Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
100 Level 2nd Semester Examination – Jan./Feb. 2016
BGE 131-3 Basic Mathematics and Engineering Technology

Uva Wellassa University

(Part B)

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Instructions to candidates
Duration: One(01) hour
Number of questions: Two(02) Essay Questions
Mark allocation: 100 mark
Scientific calculators are allowed.
Answer all questions

1.

a.

i. Define *speed*, *velocity* and *acceleration* of an object moving in a straight line. How is velocity different from speed? (20 mark)

ii. What is the relationship between force (F), mass (m) and acceleration (a). (03 mark)

iii. What is the SI unit of the force? (02 mark)

b. A certain force exerted on 5 kg weighted object for 1.2 seconds. It raises the velocity of the object from 1.8 m/s to 4.2 m/s.

i. Write down an equation to find the acceleration of the object using initial velocity (u), final velocity (v) and time (t). (10 mark)

ii. Find the change in velocity and acceleration of the object? (05 mark)

iii. Find the force exerted on the object. (05 mark)

iv. If the same force is applied for 2 seconds, how much does the velocity of the object change in 2 seconds? (05 mark)

2.

a. Write down the relationship among density (ρ), mass (m) and volume (v) of a substance. (05 mark)

b. What is the density of water at 4 °C? (05 mark)

c. A piece of wood that measures 3.0 cm by 6.0 cm by 4.0 cm has a mass of 80 g.

i. What is the volume of the piece of wood? (05 mark)

ii. What is the density of the wood? (05 mark)

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b. Find $\frac{dy}{dx}$ of the following functions.

i. $y = x^3 + 2x + 1$ (05 mark)

ii. $y = e^x(x + 1)$ (06 mark)

iii. $y = \frac{x^3}{x^2 + 1}$ (08 mark)

c. Integrate the following functions with respect to x.

i. $\int (x^2 + 2x + 1)dx$ (05 mark)

ii. $\int (2x + 1)^2 dx$ (05 mark)

iii. $\int_0^1 \frac{3}{3x + 7} dx$ (07 mark)