M 26217

Reg. No. : ....

Name : ....

V Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, November 2014
(2007 Admn. Onwards)
PT 2K6/2K6 CE/ME/EE/EC/CS/IT/AEI 501 : ENGINEERING MATHEMATICS – IV

Time: 3 Hours   Max. Marks : 100

PART – A

1. A die is tossed twice. Getting a number greater than 4 is considered as success. Find the variance of the probability distribution of the number of success.

2. Ten coins are tossed simultaneously. Find the probability of getting at least seven heads.

3. A random sample of size n = 100 is taken from a population with $\sigma = 5.1$ given that sample mean is 21.6. Construct a 95% confidence interval for the population mean μ.

4. Explain null hypothesis and alternative hypothesis with examples.

5. Find the Fourier sine transform of $\dfrac{e^{-ax}}{x}$.

6. If F(S) is the complex Fourier transform of f(x), then prove that
   $F(f(x-a)) = e^{ias} F(s)$.

7. Show that $\int_{\frac{1}{2}} (x) = \sqrt{\frac{2}{\pi x}} \sin x$.

8. Prove that $\int_{-1}^{1} P_0(x)\, dx = 2$. **(8×5=40)**

PART – B

All questions carry **15** marks **each**. **(4×15=60)**

9. i) Derive the mean and variance of Binomial distribution.

   ii) Show that for a Poisson distribution with unit mean the mean deviation about mean is $\frac{2}{e}$ the SD.

OR

10. i) A car hire firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as a Poisson distribution with mean 1.5. Calculate the proportion of days on which

   a) there is no demand

   b) some demands are refused.

   ii) Of a large group of men 5% are under 60 inches in height, 40% are between 60 and 65 inches. Assuming a normal distribution find the mean and SD.

11. i) Random samples of sizes 500 and 600 are found to have means 11.5 and 10.9 respectively. Can the samples be regarded as random samples drawn from same population whose SD is 6.

   ii) An engineer is making engine parts with axle diameter 0.6 inches. A random sample of 10 parts shown a mean of 0.742 inches and SD 0.04. Test the hypothesis $H_0 : \mu = 0.6$ against $H_0 : \mu \neq 0.6$.

OR

12. i) The following observations came from a normal population 47, 49, 63, 45, 53. Test whether the mean of the distribution is 55 or not.

   ii) The SD of the scores of 10 candidates in an examination is 3.5. Is their justification in the belief that the SD of population is less than 3.

13. Solve Bessel's equation of order 'n'.

OR

14. Derive the generating function for $P_n(x)$.

15. i) Find the Fourier transform of $e^{-a|t|}$, a > 0.

   ii) Find the Fourier cosine transform of $f(x) = \dfrac{1}{x^2 + 1}$.

OR

16. i) Find the Fourier transform of cos at; t > 0.

   ii) If $F(f(t)) = \dfrac{1}{(1 + iw)^2}$ and f(t) = 0 for t < 0 find f(t) using convolution theorem.

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