

[Time: Two and half 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, labeled diagrams wherever necessary
 4. Use of log books and non-programmable calculator is allowed

Q.1 a) Define **any three** of the following

- i. Morphogen
- ii. Paracrine signaling
- iii. Desensitization
- iv. Receptor dimerization
- v. Nuclear receptors
- vi. Heterotrimeric protein

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b) Discuss **any two** of the following

- i. Different types of receptors in signal transduction.
- ii. Role of any two second messengers
- iii. Extracellular signal molecules and response of a cell to multiple signals.
- iv. The effect of lifetime of an extracellular messenger on cell signaling.

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Q.2 a) Name **any three** of the following

- i. The phase of cell cycle in which chromosome segregation and cell division occurs.
- ii. Example of cells that are highly specialized and lack the ability to divide.
- iii. Proteases with a key cysteine residue that are activated at early stage of apoptosis.
- iv. A protein that has the ability to kill tumor cells.
- v. Genes that encode proteins that inhibit excessive cell proliferation.
- vi. A protein that initiates entry of a cell into M phase.

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b) Give an account of **any two** of the following.

- i. Cell cycle check points and its importance.
- ii. Mitochondria mediated pathway of apoptosis.
- iii. Role of cyclin dependent kinases in cell cycle
- iv. Significance of apoptosis.

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

- i. Define-Antimicrobial agent.
- ii. Give one example of broad spectrum antibiotic.
- iii. State True or False- Bactericidal process is irreversible while bacteriostasis is reversible.
- iv. Fill in the blank- The ratio of toxic dose to therapeutic dose is called _____.
- v. Name the microorganism that produces Gentamicin.
- vi. Give one example of antifungal agent.

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b) Answer **any two** of the following

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- With the help of two examples explain the mechanism of inhibition of nucleic acid synthesis by antibiotics.
- Explain the mechanism of action of Streptomycin and Erythromycin.
- Elaborate on the discovery and design of antimicrobial agents.
- How does drug resistance originate and get transmitted?

Q.4 a) Do as instructed **any three** of the following

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- Calculate arithmetic mean:- 5,10,15,20,25,30,35,40,45,50
- State true or false:- Frequency polygon is a line graph.
- Square root of variance is _____.
- What is the shape of normal probability curve?
- Define independent and dependent variables in regression analysis.
- Give one application of chi-square test.

b) Attempt **any two** of the following

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- Explain with example measures of central tendency.
- Give the steps in testing statistical hypothesis.
- Calculate the coefficient of correlation for the following data

X	4	8	12	16	20
Y	5	10	15	20	25

- In a clinical treatment, the patients were tested to see the effect of a potential antihypertensive drug. 50 patients were assigned to receive the dose of active drug and 50 as placebo at random. Their response to treatment was categorized as favourable and unfavourable. The data is given in the table below (**Given $X^2_{0.05, 1}=3.84$**)

	favourable	favourable	Total
Placebo	40	10	50
Drug	20	30	50
Total	60	40	100

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

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- Modes of action of antiviral agents
- Classification of antibacterial agents.
- Cancer vaccines
- Role of GAP junctions in cell signaling.
- Dissociation constant of receptor ligand complex.
- Scope of Biostatistics.
