

GANPAT UNIVERSITY
B.TECH. 5th SEM. BIOMEDICAL AND INSTRUMENTATION ENGINEERING
REGULAR EXAMINATION NOVEMBER/DECEMBER 2013
2BM506: ANALYTICAL INSTRUMENTATION

TIME: 3 Hours

Total marks: 70

INSTRUCTIONS:

1. Use separate answer sheets for the two sections
2. Figures on the right side indicate marks
3. Please explain with the help of diagram wherever it is necessary
4. Each sub-question carries equal marks unless it is specified

SECTION – I**Que.1 Write answers of the following questions.****12**

- A Write a detailed note on electrophoresis.
- B Explain the sample preparation procedure of electron microscopy.

OR**Que.1 Write answers of the following questions.****12**

- A What is microscopy? Explain detailed construction of dark field microscope.
- B Explain the origins of absorption spectra.

Que.2 Write answers of the following questions.**11**

- A Explain the principle of liquid chromatography and enlist the types of liquid chromatography.
- B Explain the principle, construction and applications of autoclave.

OR**Que.2 Write answers of the following questions.****11**

- A Explain in detail the infrared spectrophotometry.
- B Explain the systemic (determinate) errors.

Que.3 Write answers of the following questions.**12**

- A Define: Random Errors, Precision, Buffers **3**
- B Find out the pH of solution, on addition of 100 ml of 3M NaOH to 1L of 0.4M Carbonic acid/0.25 M Bicarbonate buffer solution. The value of dissociation constant of given buffer solution is 4.27×10^{-7} . **5**
- C Explain the advantages and disadvantages of instrumental analysis. **4**

SECTION – II

Que.4 Write answers of the following questions.

12

- A Explain pH meter in detail.
B Write a note on centrifuge machine.

OR

Que.4 Write answers of the following questions.

12

- A Explain in detail the fluorescence microscopy.
B Write a note on size exclusion chromatography.

Que.5 Write answers of the following questions.

11

- A Explain coulter counter method for blood cell counting.
B Explain the Scanning Electron Microscopy.

OR

Que.5 Write answers of the following questions.

11

- A Explain your views on the nature of electromagnetic radiation.
B Derive the equation for the Beer-Lambert law.

Que.6 Write answers of the following questions.

12

- A What is the pOH of a solution containing 2.75×10^{-4} M of $[H^+]$?
B Analysis of a sample gave following percentage values for active constituents; 8.6, 9.5, 11.5, 7.0, 8.4, 6.7, 21.5, 6.8, 8.5. Calculate the mean, standard deviation and coefficient of variation.

C	New method	Standard method	5
Mean	12.67	13.73	
Standard Deviation	± 0.8654	± 0.2362	
No. of samples	6	9	

Test at 90% confidence if the new method mean is significantly different from the standard method. Tabulated value of $f = 2.73$, $t = 1.76$.

-----END OF THE PAPER-----