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Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (ECE) (Sem.–5)

MATHEMATICS III

Subject Code : BTAMXXX18

M.Code : 78750

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Write briefly :

1. Find the Z-Transform of a^k.
2. Prove that $L(e^{at}) = \frac{1}{s-a}$ if $s > a$.
3. State first shifting theorem in Laplace transformation.
4. State the formula to calculate the Fourier coefficients.
5. What are the Dirichlet's conditions for Fourier Series?
6. State the shifting property in Z-Transform.
7. A coin is tossed successively three times. Determine the probability of getting

   (*i*) Exactly two head (ii) at least two heads
8. Define Probability Density Function (P.D.F).
9. Determine the Binomial Distribution when mean is 9 and whose standard deviation is $\frac{3}{2}$.
10. Write a short note on Correlation.

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SECTION-B

11. Calculate the coefficient of rank correlation from the data given as :

Marks in Statistics	20	30	40	50	60	70	80
Marks in Company Law	14	5	30	32	40	45	65

12. A die is thrown 10 times. If getting an even number is a success. What is the probability of getting at least 6 successes?

13. Find the z-transform of $(i)\ \sin^2 3t$ $(ii)\ \cos^3 t$

14. State and prove Convolution theorem for Fourier Transforms.

15. Evaluate $L^{-1}\left(\log\frac{s+1}{s-1}\right)$

SECTION-C

16. Prove that $x\cos x = -\frac{1}{2}\sin x + 2\sum_{n=2}^{\infty}\frac{(-1)^n}{n^2-1}\sin nx$ for $x \in (-\pi\ \pi)$.

17. Solve $6x(k+2) - x(k+1) - x(k) = 0$; $x(0) = 0$; $x(1) = 1$ by using Z-Transforms.

18. Fit the curve $y = a + bx^2$ to the data :

x	10	20	30	40	50
y	8	10	15	21	30

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NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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