

2 1/2 Hours

Total Marks: 75

1. Attempt **all** questions.
2. **All** questions carry **equal** marks.
3. Draw **neat labelled diagrams** wherever necessary.
4. Use of **log tables** and **non-programmable calculator** is **allowed**.

Q.1 a. Define the following: (any three)

03

1. RTK.
2. Receptor mediated endocytosis.
3. IP3.
4. Gap junctions.
5. Orphan nuclear receptors.
6. Second messengers.

Q.1 b. Give an account of: (any two)

12

1. General principles of cell communication.
2. How the life span of a signalling molecule affects the signalling.
3. Structure of GPCR and G proteins.
4. Role of calcium as a second messenger.

Q.2 a. Name the following: (any three)

03

1. Phase of the cell cycle in which DNA is replicated.
2. The enzyme responsible for the phosphatidyl serine to move from the inner leaflet to outer leaflet of plasma membrane.
3. Cells that do not divide in their life time.
4. The enzyme which helps in detachment of an apoptotic cell from the tissue.
5. The membrane bound vesicles being released from a cell undergoing apoptosis.
6. A protein which regulates the cell cycle.

Q.2 b. Explain the following: (any two)

12

1. What are checkpoints in a cell cycle? Give their significance.
2. Explain the Intrinsic pathway of Apoptosis.
3. What are Tumour Suppressor Genes? Give their role in the normal functioning of a cell.
4. Compare the characteristics of a normal cell with a cancerous cell.

Q.3 a. Do as instructed: (any three)

03

1. Give one example of antiviral drug.
2. Fill in the blank - _____ a polyene antifungal from *Streptomyces* is used to control candida.
3. State true / false – indiscriminate antimicrobial use results in the selection

of resistant strains.

4. Explain the term - Narrow spectrum antibiotic.
5. Name the scientist who coined the term selective toxicity.
6. Name one pharmacological activity of an antimicrobial agent.

Q.3 b. Elaborate on the following questions: (any two)

12

1. Classification of antibacterial agents.
2. Mode of action of tetracyclins and chloramphenicol.
3. Origin and transmission of drug resistance.
4. Mechanism of action of quinolones and rifampin.

Q.4 a. Do as directed:(any three)

03

1. Calculate mode: 2, 4, 6, 6, 6, 6, 6, 8.
2. Define- Median.
3. State true or false: Histogram is a graph containing set of rectangles depicting a frequency distribution.
4. If standard deviation is 6 what is the variance.
5. Fill in the blank: In regression analysis, the variable whose value is unknown is _____ variable.
6. What is z-test?

Q.4 b. Attempt the following questions: (any two)

12

1. Calculate regression coefficients b_{xy} and b_{yx} for the following data

x	1	2	3	4	5
y	1	2	3	4	5

2. What is correlation? Give types of correlation.
3. Explain:
 - a. Null hypothesis and Alternative hypothesis.
 - b. Type 1 and type 2 error.
4. Solve: A machine is designed to produce insulating washers for electrical devices of average 0.50 cm. A random sample of 10 washers was found to have an average 0.55 cm with standard deviation of 0.05 cm. Test the significance of the deviation. ($t_{\alpha, 0.05, 9} = 2.262$)

Q. 5 Write short notes on: (any three)

15

- a. Morphogens.
- b. Significance of K_d and binding energy of receptors.
- c. Interphase and its stages.
- d. Biostatistics – Definition and its applications.
- e. Chi-square test.
- f. Metronidazole – mode of action.