

[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)

- i) Second messengers
- ii) Receptors mediated endocytosis
- iii) Endocrine signalling
- iv) Ligand gated channels
- v) IP3
- vi) NO

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b. Discuss the following : (any two)

- i) Functioning of Nuclear Receptors.
- ii) Role of G proteins in GPCR functioning.
- iii) Transautophosphorylation in RTKs.
- iv) K_d and binding reaction of Ligand to its receptors.

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

- i) The phase of cell cycle that follows DNA replication.
- ii) Cells that lack the ability to divide
- iii) A trimeric pre-assembled receptor that turns on apoptotic process.
- iv) Cancer associated genes that regulates programmed cell death.
- v) A tumor that is not capable of indefinite growth and does not invade the surrounding healthy tissue.
- vi) Proteins that activate the intrinsic pathway of apoptosis.

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b. Give an account of the following: (any two)

- i) MPF and its role in regulation of cell cycle.
- ii) Mitochondrial mediated apoptosis.
- iii) Caspases and their role in apoptosis.
- iv) Malignant tumors and their classification.

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

- i) Name the following—The property of the drug whereby it inhibits the microbial pathogen without damaging the host.
- ii) Give one example of synthetic drug.
- iii) State true or false—During antibiotic treatment patient's normal flora are also getting exposed to the effects of the antibiotic.
- iv) Name a genetic element other than the plasmids on which antibiotic resistant genes are located.
- v) Fill in the blanks- _____ are Gram negative bacteria devoid of cell wall.
- vi) State an example of antiviral drug used in treatment of Herpes infection.

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b. Elaborate on the following: (any two) 12

- i) Inhibitors of nucleic acid synthesis with two examples.
- ii) Mode of action of Polymyxin B and Vancomycin.
- iii) Desirable properties of a new antimicrobial agent.
- iv) Antimetabolites acting as antibiotics with two examples.

Q.4

a. Do as instructed: (any three) 03

- i) _____ is defined as the positive square root of the mean of the squares of the deviations of observations from their mean.
- ii) Calculate Arithmetic mean of all even numbers in a series of 0 to 10.
- iii) Give the regression line when X is a dependent variable and Y is an independent variable.
- iv) Define Median.
- v) State true or false-Pie chart is a kind of circle graph which shows data as a whole as well as in parts.
- vi) What is t-test?

b. Attempt the following: (any two) 12

- i) Define Biostatistics. Discuss its applications in biological sciences.
- ii) Explain the various steps in testing statistical hypothesis.
- iii) The amount of a certain trace element in blood is known to vary with a standard deviation of 15 ppm (parts per million) for male blood donors and 9.5 ppm for female donors. Random samples of 75 male and 50 female donors yield concentration means of 25 and 30 ppm, respectively. What is the likelihood that the population means of concentrations of the element are the same for the men and women? ($Z_{\alpha,0.05}=1.96$).
- iv) A researcher wants to study the relationship between disease and exposure to carcinogens. He organizes the data of 120 individuals in a contingency table. He finds that 68% of diseased individuals were exposed and 20% of non-diseased were exposed. Do these data suggest an association between disease and exposure? ($X^2_{0.05,1}=3.84$).

	Disease		
Exposure	Yes	No	Total
Yes	37	13	50
No	17	53	70
Total	54	66	120

Q.5

Write short notes on the following: (any three) 15.

- i. Mode of action of Bacitracin.
- ii. Various methods by which organisms acquire resistance.
- iii. Types of correlation.
- iv. Role of Arrestins.
- v. Features of Synaptic signalling.
- vi. Check points of cell cycle.
