

**322304**

Jan. 2022

**B.Sc. (Chemistry) - IIIrd SEMESTER  
Statistics and Infinite Series (OMTH-302)**

Time : 90 Minutes]

[Max. Marks : 25

*Instructions :*

1. It is compulsory to answer all the questions (1 mark each) of Part-A in short.
2. Answer any three questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

**PART-A**

1. (a) A sequence is defined by  $u_n = u_{n-1} + u_{n-2}$ , when  $u_1 = 1, u_2 = 2$ . Write its fifth term. (1)  
(b) Find the 17th term of the arithmetic progression with first term 5 and common difference 2. (1)  
(c) Find the sum of the series  $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$  (1)  
(d) Define null sequence. (1)  
(e) A ball is drawn at random from a box containing 6 red balls, 4 white balls, and 5 blue balls. Determine the probability that it is not red. (1)

- (f) The arithmetic mean of four numbers  $x_1, x_2, x_3, x_4$  is 4. What will be the AM of

$$x_1 - 3, x_2 - 3, x_3 - 3, x_4 - 3? \quad (1)$$

- (g) Define mutually exclusive event. (1)

- (h) Two unbiased die are thrown together. Find the probability of getting 3 in both the die. (1)

- (i) If  $P(A) = \frac{1}{2}$ ,  $P(B) = \frac{1}{3}$ ,  $P(A \cap B) = \frac{1}{4}$ , find  $P(\bar{A} \cup \bar{B})$ . (1)

- (j) A person travelled 20 hours at 5 km. per hour and next 24 hours at 4 km. per hour. What is his average speed? (1)

### PART-B

2. (a) Calculate the mean weight from the following table : (2)

Weight (lbs)	95-105	105-115	115-125	125-135	Total
No. of students	20	26	38	16	100

- (b) The arithmetic mean of the following frequency distribution is 1.46.

No. of accidents	0	1	2	3	4	5	Total
No. of days	46	$f_1$	$f_2$	25	10	5	200

Find the values of  $f_1$  and  $f_2$ . (3)

3. (a) There are four persons in a company. Find the probability that all of them have different birth dates. (2)

- (b) There are two identical urns containing respectively 5 white, 3 red balls and 4 white, 6 red balls. An urn is chosen at random and a ball is drawn from it. Find the probability that the ball is white. Also find if the ball drawn is white, what is the probability that it is from the first urn? (3)

4. (a) The sum to infinity of a GP is four times the first term. Find the common ratio. (2)

- (b) Find the sum of the series  $1 + 3.5 + 6 + 8.5 + \dots + 101$ . (3)

5. (a) Test the convergence of the sequence  $s_n = 2 + (-1)^n$ . (2)

- (b) Show that the sequence  $\left\{ \frac{1}{3n+5} \right\}$  is monotonically decreasing and convergent. (3)

6. Test the convergence of the following series

$$\frac{1}{1+2^{-1}} + \frac{2}{1+2^{-2}} + \frac{3}{1+2^{-3}} + \dots \quad (5)$$