[This question paper contains 4 printed pages]

5206 *Your Roll No*

B.Sc. Prog./II **J**

AC-201 Basic Principles & Lab Operations

(NC – Admissions of 2005 & onwards)

Time 3 Hours *Maximum Marks 75*

(Write your Roll No on the top immediately on receipt of this question paper)

Attempt **FIVE** *questions in all*
All *questions carry equal marks*

1 Determine the correct number of significant figures in the answer and give reason for your choice

(a) Calculate the cost of brass in an old coin that is a pure brass The mass of the coin is 4 351 g and price of brass is Rs 720 00 per pound The number of grams in a pound is 453 6

(b) $(3\ 4617\times10^{17}) - (5\ 61\times10^{-4})$

(c) 3 461723 + 14 91 + 0 980001 + 5 2631

(d) 0 04216 – 0 0004134

P T O

2 (a) A 25 0 µL serum sample was analysed for glucose content and found to contain 26 7 µg Calculate the glucose concentration of glucose in ppm and in mg/dL

(b) A soda ash sample is analysed by titrating the sodium carbonate with the standard 0 1288 M hydrochloride solution, required 38 2 mL HCl

The reaction is

$$CO_3^{2-} + 2H^+ \rightarrow H_2O + CO_2$$

Calculate the percent sodium carbonate in the sample

(c) Describe how to prepare 250 0 mL of 0 150 M K_2SO_4 with a volumetric flask

3 (a) Define precision and accuracy Explain with the help of an example

(b) Explain the difference between systematic and random errors

(c) Differentiate between absolute uncertainty and relative uncertainty

4 (a) Describe the principle of colourimetry

(b) The peak absorbance of 3.16×10^{-3} M $KMnO_4$ at 555 nm in a 1.000 cm path length of the cell is 6

(i) Find the molar absorptivity and percent transmittance of this solution

(ii) What would be the absorbance if the path length were 0.100 cm ?

(iii) What would be the absorbance in a 1.000 cm cell if the concentration were decreased by a factor of 4 ?

5 (a) Which is more accurate, a transfer pipet or a measuring pipet ?

(b) Distinguish between absorption and adsorption Why do you heat glassware in a drying oven, are you removing absorbed or adsorbed water

(c) What is the difference between a homogeneous and a heterogeneous material ?

(d) What is the purpose of calibration curve ? Explain

6 (a) What do you mean by TD and TC on glassware ?

(b) Describe a sintered-glass crucible

(c) Name any three drying agents used in desiccators

(d) What do you understand by the term tolerance and precision of glassware

7 (a) Describe a typical single pan balance

(b) Explain the position of Zero point and rest point in a balance

(c) Pipette should not be blown out by mouth Comment