

G 1532

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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)

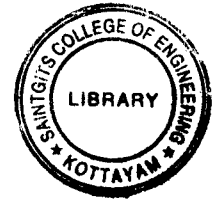
Time : Three Hours

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

## Part C

Answer all questions.  
Each full question carries 12 marks.

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

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  $\int_0^{\infty} \frac{\sin^4 x}{x^4} dx = \frac{\pi}{3}$ .

Or

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

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)

