

[Time: 2½ Hours]

[Marks:75]

Please check whether you have got the right question paper.

- N.B:
1. All questions are **compulsory**.
 2. All questions carry **equal** marks.
 3. Draw **neat**, labelled **diagrams** wherever **necessary**.
 4. Use of **log books** and **non –programmable** calculator is allowed.

- Q.1 a. Explain the following: (**any three**) 03
- i) Gap Junctions
 - ii) Morphogen
 - iii) Synaptic signalling
 - iv) GPCR
 - v) Desensitization
 - vi) Orphan Nuclear receptors
- b. Discuss the following: (**any two**) 12
- i) Response of a cell to multiple extracellular signals.
 - ii) Role of NO as an extracellular messenger.
 - iii) Mechanism of activation of Receptors Tyrosine Kinase.
 - iv) Role of calcium as a second messenger.
- Q.2 a. Name the following: (**any three**) 03
- i) The phase of cell cycle at which the chromosomes move to the opposite poles of spindle.
 - ii) Cells that possess a relatively high level of mitotic activity.
 - iii) An enzyme that moves phosphatidylserine molecules to the outer leaflet of the plasma membrane where they are recognized by macrophages.
 - iv) Malignant tumors of hematopoietic cells of bone marrow.
 - v) Process where clusters of cancer cells dislodge from a tumor and invade the blood vessels.
 - vi) An extracellular messenger protein that has the ability to kill tumor cells.
- b. Give an account of the following: (**any two**) 12
- i) Regulation of the activities of CdKs.
 - ii) Intrinsic pathway of apoptosis.
 - iii) Tumour Suppressor Genes and their role.
 - iv) Significance of apoptosis.
- Q.3 a. Do as directed: (**any three**) 03
- i) Give a term for the following – The antimicrobial agent that is effective only against a limited variety of pathogens.
 - ii) Give one example of antiviral drug
 - iii) State true or false- Indiscriminate antimicrobial use results in the selection of resistant strains.
 - iv) Name the scientist who coined the term selective toxicity.

- v) Fill in the blank- _____ a polyene antifungal from *Streptomyces* is used to control *Candida*.
- vi) Name one desirable pharmacologic activity of an antimicrobial agent.

- b. Elaborate on the following: (**any two**) 12
- i) Mechanisms of drug resistance with examples.
 - ii) Mode of action of Cephalosporins.
 - iii) Origin and transmission of drug resistance.
 - iv) Mechanism of action of Aminoglycosides with example.

- Q.4 a. Do as instructed: (**any three**) 03
- i) Compute standard deviation if Variance is 25
 - ii) Identify the mode in the given series 3,4,5,6,6,6,6,7,7,8,9.
 - iii) Name the parametric test used to test the significance of means for sample size less than 30
 - iv) Give the formula to calculate Coefficient of variance.
 - v) Define Arithmetic mean
 - vi) State true or false- The normal probability curve is a bell shaped curve.

- b. Attempt the following: (**any two**) 12
- i) What is regression? Give two lines of regression and regression equations.
 - ii) A researcher wants to represent the data with diagrams and graphs. Which are the different diagrams and graphs you would recommend for data representation?
 - iii) A herd of 100 cattle was fed a special high-protein grain for a month and had gained an average of 6.5 pounds. If the standard deviation of weight gain for the entire herd is 1.0 pounds, test the hypothesis at 5% level of significance that the average weight gain per cattle for the month was more than 5 pounds.
(**$Z_{\alpha}, 0.05=1.96$**).
 - iv) In a biology experiment a number of cultures were grown in a laboratory. The number of bacteria in millions and their ages in days are given below. Calculate the coefficients of correlation.

| | | | | | | |
|------------------------------------|----|-----|-----|-----|-----|-----|
| Age in days (x) | 1 | 2 | 3 | 4 | 5 | 6 |
| Number of bacteria in millions (y) | 50 | 110 | 150 | 200 | 240 | 300 |

- Q.5 Write short notes on the following: (**any three**) 15
- i) Mode of action of Metronidazole.
 - ii) Use and misuse of antimicrobial agents.
 - iii) Concepts and uses of Chi-square test.
 - iv) Relationship between number of surface receptors and the ligand concentration.
 - v) Characteristic features of endocrine signalling.
 - vi) Interphase and its stages.
