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**University Examinations 2015/2016**

FIRST YEAR FIRST SEMESTER EXAMINATION FOR CERTIFICATE IN BRIDGING MATHEMATICS

**SMB 0003: CALCULUS AND MATRICES**

 **DATE: NOVEMBER 2015 TIME: 11/2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***three*** *questions*

**QUESTION ONE (30 MARKS)**

1. Differentiate between a rational number and a real number. (2 Marks)
2. Given that A is a set of multiples of 5 less than 40 and B is a set of multiples of 7 less than 50, list the members of:
3. A
4. B
5. A (3 Marks)
6. Find the inverse of the function  (2 Marks)
7. Given that and and . Write down the function $fgh$ (3 Marks)
8. Evaluate the limit  (2 Marks)
9. Use the rule in bracket to differentiate the following;
10. product rule. (2 Marks)
11. (quotient rule) (2 Marks)
12. Find the equation of the tangent at the point (2,4) to the curve  (3 Marks)
13. For the function. Find the turning points and state their nature. (4 Marks)
14. Evaluate the definite integral  (3 Marks)
15. The distance S of an object form a fixed point is given by . Find its velocity at t=5 (2 Marks)
16. Given that find x given that the determinant is 0. (2 Marks)

**QUESTION TWO (10 MARKS)**

1. Use trapezoidal rule to approximate the area under the graph between x=2, and x=5 taking intervals of 0.5. (4 Marks)
2. Evaluate the integral  (2 Marks)
3. Given that list the members of:
4.  (2 Marks)
5.  (2 Marks)

**QUESTION THREE (10 MARKS)**

1. Two first class and one second class ticket for a certain journey are shs.1600. While two second class and three first class tickets cost shs.2,600. How much does each ticket cost? Use matrix method (4 Marks)
2. Use Simpson’s rule to estimate the area under the curve from the points  to  (4 Marks)
3. Evaluate the limit

**** (2 Marks)

**QUESTION FOUR (10 MARKS)**

1. Given that simplify  where  (3 Marks)
2. The equation of a curve is given by Find the stationery points and state their nature. (3 Marks)
3. A ball is kicked upwards after $t$ seconds its height $h $metres is given by Find the height, velocity and acceleration of the ball when . (4 Marks)

**QUESTION FIVE (10 MARKS)**

1. Determine the second derivative of the function  (2 Marks)
2. Given that and . Find the function fg. (3 Marks)
3. Find the equation of the tangent and the normal to the curve at the point where . (4 Marks)
4. Given that  and . Find . (1 Mark)

**QUESTION SIX (10 MARKS)**

1. Evaluate the limit

 (3 Marks)

1. Find the inverse of the function given that and  (3 Marks)
2. Find the instantaneous velocity of a falling object given that at $t=3.8$ seconds. (4 Marks)