**Semester –IV** **Subject: Mathematics IV**

**Question Bank for April 22 examinations**

**SHORT ANSWER TYPE QUESTIONS**

1. Find the GCD and LCM of 7!, 8! and 9!.

2. Compute $\frac{20!-19!}{18!}$

3. If (n+ 3) ! = 56 [ (n-1)!] , find n.

4. If P(5,r) = P (6, r-1), find r.

5. If ${}^{n+5}P_{n+1} = \frac{11(n-1)}{2}\ {}^{n+3}P_{n}$ , Find n.

6. How many 8 digit telephone numbers can be constructed with digit 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 if each number starts with 23 and no digit appears more than once.

7. In how many ways can 6 boys and 5 girls be arranged for a group of photograph if the girls are to sit on chairs in a row and the boys are to stand in a row behind them?

8. How many words can be formed with the letters of the word 'UNIVERSITY', such that the vowels always remains together?

9. In how many ways can the letters of the 'DIRECTOR' be arranged so that the three vowels are never together?

10. Out of 7 men and 4 ladies a committee of 5 is to be formed. In how many ways can his be done so as to include at least 3 ladies?

11. Using binomial theorem expand $(2x + 3y)^4$ .

12. Compute $(99)^4$ , using binomial theorem.

13. Find the 5th term from the end in the expansion $(3x - \frac{1}{x2})$.

14. Find 8th term in the expansion of $(2x + 3y)^9$ .

15. Find the probability of getting a multiple of 2 or 3 when a die is thrown.

16. A coin is tossed. If head comes, the coin is tossed again and if tail comes, a die is thrown. Find the probability of getting (i) 2 heads (ii) tail and even number

17. Find the Probability that in random arrangement of the letters of the word 'FORTUNATES', two 'T' comes together.

18. If P(A) = 0.4, P(B) = 0.8 and P(B/A) = 0.6, Find P (A/B) and P(A U B).

19. A coin tossed three times, if head occurs on first two tosses. Find the probability of getting head on third toss.

20. If P (not B) = 0.65, P(A U B) = 0.85 and A and B are independent events, then find P(A).

21. A random variable X has the following distribution.

| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| P(X) | A | 3a | 5a | 7a | 9a | 11a | 13a | 15a | 17a |

Determine the value of a

22. A die is thrown at random. What is the expectation of the number on it?

23. Define Interpolation and Extrapolation?

## LONG ANSWER TYPE QUESTIONS

1. Estimate the number of workers failing in the earning group of Rs. 2500 to Rs. 3500 from the following table.

| Earnings in Rs. | No. of workers |
|---|---|
| Less than 1000 | 50 |
| Less than 2000 | 150 |
| Less than 3000 | 300 |
| Less than 4000 | 500 |
| Less than 5000 | 700 |
| Less than 6000 | 800 |

2. Given: sin $45^o$ = 0.7071, sin $50^o$ = 0.7660, $55^o$ = 0.8192, sin $60^o$ = 0.8660, find sin $52^o$.

3. Find out the divided difference of f(x) ; given that:

| x : | 1 | 2 | 4 | 7 | 12 |
|---|---|---|---|---|---|
| f(x): | 22 | 30 | 82 | 106 | 216 |

4. The mean and variance of a binomial distribution are respectively are 3 and 2 respectively. Find the probability that the variable takes the values less than or less to 1.

5. 4 unbiased coins are tossed 256 times calculate the mean and standard deviation of the number of heads.

6. If two dice are rolled 12 times, obtain the mean and the variance of the distribution of success, if getting a total greater than 4 is a success.

7. If on an average 8 ships out of 10 arrive safely at a port, find the mean and standard deviation of the number of ships arriving safely out of total of 1600 ships.

8. Find the variance for the following distribution:

| X | 8 | 12 | 16 | 20 | 24 |
|---|---|---|---|---|---|
| P(X) | 1/8 | 1/6 | 3/8 | ¼ | 1/12 |

9. $X_1$ and $X_2$ be two independent random variables having variances k and 2 respectively. If the variance of $Y = 3X_2 - X_1$ is 25. Find the value of K.

10. A coin is tossed till a tail appears. What is the expected number of tosses?

11. A box contains 12 bulbs out of which 3 are defective. If 3 bulbs are drawn at random from the box, find the expected number of defective bulbs drawn.

12. An urn contains 5 white and 3 black balls. Find the probability distribution of the number of black balls in the random draw of three balls.

13. If a machine is correctly set up, it will produce 90% of acceptable items. If it is incorrectly set up, it will produce 30% of acceptable items. Past experience shows that 80% of the set-ups are correctly done. If after a certain setup, first item produced is acceptable, what is the probability that the machine is correctly set up?

14. A man is known to speak truth 3 out of 4 times. He throws a die and reports that it is a six. Find the probability that it is actually a six?

15. If P(A) = 1/8, P(A/B) = ¼ and P(B/A) = 1/8. Check whether.

(i) A and B are mutually exhaustive events. (ii) A and B are independent events

16. A Class contains of 100 students, 25 of them are girls and 75 boys, 20 of them are rich and remaining poor, 40 of them are fair complexioned. What is the probability of selecting a fair complexioned rich girl?

17. There are 10 professors and 20 students out of whom a committee of 2 professors and 3 students is to be formed. Find the number of ways in which this can be done. Also, find how many ways of these committees:

a) a particular professor is included
b) a particular student is included
c) a particular student is excluded.

18. A person has 12 friends of whom 8 are relatives. In how many ways can he invite 7 friends such that atleast 5 of them may be relatives.

19. Using binomial theorem find the value of $(3 + \sqrt{2})^5 - (3 - \sqrt{2})^5$

20. Find the middle term in the expansion of $( 3x - x^3/6)^9$.