FYUGP 2nd Semester Final Examination, 2026

MULTI DISCIPLINARY COURSE

Paper Code- MDC0201203N

(Foundation of Mathematical Sciences-II)

Full Marks: 45 **Time: 2 hours**

1. Answer the following questions: $1 \times 5 = 5$

(a) What is the negative of the statement "All birds can fly."

(b) If statement p stands for "11 is prime" and statement q stands for "20 is odd", then find the truth value of $p \Leftrightarrow q$

(c) Fill the blank in the following series :

$$M_1A, L_3b, K_5C, J_7D, ___$$

(d) What is the unit of area?

(e) Give the definition of dispersion

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2. Answer any five of the following questions: $2 \times 5 = 10$

(a) A restaurant offers 3 drinks and 4 snacks. How many different combinations can be made?

(b) If '+' means '÷', '−' means '+', '×' means '−' and '÷' means '×', the find the value of $16 + 4 - 3 \div 2$.

(c) Solve $9 + x \leq 18 - 2x$, when x is an integer.

(d) The average of three consecutive even numbers is 20. Find the numbers.

(e) If GARDEN=123456, then DANGER=?

(f) IF A is the brother of B, C is the mother of B, and D is the father of C, then how is D related to A?

(g) A polygon has 20 diagonals. Find the number of sides.

(h) Write the conditions for a distribution to be said "skewed distribution".

(i) What are the characteristics of an ideal measure of dispersion?

(j) Write the formula for obtaining 1st quartile and 3rd quartile for a grouped frequency distribution.

3. Answer any four of the following: **$5 \times 4 = 20$**

(a) Select the odd word from the given alternative: Bhopal, Chennai, Odisha, Ranchi.

Also find the missing number.

64	36	2
81	25	4
144	16	?

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(b) How many 4-digit numbers can be formed from 1, 2, 3, 4, 5, 6 that are divisible by 2?

(c) Solve the following:

1. Evaluate 8!.
2. A committee of 6 members is to be formed from 7 men and 5 women. Find the number of way in which the committee can be formed if it contains exactly 3 women.

(d) If the second and third terms in the expansion of $(x+y)^n$ are 20 and 15 respectively, find n.

(e) Prove by mathematical induction that

$$1^2 + 2^2 + 3^2 + 4^2 + \cdots . + n^2 = \frac{n(n+1)(n+2)}{6}.$$

(f) Find the 20th term and sum of first 20th term of the arithmetic progression(AP)

$$3, 7, 11, 15, \ldots.$$

(g) Describe the various measures of dispersion?

(h) Prove that $\sigma^2{}_x = \frac{1}{N}\sum f_i x_i^2 - \left(\frac{1}{N}\sum f_i x_i\right)^2$

4. Answer any one of the following: **$10 \times 1 = 10$**

(a) The length, breadth and height of a cuboid are in the ratio 5: 4: 3 . If the total surface area of the cuboid is 376 cm^2, find

i) The length, breadth and height of the cuboid.

ii) The volume of the cuboid.

iii) The length of the diagonal of the cuboid.

4+3+3

(b) Using binomial theorem,

i) Expand $\left(1+\frac{x}{2}\right)^5$ up to the fourth term.

ii) Find the coefficient of x^3.

iii) Hence find the value of the expansion when $x = 2$.

6+1+3

(c) Define Correlation Coefficient? Show that Correlation Co-efficient is independent of change of origin and scale

(d) Calculate the mean and standard deviation for the following table giving the age distribution of 542 members of a club:

Age (in years) :	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of members:	3	61	132	153	140	51	2

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