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BTECH
(SEM II) THEORY EXAMINATION 2021-22
ELEMENTARY MATHEMATICS - II

Time: 3 Hours

Total Marks: 100

Notes:

- Attempt all sections and assume any missing data.
- Appropriate marks are allotted to each question, answer accordingly.

SECTION - A	Attempt all of following questions in brief	Marks (10×2=20)	CO
Q.140	Find $\int x \cos^2 x e^{2x-3} dx$		1
Q.140	Evaluate $\int_0^1 x^{11} \cos^2 x dx$.		1
Q.140	Form the differential equation of the family of circles touching the x-axis at origin.		2
Q.140	In a bank, principal increases continuously at of 5% per year. In how many years Rs 1000 double itself?		2
Q.140	Write all the unit vectors in XY-plane.		3
Q.140	Find the value of x for which $x(i + j + k)$ is a unit vector.		3
Q.140	Find the coordinates of the point where the line through the points A (3, 4, 1) and B (5, 1, 6) crosses the xy-plane.		4
Q.140	Find the direction cosines of the sides of the triangle whose vertices are (3, 5, -6), (-1, 1, 3) and (-5, -5, -2).		4
Q.140	Three cards are drawn successively, without replacement from a pack of 52 well shuffled cards. What is the probability that first two cards are kings and the third card drawn is an ace?		5
Q.141	Two cards are drawn successively with replacement from a well-shuffled deck of 52 cards. Find the probability distribution of the number of aces.		5

SECTION - B	Attempt any three of the following questions	Marks (3×10=30)	CO
Q.240	Find the area lying above $x -$ axis and included between the circle $x^2 + y^2 = 16$ and inside of the parabola $y^2 = 4x$.		3
Q.240	Find the equation of a curves passing through the point (5, 1). If the slope of the tangent to the curve at any point (x, y) is equal to the sum of $x -$ coordinate (abscissa) and the product of the $x -$ coordinate and $y -$ coordinate (ordinate) of the point.		3
Q.240	Show that the points A (3, -2, -8), B (5, 9, -2) and C (11, 3, 7) are collinear, and find the ratio in which B divides AC.		3
Q.240	Find the distance of the point (-1, 3, 10) from the point of intersection of the line $r = (2i - j + 2k) + \lambda(3i + 4j + 2k)$ and the plane $r \cdot (i - j + k) = 5$.		4
Q.240	Bag I contains 3 red and 4 black balls while another bag II contains 5 red and 6 black balls. One ball is drawn at random from one of the bag and it is found to be red. Find the probability that it was drawn from Bag II.		5