G 1582

Reg. No..

Name..

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

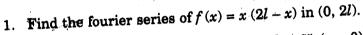### EN 010 401—ENGINEERING MATHEMATICS–III

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]
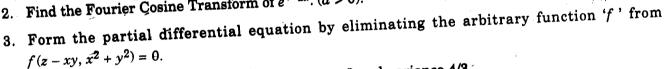
(Common for all branches)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Find the fourier series of $f(x) = x(2l - x)$ in $(0, 2l)$.

2. Find the Fourier Cosine Transform of e^{-ax}. $(a > 0)$.

3. Form the partial differential equation by eliminating the arbitrary function 'f' from $f(z - xy, x^2 + y^2) = 0$.

4. Find the binomial distribution which has mean 2 and variance 4/3.

5. Define type I and type II error.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Find the Fourier series expansion of $f(x) = x^2 + x$ in $(-2, 2)$.

7. Find the Fourier transform of unit step function.

8. Solve $x^4 p^2 - yzq - z^2 = 0$.

9. A random variable X has a Poisson distribution of $\sqrt{2}$ P $(X \leq 1) = $ P $(X \leq 2)$ find P $(X = 0)$.

10. A random sample is taken from a normal population with mean 30 and standard deviation 4. How large a sample should be taken of the sample is to be between 25 and 35 with probability 0.98 ?

(5 × 5 = 25 marks)

Turn over

 G

Part C

Answer all questions.

Each full question carries 12 marks.

11. Find the Fourier series $f(x) = |\cos x|$ in $-\pi \le x \le \pi$.

Or

12. Find the Fourier series expansion of :

$$f(x) = \begin{cases} 1, & 0 < x < 1 \\ 2, & 1 < x < 3. \end{cases}$$

13. Find the Fourier Transform of $f(x)$ if :

$$f(x) = \begin{cases} 1 - |x| & |x| < 1 \\ 0, & |x| > 1, \end{cases}$$

Hence prove that $\displaystyle\int_0^\infty \frac{\sin^4 x}{x^4}\, dx = \frac{\pi}{3}$.

14. Find $f(x)$ of its Fourier sine transform is $\dfrac{s}{s^2 + 1}$.

15. Solve $z^2 (p^2 + q^2 + 1) = c^2$.

Or

16. Solve $(pq - p - q)(z - px - qy) = pq$.

17. In a normal distribution 7% of the items are under 35 and 10% of the items are above 55. Calculate the mean and variance.

Or

18. Fit a Binomial distribution to the following frequency distribution :

x :	0	1	2	3	4	5	6
f :	13	25	52	58	32	16	4

19. Two independent samples of size 7 and 8 item here the following values :

Sample I :	10	12	10	14	10	9	8	
Sample II :	9	11	11	13	15	9	12	14

Do the estimates of means of population differ significantly at 5% level of significance.

Or

20. The mean life time of a sample of 9 items is 49.11 and standard deviation 2.47. Does this mean value differ significantly from the assured mean value 47.5.

(5 × 12 = 60 marks)