

**W1-2-60-1-6**

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

# **UNIVERSITY EXAMINATIONS 2016/2017**

FIRST YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY

**SMA 2100: DISCRETE MATHEMATICS**

**DATE: APRIL 2017 TIME: 2 HOURS**

**INSTRUCTIONS:**

**ANSWER QUESTION ONE [COMPULSORY] AND ANY OTHER TWO QUESTIONS**

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**QUESTION ONE [COMPULSORY][3 MARKS]**

1. Define the following terms:
2. Subjective
3. Bijective
4. A set
5. Logic [4 marks]
6. Define the following type of numbers;
7. Natural numbers , N
8. Rational numbers, Q [2 marks]
9. If  and

Find

1. (gof)(x) and the domain
2. (fog) (x) and the domain [4 marks]
3. Determine whether the following are valid propositions
4. The moon is round
5. 5 +6 = 7
6. The population of Kenya is 43 million [3 marks]
7. Let :-

is odd and  and

 prime and 

1. Write down the elements in set P and set Q [2 marks]

Use :

1. Above to compute
2. 
3. 
4. P- Q
5. Q- P
6.  [6 marks]
7. Prove by induction that:

 [6 marks]

1. Construct truth table for

(i)conjunction - (AND)

(ii)Disjunction (OR) [4 marks]

**QUESTION TWO [20 MARKS]**

1. Construct truth tables for:

(i)  and

(ii)  and hence show that these statements are logically equivalent [10 marks]

1. Given that : 

Find :-

(i) 

(ii) 

(iii) 

1. 
2.  [1 mark]

**QUESTION THREE [20 MARKS]**

1. Define p, q and v as P : mathematics is easy

Q: mathematic is fun

R: mathematics is useful

Write in reasonable English, the proposition represented by

(i) 

(ii) 

(iii) 

(iv) 

(v) 

(vi) 

(vii)  [7 marks]

1. Given u={1,2,3,4,5,6,7,8,9,10}

A={1,5,7,10} B={5,6,8,10} and

C={4, 6, 8}

List the elements in the following sets

(i) 

(ii) 

(iii) An 

(iv) 

1. 
2. 
3. (i)
4.  [13 marks]

**QUESTION FOUR**

1. Write each of the following as a conditional statement

(i) One can pass this course only if one studies

(ii) A necessary condition for a person to vote is that, that person must be registered

(iii) A sufficient condition for water to be salty is that it be taken from the pacific ocean [6 marks]

1. Determine the domain and range of the following functions

(i)  [3 marks]

(ii)  [3 marks]

1. Given that

A={0,1,2,3,4,5} and

B={1,3,4,7, 9}

Find the following

(i) 

(ii) 

(iii) 

(iv)  [5 marks]

**QUESTION FIVE [20 MARKS]**

1. In a survey of two randomly chosen students, a marketing questionnaire included the following 3 questions

(i) do you own a TV?

(ii) do you own a car?

(iii) Do you own a TV and a car?

75 answered yes to (i) , 45 answered yes to (ii) and 35 answered yes to (iii) .

represent your answer in a venn diagram. Use your venn diagram to answer

the following [3 marks]

(i) How many students owned either a (or a Tv)?

(ii) How many students did not own either a car or a tv?

(iii) How many students owned a car but not a TV? [4 marks]

(iv) How many students did not own non car and a TV [4 marks]

1. Prove that  [4 marks]

(c)Let A=B=C=R, where R is the set of all real number;

Let  be defined by



And Let  be defined by 

Compute:

(i) 

(ii) 

(iii) 

(iv) 

(v) Comment on gof and fog [9 marks]