41265

B. Sc. (Hons.) Chemistry 4th Semester Examination – May, 2019

MATHEMATICS - III

Paper : CH(H)-405 Opt-ii

Time : Three hours]   *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. **9** is *compulsory*. All questions carry equal marks.

UNIT – I

1. (a) Find a real root of the equation $x^3 - x - 4 = 0$ using the bisection method correct to three places of decimal.

   (b) Find a real root of the equation $x^3 - 4x - a = 0$ by Regula - Falsi method.

2. (a) Calculate by Trapezoidal rule an approximate value of $\int_{-3}^{3} x^3 dx$ by taking 7 equidistant ordinates and compare with exact value.

41265

8. (a) A survey of 800 families with four children each revealed the following destribution :

No. of boys	0	1	2	3	4
No. of girls	4	3	2	1	0
No. of families	32	178	290	236	64

Is this result consistent with the hypothesis that male and female births are equally probable ?

   (b) Write a short note on ANOVA for two way classified data.

UNIT – V

9. (a) Write down the order of convergence of Newton-Raphson method.

   (b) Write Simpson's $\frac{3}{8}$ th rule.

   (c) Distinguish between +ve and –ve correlation.

   (d) Distinguish between Correlation and Regression.

   (e) Write a short note on application of χ^2 test.

   (f) From a bag contain 4 white and 5 black balls, 3 balls are drawn at random. What are the odds against these being all black ?

(b) Using Simpson's $\frac{1}{3}$rd rule to evaluate $\int \frac{4dx}{x}$ using six sub-intervals and hence find approximate value of $\log_e 4$.

UNIT – II

3. (a) The contents of urns I, II and III are as follows :

1 white, 2 black and 3 red balls,

2 white, 1 black and 1 red balls, and

4 white, 5 black and 3 red balls.

One urn is chosen at random and two balls drawn from it. They happen to be white and red. What is the probability that they will come from urns II.

(b) Write a short note on classical, statistical definition of probability.

4. (a) A bag contains 50 tickets numbered 1, 2, 3, ..., 50 of which five are drawn at random and arranged in ascending order of the magnitude $(x_1 < x_2 < x_3 < x_4 < x_5)$. What is the probability that $x_3 = 30$?

(b) Two cards are drawn at random from a well shuffled pack of 52 cards. Show that the chances of drawing two aces es $\frac{1}{221}$.

UNIT – III

5. (a) Calculate Karl Pearson's coefficient of correlation for data given below :

X	1	2	3	4	5
Y	6	8	10	2	4

(b) Calculate rank coefficient of correlation with the help of following data :

X	48	33	40	9	16	16	65	24	16	57
Y	13	13	24	6	15	4	20	9	6	19

6. (a) Obtain the regression coefficient from the following data :

X	7	8	4	5	6
Y	13	12	7	10	8

Also, calculate the coefficient of correlation.

(b) Find out regression coefficients from the following data. Also estimate the value of x for $y = 72$:

x	20	22	25	30	35
y	25	28	30	36	32

UNIT – IV

7. (a) The heights of 10 males of a given locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 inches. Is it reasonable to believe that the average height is greater than 64 inches ? Test at 5% significance level assuming that for 9 degrees of freedom $P(t > 1.83) = 0.05$.

(b) It is believed that the precision (as measured by the variances) of an instrument is no more than 0.16. Write down the null and alternative hypothesis for testing this belief. Carry out the test at 1% level given 11 measurements of the same subject on the instrument :

2.5, 2.3, 2.4, 2.3, 2.5, 2.7, 2.5, 2.6, 2.6, 2.7, 2.5

P. T. O.