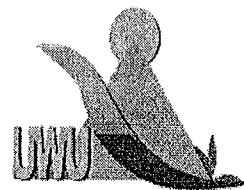
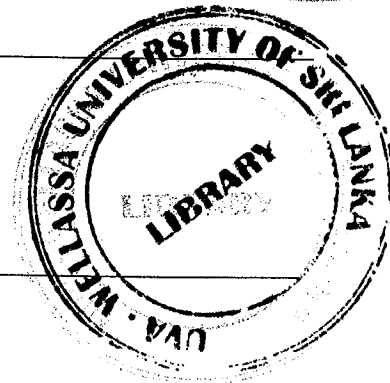


UvaWellassa University, Sri Lanka
End Semester Examination – August 2011
SCT 102-3 Basic Mathematics and Engineering Technology
(Repeat)



Time: Three (03) hours

This paper has two parts (Part A and B)
Answer the two parts separately
One and half hours for part B
Answer all questions



Part B

1. i. Define the terms velocity and wavelength applied to sound wave and state the relationship between velocity, frequency and wavelength.
ii. What is meant by echo? What are the conditions necessary for its formation?
iii. Why do echoes produced in an empty auditorium usually decrease when it is full of audience?
iv. A boy fires a gun and hears the echo 2 seconds later. If he is 480 m away from a wall, calculate the velocity of sound in air.

(30 marks)

2. i. (a) Five resistors are connected as shown in the figure Q2. Find the equivalent resistance between point A and B.

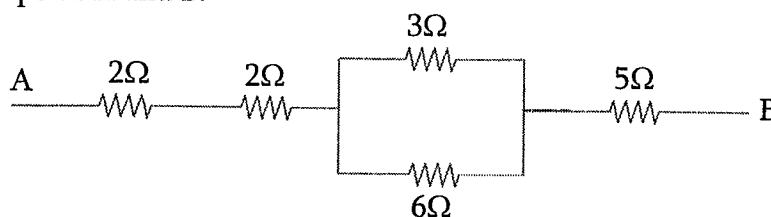


Figure Q2

- (b) If a 12V car battery is powering headlights that draw 2.0 A of current, what is the effective resistance in the circuit?
- ii. (a) Distinguish between converging and diverging lenses.
(b) An object of 2.0 cm high is situated in front of a concave mirror at a distance of 15.0 cm from the mirror that has radius of curvature of 10.0 cm. Using the ray diagram drawn to scale, find
 - a) the location
 - b) the height of the image

(40 marks)

3. i. Why you should wear seat belts when you drive? Explain it using Newton's laws.
- ii. A rocket moves straight upward, starting from rest with an acceleration of 29.4 m/s^2 . It runs out of fuel at the end of 4 s and continues to go upward, reaching a maximum height before falling back to Earth.
- (a) Draw a rough sketch to show the path of the rocket and mark the given data.
 - (b) Why the rocket continues going upward even after fuel ran out?
 - (c) Find the rocket's velocity and position at the end of 4 s.
 - (d) Find the maximum height the rocket reaches.
 - (e) Find the velocity the instant before the rocket crashes on the ground.
- Assume acceleration of gravity (g) = 9.8 ms^{-2}

(30 marks)