin on a microtubular track is _____.
8. Give one example of P-type transport ATPase.
9. Define: Siderophores.
10. State true or false: Large molecules, ions and polar substances do not cross membranes by passive diffusion.
11. Give one example of Glycosaminoglycans.
12. Define: Symport.
13. Fill in the blank: Focal adhesions and hemidesmosomes are formed by transmembrane adhesion proteins of the _____ family.
14. What is a nucleosome?
15. State true or false: Karyotype is the chromosome complement of the cell.
16. How would you calculate interference value if the coefficient of coincidence is 0.76 ?
17. An individual is doubly heterozygous for the w and z alleles. How will you arrange these alleles in a cis- configuration?
18. State true or false: An individual with a Turner syndrome is phenotypically a female.

19. State true or false: In *Drosophila*, if there are two X chromosomes in a diploid cell (2X:2A), the fly is female.

20. What is an aneuploidy?

Q.2 A What is a cytoskeleton? Give an overview of its functions. **08**

Q.2 B Discuss the motor proteins associated with microtubules. **07**

OR

Q.2 C Elaborate on actin binding proteins. **08**

Q.2 D What are intermediate filaments? Give its types. **07**

Q.3 A Give an account of structural organisation and functions of tight junctions. **08**

Q.3 B Discuss the functions of cell coat **07**

OR

Q.3 C Describe any two transport processes associated with the uptake of nutrients by the prokaryotic cells. **08**

Q.3 D Discuss the role of proteoglycans as a component of extracellular matrix **07**

Q.4 A Solve:- A *Neurospora crassa* strain that required leucine and lysine (leu and lys) for growth was mated to a wild type of strain (leu+ and lys+) following products were obtained **08**

	I	II	III	IV
Spore pair 1	+ lys	+ +	+ lys	leu lys
Spore pair 2	+ lys	+ +	leu +	+ +
Spore pair 3	leu +	leu lys	+ +	+ +
Spore pair 4	leu +	leu lys	leu lys	leu lys
Total	**5**	**80**	**12**	**48**
	V	VI	VII	VIII
Spore pair 1	leu +	+ +	+ lys	+ lys
Spore pair 2	+ lys	+ lys	leu lys	+ lys
Spore pair 3	leu lys	leu +	leu +	leu +
Spore pair 4	+ +	leu lys	+ +	leu +
Total	**20**	**15**	**10**	**10**

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

b. Identify the PD, NPD and TT tetrads.

Q.4 B Discuss the cytogenetics and any four characteristics of Trisomy21 and Cri-du-Chat syndrome. **07**

OR

Q.4 C What are chromosomal aberrations? Explain with an example deletion, duplication, inversion and translocations. **08**

Q.4 D Discuss Pedigree analysis involves Signs and Symbols with suitable example. **07**

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

a MTOCs.

b Desmosomes.

c ATP-binding cassette transporters.

d ZZ-ZW mechanism of sex determination.

e Euchromatin and heterochromatin.