



ACE
Engineering College
(with a Difference in Excellence)

An AUTONOMOUS Institution

Question Paper Code:

MA301BS

ACE-R20

Semester Supplementary Examination
II B. Tech- I Semester- SEPTEMBER-2022
PROBABILITY AND STATISTICS & COMPLEX VARIABLES
(MECHANICAL ENGINEERING)

Time: 3 Hours

Max. Marks: 70

H. T. No

Answer any 5 Questions out of 8 Questions from the following
M=Marks

Q.No	Question	M																
1. a)	Of the three men, the chances that a politician, a business man or an academician will be appointed as a vice-chancellor(V.C.) of a University are 0.5,0.3, 0.2 respectively. Probability that research is promoted by these persons if they are appointed as V.C. are 0.3, 0.7,0.8 respectively. (i) Determine the probability that research is promoted. (ii) If research is promoted, what is the probability that V.C. is an academician.	7																
b)	If $f(x) = \begin{cases} kxe^{-x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$ is probability density function. Determine k and Mean of the density function.	7																
2. a)	Fit a binomial distribution to the following frequency distribution: <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>f</td> <td>13</td> <td>25</td> <td>52</td> <td>58</td> <td>32</td> <td>16</td> <td>4</td> </tr> </table>	x	0	1	2	3	4	5	6	f	13	25	52	58	32	16	4	7
x	0	1	2	3	4	5	6											
f	13	25	52	58	32	16	4											
b)	Derive mean and variance of poisson distribution.	7																
3. a)	Number of monthly breakdowns of a computer is a random variable having poisson distribution with mean equal to 1.8. Find the probability that the computer will function for a month (i) without a breakdown (ii) with only one breakdown and (iii) with at least one.	7																
b)	If X is a normal variate with mean 30 and standard deviation of 5. Find the probabilities that i) $26 \leq X \leq 40$, ii) $X \geq 45$, iii) $X \leq 22$	7																
4. a)	An ambulance service claims that it takes on the average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the claim at 0.05 level of significance.	7																
b)	A process for making certain ball bearings is under control if the diameters of the bearings have a mean of 0.500 cm. If a random sample of 10 of these bearings has a mean diameter of 0.5060 cm and S.D. of 0.0040 cm, is the process under control.	7																

5. a)	A sample of 64 students have a mean weight of 70 kgs. Can this be regarded as a sample from a population with mean weight 56 kgs and standard deviation 25 kgs.	7
b)	A random sample of 500 pineapples was taken from a large consignment and 65 were found to be bad. Find the percentage of bad pineapples in the consignment.	7
6. a)	If $f(z)$ is a regular function of z , P.T $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) f(z) ^2 = 4 f'(z) ^2$	7
b)	Show that $u=e^{-x}(x\sin y - y\cos y)$ is harmonic	7
7. a)	Show that the function $f(z)=\sqrt{ xy }$ is not analytic at origin, although C-R equations are satisfied at that point.	7
b)	Evaluate $\int_C \frac{\cos \pi z^2}{(z-1)(z-2)^3} dz$ where C is $ z =3$ by using Cauchy's residue theorem.	7
8. a)	Find the Laurent series expansion of $\frac{1}{z^2 - 4z + 3}$ for a) $1 < z < 3$ b) $ z < 1$ c) $ z > 3$	7
b)	Determine the bilinear transformation that maps from $(0, -i, 2i)$ to $(5i, \infty, -\frac{i}{3})$.	7