QP CODE: D3BMT2401	(Pages: 3)	Reg. No : .....
		Name : .....

Third Semester FYUGP Degree Examination November 2025

Multi-Disciplinary Courses (MDC)

MAT3FM105(2) : Matrices and Basics of Probability Theory

(Credits: 3)

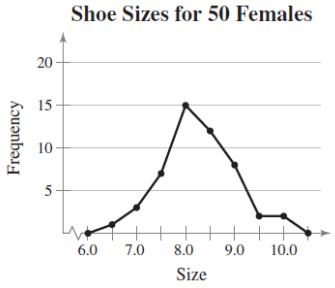
Time: 1.5 Hours **Maximum Marks: 50**

Section A

Answer the following questions. Each carries 2 marks (Ceiling: 16 marks)

1.	Determine the inverse of $\begin{pmatrix} \frac{1}{2} & \frac{2}{3} \\ -\frac{1}{3} & -\frac{3}{5} \end{pmatrix}$.	BL1	CO1
2.	Solve using matrices, $2x - y = 5$ $3x + 4y = 6$	BL2	CO1, CO2
3.	Define mean.	BL1	CO3
4.	What is the difference between independent and dependent events?	BL1	CO3
5.	Solve the following system of equations using the Gaussian elimination method: $5x - 4y = 6$ $2x + y = 11$	BL2	CO1, CO2
6.	Let $D = \begin{pmatrix} 4 & -7 & 6 \\ -2 & 4 & 0 \\ 5 & 7 & -4 \end{pmatrix}$, $E = \begin{pmatrix} 3 & 6 & 2 \\ 5 & -3 & 7 \\ -1 & 0 & 2 \end{pmatrix}$, $F = \begin{pmatrix} 3 & 2 & 6 \\ -1.6 & 3.8 & -1.9 \\ 5.3 & 3.4 & -4.8 \end{pmatrix}$, Find $-5D - 3E + 4F$.	BL2	CO1
7.	Last year a company with 56 employees spent a total of $3,540,745 on employees salaries. Does the amount spent describe a population parameter or a sample statistic?	BL2	CO3
8.	Given a data set, how do you know whether to calculate σ or s.	BL2	CO3

(PTO)

9.	Determine the number of outcomes in the event. Then decide whether the event is a simple event or not. Explain your reasoning. i) A computer is used to randomly select a number from 1 to 2000. Event A is selecting the number 253. ii) A computer is used to randomly select a number from 1 to 4000. Event B is selecting a number less than 500.	BL2	CO3
10.	Use the frequency polygon to identify the class with the greatest, and the class with the least, frequency. 	BL2	CO3

Section B

Answer the following questions. Each carries 6 marks (Ceiling: 24 Marks)

11.	The relationship between the displacement s, velocity v, and acceleration a of a piston is given by the equations: $s + 2v + 2a = 4$ $3s - v + 4a = 25$ $3s + 2v - a = -4$ Use Cramer's rule to find the values of $s,\ v$ and a.	BL2	CO1, CO2
12.	Find the adjoint of $\begin{pmatrix} 3 & 6 & 1 \\ 2 & 5 & -2 \\ 3 & 7 & -1 \end{pmatrix}$.	BL2	CO1
13.	i) Define interquartile range. ii) Find the interquartile range of the data set 38 33 40 42 34 27 44 38 32 34 45 32 23 46 27 23 30 27 41 22 26 45 31 26 19. Are there any outliers?	BL2	CO3
14.	In an experiment of rolling a die, find each probability. i) Rolling a 5 or a number greater than 3. ii) Rolling a number less than 4 or an even number. iii) Rolling a 2 or an odd number.	BL2	CO3

15.	i) A student advisory board consists of 17 members. Three members serve as the board's chair, secretary, and webmaster. Each member is equally likely to serve in any of the positions. What is the probability of selecting at random the three members who currently hold the three positions? ii)Find the probability of being dealt 5 diamonds from a standard deck of 52 playing cards. iii) The number of four-letter passwords that can be created when no letter can be repeated.	BL2	CO3
	Section C		
	Answer any one question. Each carries 10 marks (1 x 10 = 10 Marks)		
16.	Solve using determinants: $1.2p - 2.3q - 3.1r + 10.1 = 0$ $4.7p + 3.8q - 5.3r - 21.5 = 0$ $3.7p - 8.3q + 7.4r + 28.1 = 0$	BL2	CO1, CO2
17.	Construct a frequency distribution and a relative frequency histogram for the data set using five classes. Which class has the greatest relative frequency and which has the least relative frequency? Data set : Rating from 1(lowest) to 10 (highest) provided by 24 people after taste-testing a new soft drink flavor 5 7 4 5 7 8 10 6 9 5 7 6 8 2 9 7 8 1 3 10 8 8 7 9	BL2	CO3
	CO : Course Outcome		
	BL : Bloom's Taxonomy Levels (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)		