



- (c) Prophase  
(d) Anaphase
- 1-d. The best stage at which the total number of chromosomes can be counted in any species is? (CO2) 1  
(a) Telophase  
(b) Metaphase  
(c) Late anaphase  
(d) Late prophase
- 1-e. Who proposed the the DNA as genetic material? (CO3) 1  
(a) Griffith  
(b) Robert hook  
(c) Robert brown  
(d) Harshey and Chase
- 1-f. Which of the following nitrogen base are pyridines ? (CO3) 1  
(a) T and C  
(b) T and A  
(c) Aand C  
(d) Gand T
- 1-g. Allergy involves: (CO4) 1  
(a) IgA  
(b) IgE  
(c) IgD  
(d) IgG
- 1-h. Barrier created by saliva and tears is released to:(CO4) 1  
(a) Physiological barrier  
(b) Cellular barrier  
(c) Cytokine barrier  
(d) Physical barrier
- 1-i. Hirudin is? (CO5) 1  
(a) Protein from Hordeum valgare  
(b) Toxic molecules from Gossypium  
(c) Protein from transgenic Brassica napus  
(d) Antibiotic from GM Escherichia

- 1-j. Reagent used in ELISA test is (CO5) 1
- (a) Endonuclease
  - (b) Polymerase
  - (c) Ligase
  - (d) Peroxidase

**2. Attempt all parts:-**

- 2.a. Explain the main points of cell theory? (CO1) 2
- 2.b. Describe the prophase of mitosis? (CO2) 2
- 2.c. Write down the contribution of F. Griffith? (CO3) 2
- 2.d. What is the process by which immune cells recognize and destroy abnormal cells in the body? (CO4) 2
- 2.e. Write down the function of DNA ligases? (CO5) 2

**SECTION B**

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**3. Answer any five of the following:-**

- 3-a. Give an account of structure and functions of endoplasmic reticulum? (CO1) 6
- 3-b. Describe the structure of cell wall and state its functions? (CO1) 6
- 3-c. Discuss somatic cell division and mention its importance? (CO2) 6
- 3-d. Give an account of cell cycle? (CO2) 6
- 3.e. Why is DNA a better genetic material when compared to RNA? (CO3) 6
- 3.f. Explain the type of immunity is developed after recovering from a disease? (CO4) 6
- 3.g. Discuss the three critical research areas of Biotechnology? (CO5) 6

**SECTION C**

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**4. Answer any one of the following:-**

- 4-a. Write a detailed notes on amino acids and proteins? (CO1) 10
- 4-b. What are carbohydrates? Give the properties of carbohydrates? (CO1) 10

**5. Answer any one of the following:-**

- 5-a. Discuss the importance of meiosis cell division in sexually reproducing organisms? (CO2) 10
- 5-b. How cytokinesis is different in an animal cell division and plant cell division? (CO2) 10

**6. Answer any one of the following:-**

- 6-a. Enlist the salient features of the double helix structure of DNA? (CO3) 10
- 6-b. Discuss the Harshey and Chase experiment. Write the conclusion drawn by the scientist after their experiment? (CO3) 10

**7. Answer any one of the following:-**

- 7-a. Write down the difference between primary lymphoid organs and secondary lymphoid organs with suitable example? (CO4) 10
- 7-b. Draw a labelled diagram of an antibody? Discuss the different types of antibodies? (CO4) 10

**8. Answer any one of the following:-**

- 8-a. What is bioreactor? With the help of diagram discuss the components of bioreactors? (CO5) 10
- 8-b. Mention any six fields of application of biotechnology for human welfare. (CO5) 10

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