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I-Sem. B. Tech (Engg. Phy)
Test 1, September 2012
(PH1002 / Introduction to Engineering Physics Profession)

Time : 1h **Max Marks : 20**

(Answer all questions)

1. If the probability density of a random variable is given by
   $f(x) = kx^3 \quad 0 < x < 1$, and
   $f(x) = 0 \qquad$ *elsewhere*
   find the value of k and the probability that the random variable takes on a value between (a) 1/4 and 3/4 and (b) greater than 2/3 (5 Marks)

2. What is meant by the uniform distribution? Derive the equations for the mean and the variance for a random variable with uniform distribution. (4 Marks)

3. A random variable has a normal distribution with σ=10. If the probability is 0.8212 that it will take on a value less than 82.5, what is the probability that it will take a value ~~less than~~ greater than 82.5? What is the probability that it will take a value greater than 58.3 ? (4 Marks)

4. If a random variable has a binomial distribution with $n=30$ and $p= 0.60$ use the normal approximation to determine the probabilities that it will take on a value (a) 14 (b) less than 12 (4 Marks)

5. If a random variable has a normal distribution, find the probability that it will take on a value (a) within one standard deviation of the mean (b) within three standard deviations of the mean. (3 Marks)

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