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RNLKWC/M.Sc.-CBCS/IS/MB./P.G./103/21

2021

Microbiology

[P.G.]

(CBCS)

(M.Sc. First Semester End Examinations-2021)

PAPER-103

[Biochemistry, Biophysics and Bioinstrumentation]

Full Marks: 40

Time: 02 Hrs

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

Group-A (MCB-103.1)

Marks 20

- 1. Answer anytwo question from the following: 2x2= 4**
- Calculate the isoelectric point of phenylalanine ($pK_1=1.8$ and $pK_2=9.1$). 2
 - Which amino acid residues destabilize the α -heix and why? 2
 - Write down the importance of micro-RNA in biological system with a suitable example. 2
 - What is the function of bacteriorhodopsin? 2

(2)

2. **Answer any two question from the following: 4x2= 8**
- a. Mention the interactions that stabilize the protein structure. 4
- b. Write the equation of Lineweaver-Burk plot and explain the parameters. How would you calculate the K_m from the Lineweaver-Burk plot? 3+1
- c. How does an enzyme increase the rate of reaction? Prove that the rate of reaction will be maximum when enzyme is fully saturated with substrate. 4
- d. Explain the functioning of proteases with examples. 4
3. **Answer any one question from the following: 8x1= 8**
- a. Discuss motif, fold and domain of a protein. 8
- b. Discuss the structural features of B-DNA. What is a superhelix? Why is supercoiling biologically important? When is hyperchromic effect observed in DNA? 4+1+1+2

Group-B (MCB-103.2)

Marks 20

1. **Answer any two question from the following: 2x2= 4**
- a. Write down the protonic theory of acid and base with demerits. 2
- b. Write Lewis theory with example. 2

(3)

- c. How matrix assists ionization in MALDI –ToF Mass Spectrometry? 2
- d. What is R_f value for a compound during TLC analysis? 2
2. **Answer any two question from the following: 4x2= 8**
- a. Write down the Law of thermodynamics. 4
- b. State the Beer Lambert law of absorption spectrum and indicate the conditions that violate the law. 4
- c. Write down the basic principle of Fluorescence Microscopy and how can it be differed from Confocal Microscope? 2+2
- d. What are the safety guidelines required for handling the radioactive materials? 4
3. **Answer any one question from the following: 8x1= 8**
- a. What is resolving power of a microscope? Schematically represent the techniques involved in Scanning electron microscopy with its applications. 2+6
- b. Write the application of buffer in biological system. Write Lux-Flood concept. 6+2
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