

[Time: Three Hours]

[Marks:100]

Please check whether you have got the right question paper.

- N.B:
1. All questions are **compulsory**. Choices are **internal**.
 2. **Figures** to the **right** indicate **full** marks.
 3. Draw **structures** and **diagrams** wherever necessary.

Q.1 A Define and explain the following terms:

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- i) Bolus
- ii) Aquaporin
- iii) Coccus
- iv) Nucleoplasm
- v) Pathogen

B State **TRUE** or **FALSE** giving reason:

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- i) Distal convoluted tubule is fully permeable to water.
- ii) Protein digestion requires alkaline pH.
- iii) The longest phase in mitosis is anaphase.
- iv) In Gram staining, iodine is used as a mordant.
- v) Anaerobic bacteria can grow as a pellicle.

Q.2 Attempt the following (**Any four**)

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- i) Explain the different stages of second meiotic division with the aid of neat labelled diagrams.
- ii) Summarize the events of first meiotic prophase.
- iii) With the help of neat, labelled diagrams, explain cytokinesis.
- iv) Write a note on:
 - a) Mitotic spindle
 - b) Nuclear membrane
- v) Diagrammatically, explain the ultra structure of a typical nucleus.
- vi) Discuss different types of proteins and nucleic acids found in the nucleus.
- vii) Elaborate on the structure and chemical composition of nucleolus.
- viii) Define cell cycle and write in detail about the sequence of events in interphase.

[Turn Over]

Q.3 Answer the following:(Any four)

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- i) Seema is complaining of weakness. Her lab reports showed a depleted sodium level. Is there a correlation between the two findings? Explain your answer.
- ii) Explain the digestion of starch with a special mention of the enzymes involved.
- iii) Describe the process of digestion of proteins.
- iv) Elaborate on the role of accessory organs in the digestive process.
- v) Compare the process of urine formation in proximal and distal convoluted tubule.
- vi) In detail explain regulation of tubular reabsorption.
- vii) State **True** or **False** and justify – “kidney has functions other than excretion”.
- viii) Explain counter- current mechanism of urine formation.

Q.4 Answer the following: (Any four)

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- i) Citing examples, discuss bacterial classification based on shape and number of cells.
- ii) Write an elaborate note on 'Flagella' and its significance for bacteria.
- iii) Describe in detail capsule staining.
- iv) Write a note on bacteria surviving in extreme conditions.
- v) Justify: "In synchronous culture, all microorganisms are in the same phase of growth."
- vi) Differentiate between gram positive and gram negative bacteria.
- vii) Explain the contributions of any two scientists to the field of microbiology.
- viii) State **True** or **False** justify - "Bacteria can utilize both organic and inorganic sources of nutrition."

Q.5 Answer the following : (Any four)

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- i) Justify in detail: "Staining techniques are an important tool in microbiology".
- ii) Explain the structure of bacteria with the help of a neat labelled diagram.
- iii) Compare mitosis and meiosis.
- iv) Write a note on cell cycle.
- v) Discuss the importance of bile in lipid digestion and absorption.
- vi) With the help of a neat detailed diagram, explain the structure of a nephron.

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