

(Part B)

**Instructions to candidates**

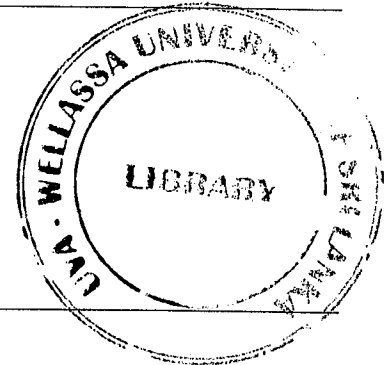
**Duration:** One(01) hour

**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 ( $\rho$ ), 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)

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)