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**University Examinations 2014/2015**

FIRST YEAR, SPECIAL /SUPPLEMENTARY EXAMINATION FOR CERTIFICATE IN BRIDGING MATHEMATICS

**SMB 0003: CALCULUS AND MATRICES**

**DATE: OCTOBER, 2015 TIME: HOURS**

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

**QUESTION ONE - (30 MARKS)**

1. Given thatP is a set of odd natural numbers less than 20 and Q is a set of prime numbers less than 20.

List the members of PnQ, PUQ (3 Marks)

1. If g(t) = . Find the natural domain for g(t) (3 Marks)
2. Given that , , ,write down the function FGH.

(3 Marks)

1. Evaluate the limit;

 (3 Marks)

1. Use the first principles to find the derivative with respect to x of the function defined as (4 Marks)
2. Find the derivative of the following using appropriate method;
3. (3 Marks)
4. (2 Marks)
5. Evaluate the integral;

 dx (3 Marks)

1. A ball is kicked upwards and after t seconds its height 5 metres is given by S=1+60t – 18t2. Find the height, velocity and acceleration of the ball when t = 5/3 seconds. (4 Marks)
2. For the function . Find the stationery values and distinguish between them. (2 Marks)

**QUESTION TWO (10 MARKS)**

1. Find the area enclosed by the curve the lines x = -2, x = 4 and the x-axis.

(3 Marks)

1. Find the equation of the line which passes through a point (-4,,6) and is parallel to the tangent to the curve at the point (3,8) (3 Marks)
2. Use Simson’s rule to estimate the area under the curve y = from the points where x = 0 up to x = 10 with an interval of 1 unit. (4 Marks)

**QUESTION THREE (10 MARKS)**

1. Using trapezoidal rule and strips of unit width estimate the area under the curve between lines x=1 and x=7. (4 Marks)
2. Evaluate the definite integral. (2 Marks)

 (3 Marks)

1. Evaluate the limit

  (3 Marks)

**QUESTION FOUR (10 MARKS)**

1. Determine the second derivative of the function; ) (3 Marks)
2. Given the function. Find the stationery points and state its nature.

(4 Marks)

1. Find the equations of the normal to the curve at the point x = 0

(3 Marks)

**QUESTION FIVE (10 MARKS)**

1. A particle moves along a straight line in such a way that its distance from a fixed point 0 on the line after t seconds is Smeters, where S=1/6. Find:
2. Its velocity during the 4th second. (2 Marks)
3. Its velocity during the 4th second. (2 Marks)
4. Its acceleration from t = 2 to t = 4 (2 Marks)
5. Solve the following system matrix method.

 (4 Marks)