4. A continuous random variable X has p.d.f. $f(x) = 3x^2, 0 \le x \le 1$. Find a and b such that

(i) $P(X \le a) = P(X > a)$ and

(ii) $P(X > b) = 0.05$. 　　　　　　　　5

5. Urn A contains 2 white, 1 black and 3 red balls; urn B contains 3 white, 2 black and 4 red balls, and urn C contains 4 white, 3 black and 2 red balls. One urn is chosen at random and 2 balls are drawn. They happen to be red and black. What is the probability that both balls came from urn B? 　　　5

6. What are mean and variance of a random variable? Obtain the mean and variance of the random variable X whose p.d.f. is given by $f(x) = 3x^2, 0 \le x \le 1$.
　　　　　　　　　　　　　　1+4=5

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**Computer Science & Engineering /
Agricultural Engineering / Electronics &
Communication Engineering**

Course No.: ASH-202
(Mathematics-II)

Full Marks: 30
Pass Marks: 09/15

Time: 1½ hours

Note: 　1. All questions are compulsory.
　　　2. Answer parts of a question at a glance.
　　　3. Assume reasonable data whereever required
　　　4. The figures in the right margin indicate full marks for the question.

1. (a) What is a random variable? What is it used for? What are discrete and continuous random variables?

　　(b) What are probability mass function and probability density function? 　　3+2=5

2. Let X be a random variable such that: $P(X = -2) = P(X = -1)$, $P(X = 2) = P(X = 1)$ and $P(X > 0) = P(X < 0) = P(X = 0)$. Obtain the probability mass function and its distribution function. 　　　5

3. A manufacturing firm produces steel pipes in three plants with daily production volumes of 500, 1000 and 2000 units respectively. According to past experience it is known that the probabilities of defective outputs produced by the three plants are respectively 0.005, 0.008 and 0.010. If a pipe is selected at random from a day's total production and found to be defective, from which plant is that pipe likely to have come? 　　　5

Turn Over