

Uva Wellassa University, Sri Lanka
End Semester Examination – June/July 2009
SCT 102-3 Basic Mathematics & Engineering
Technology

Time: Three (3) hours

Total 05 Questions

Answer All questions

This paper has Two parts (Part A and Part B)

Two hours (2) and Fifteen (15) Minutes for Part B

Calculators are NOT Allowed

PART - B

- 01)
 - i. What is Energy? Write five different energy sources. (5 marks)
 - ii. What is renewable energy? Explain using at least two examples. (10 marks)

- 02)
 - i. Explain energy conversion process of an engine. (5 marks)
 - ii. Name the parts in the figure below. Explain the functionality of a Gasoline (Petrol) Engine. (10 marks)

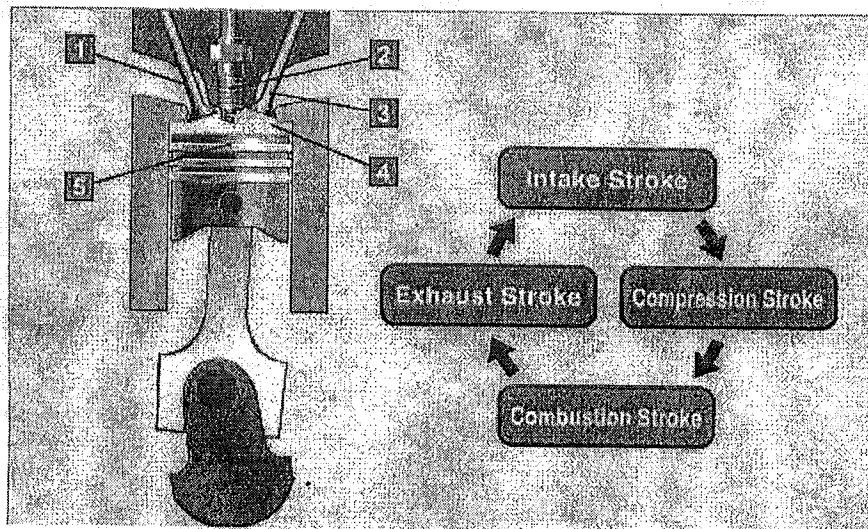


Figure Q1

03) Write short notes on FIVE of the followings.

- i. Diesel Engine
- ii. Valve Timing
- iii. Solar Tower
- iv. ABS (Anti-locking Brake System)
- v. Bio Diesel
- vi. Industrial Automation
- vii. Robotic Applications in the Industry

(15 marks)

04)

- i. State four direct impacts caused by equipment malfunction in an automated manufacturing process?
(4 marks)
- ii. The new trend in automatic manufacturing is letting workers repair their own machines. State three advantages of such a system.
(3 marks)
- iii. State 3 advantages of preventive maintenance?
(3 marks)
- iv. What are the main differences between machine repair and preventive maintenance?
(5 marks)

05)

(i) Simplify the followings

$$a) \frac{\sqrt[5]{32^{-2}} \times 5^0 \times 27^{\frac{2}{3}}}{\sqrt[3]{8^{-1}} \times \sqrt[3]{216}}$$

$$b) (0.25)^{\frac{1}{2}} \times 8^{\frac{1}{3}} \times (0.001)^{\frac{1}{3}}$$

$$c) \left(11\frac{1}{9}\right)^{-\frac{1}{2}} \times (0.81)^{-1.5}$$

$$d) \left(2^{\frac{1}{4}}b^4\right)^{\frac{1}{2}} \times \left(\frac{27a^6}{8b^3}\right)^{\frac{1}{3}}$$

(6 marks)

(ii) Find the value of "X"

$$a) 27^{x-\frac{1}{4}} = \sqrt[9]{9}$$

$$b) 4^{3x-1} \times \frac{1}{8^x} = 32$$

$$c) \log_x 18 + 2\log_x 6 - 3\log_x 2 - \log_x 3 = \frac{3}{2}$$

(6 marks)

(iii)

Both medicine and veterinary students are residing in hostel "A" and "B". Further particulars are given below

Hostel "A"

Course	No. of Students	Cost of Maintenance per student (Rs)
Medicine	22	2300.00
Veterinary	42	

Hostel "B"

Course	No. of Students	Cost of Maintenance per student (Rs)
Medicine	12	1000.00
Veterinary	0	

Write down a matrix or matrices for the above data.

(3 marks)