NAVRACHANA UNIVERSITY
a UGC recognized University

School: School of Engineering and Technology
Program/s: B.Tech EEE
Year: 2nd   **Semester:** 3rd
Examination: End Semester Examination
Examination year: December-2021

Course Code: MA224   **Course Name:** Mathematics III
Date: 01/12/2021
Time: 08:30 am to 10:30 am

Total Marks: 40
Total Pages: 1

Instructions:

→ Write each answer on a new page.
→ Use of a calculator is permitted/not permitted.
→ *COs=Course Outcome mapping. # BTL=Bloom'sTaxonomy Level mapping

Q. No.		Details	Marks	COs*	BTL#
Q.1			**10**		
	i)	For the Binomial distribution, the probability for the random variable X for X=r, i.e, P(X=r)=_____.			
	ii)	If a pair of coins is tossed then the expected value of the number of heads is _____.			
	iii)	Two marbles are drawn successively from a box containing 3 black and 4 white marbles. Find the probability that both the marbles are black if the first marble is not replaced before the second drawing.		CO1 CO2	BT1, BT2
	iv)	Average number of accidents on any day on a national highway is 1.8. Determine the probability that the accidents are at most one given that $e^{-1.8} = 0.16529$			
Q.2	i)	Area of normal curve between $\mu - 3\sigma$ and $\mu + 3\sigma$ is (a) 0.95 (b) 0.997 (c) 1 (d) none of these.	**10**		
	ii)	If the probability density function is given by $f(x) = \frac{1}{\sigma}e^{-\frac{x}{\sigma}}$, $0 \le x < \infty$, then the distribution is (a) Poisson (b)Gamma (c) Exponential (d)Beta distribution.			
	iii)	The average height of soldiers of a country is given as 68.22 inches with variance 10.8 square inches. How many soldiers out of 1000 would you expect to be over 72 inches tall? Given that area under the normal curve between z=0 and z=1.15 is 0.3746.		CO3 CO4 CO5	BT1, BT2 BT4
	iv)	If the probability density function is given as $f(x) = \begin{cases} kx^3 & 0 \le x \le 3 \\ 0 & otherwise \end{cases}$ find the value of "k" and the probability between $x = \frac{1}{2}$ and $x = \frac{3}{2}$			
Q.3	i)	The real root of the equation $xlog_{10}x - 1.2 = 0$ lies between ____ and _____.	**10**		
	ii)	Form the forward difference table for the data $u_0 = 225$, $u_1 = 238$, $u_2 = 320$, $u_3 = 340$.		CO6 CO7	BT1 BT3, BT4
	iii)	The following table gives the value for $tanx$ for $0.10 \le x \le 0.30$. Find the value of tan (0.26).			

x	0.10	0.15	0.20	0.25	0.30
$tanx$	0.1003	0.1511	0.2027	0.2553	0.3093

	iv)	Given $u_{20} = 24.37,\ u_{22} = 49.28,\ u_{29} = 162.8\ and\ u_{32} = 240.5$. Find u_{28} by Newton's divided difference formula			
Q.4	i)	Write the formula for Simpson's one third rule for the function f(x,y) defined at the points $(x_0, y_0),\ (x_1, y_1), \dots (x_n, y_n)$.	10		
	ii)	Evaluate $\int_0^6 3x^2\ dx$ by dividing the interval [0,6] into six equal parts by applying Weddle's rule.		CO8 CO9	BT1 BT2, BT3, BT4
	iii)	Apply modified Euler's method to solve $\frac{dy}{dx} = x + 3y$ subject to $y(0) = 1$ and find the approximate value of $y(0.2)$.			
	iv)	Find $y(0.2)$ for the equation $\frac{dy}{dx} = -xy,\ y(0) = 1$, using Runge Kutta's method			

***********End of Question Paper************