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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS**

**SEPTEMBER/OCTOBER 2015 EXAMINATION**

**SCHOOL OF SCIENCE AND TECHNOLOGY**

**COUSRE CODE: STT 311**

**TIME: 3 HOURS**

**COURSE TITLE: PROBABILITY DISTRIBUTION II TOTAL:** 70

**INSTRUCTION: COMPLETE ANSWERS TO ANY FIVE (5) QUESTIONS BEAR FULL MARKS**

1. There are 120 applicants for a 30 vacancies at the Nigerian Custom service, some are university graduates and some are not, some have at least ten years’ experience and some have not. The summary of the application received being:

*University Non university*

*graduates graduates*

|  |  |
| --- | --- |
| 15 | 35 |
| 25 | 45 |

At least ten years’ experience

Less than ten years’ experience

Assume that the interview in conducted in a random order, Q is the event that the first applicant interviewed is a university graduate , and N is the event that the first applicant interviewed has at least ten years’ experience.

1. Determine each of the following probabilities from the given table.
2. ; (ii) ; (iii) 

(iv) ; (v) ; (vi)  (8 Marks)

1. Use the result of (a) to verify that
2.  (3 Marks)
3.  (3 Marks)
4. (a) Two fruits are selected at random and remove in succession from a container containing five mangoes and three oranges.
5. List the element of the sample space, the corresponding probabilities, and the corresponding values r of the random variable R, where R is number of mangoes selected 4 marks
6. Find the distribution function of the total number of heads obtained in four 7 marks

tosses of a balanced coin .

(b) Draw a graph representing the distribution function of this experiment? 3 marks

3 (a) The joint density function of two continuous random variables x and y is



(i). Find the value of the constant K 3marks

(ii). Find 3marks

(iii). Find . 2marks

(b) Given the joint probability density function



of the two random variables X and Y,

Find  where A is the region  6marks

4 (a) Define probability Measure indicating relevant properties. 4marks

(b) The probability function of a random variable x is given by f(x)

 

Where p is a constant, find

1. The value of p
2. P(0≤x<3)
3. P(x>1) 10marks

5. (a) If the joint probability density of X and Y is given by

  find where A is the region  7 marks

*for*

(b) State and Prove Baye’s Theorem. 7marks

6 A pair fair dice is tossed. We obtain the finite equiprobable space consisting of the 36 ordered pairs of numbers between 1 and 6, given as

S = ((1,1), (1,2), . . . , (6,6)}. Let X assign to each point (a,b) in S, the maximum of its numbers i.e X(a,b) = max(a,b). Then

1. Show that X is a random variable with the image set X(S) = {1, 2, . . . , 6} 2marks
2. Compute the distribution f(x) 2marks
3. Compute also the expected value of X 2marks
4. Compute the expected value of Y, if Y assigns to each point (a,b) in S, the sum of its numbers a+b. 4marks
5. Indicate the g(y) graphically. 4marks .