



**DEPARTMENT OF MECHANICAL ENGINEERING**  
**MONAD UNIVERSITY, HAPUR**

**Dated:-30/09/2016**

Course: EME-231, Strength of Materials

Assignment No: 1

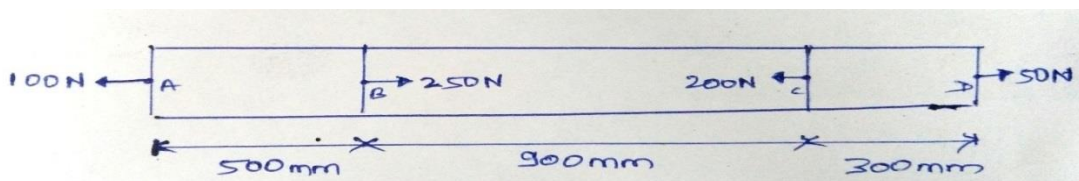
Due date of submission: 10/11/2016

Instructions

1. Write the responses to the assignment in your own handwriting & don't copy from other's assignment.
2. Submit the responses to your HoD within due date.
3. Write your name, programme, and Enrollment no. clearly at the top of the page.
4. Each question's part carries 5 marks.

Q.1

(a) The figure below shows a steel rod of  $50\text{mm}^2$  cross-sectional area. It is loaded at A, B, C and D as shown. If  $E=210\text{ GPa}$ . Find the total change in length of the rod.



- (b) Define (i) Poisson's ratio (ii) Bulk Modulus (iii) Young's modulus of elasticity  
(iv) Thermal stress (v) Strain

Q.2

(a) Explain Shear force and bending moment with proper sign convention.

(b) Derive the torsion equation  $\frac{T}{J} = \frac{\tau}{R} = \frac{C\theta}{L}$



**DEPARTMENT OF MECHANICAL ENGINEERING**  
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**Dated:-30/09/2016**

Course: EME-232, Material Science in Engineering

Assignment No: 1

Due date of submission: 10/11/2016

**Instructions**

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**Q.1**

- (a) Enumerate the various atomic models proposed by scientists over the last few decades.
- (b) Describe briefly historical prospective of material science. Explain future scope of material science in industry with suitable examples.

**Q.2**

- (a) Enumerate and sketch the basic seven crystal systems.
- (b) Define the term atomic radius. Calculate the atomic radius for the following cases:
  - (i) Simple Cubic structure
  - (ii) Body Centred Cubic structure
  - (iii) Face centred Cubic structure



**DEPARTMENT OF MECHANICAL ENGINEERING**  
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**Dated:-30/09/2016**

Course: EFM-233 , Fluid Mechanics

Assignment No: 1

Due date of submission: 10/11/2016

**Instructions**

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**Q.1**

(a) Define and explain Newton's law of viscosity. Explain the importance of viscosity in fluid motion. What is the effect of temperature on viscosity of water and that of air?

(b) A plate 0.040 mm distant from fixed plate, moves at 80 cm/s and requires a force of 5 N/m<sup>2</sup> to maintain this speed. Determine the fluid viscosity between the plates.

**Q.2**

(a) Derive an expression for the depth of Centre of pressure from free surface of liquid of an inclined plane surface submerged in the liquid.

(b) Distinguish between manometers and mechanical gauges. Write the different types of mechanical pressure gauges?



# DEPARTMENT OF MECHANICAL ENGINEERING

## MONAD UNIVERSITY, HAPUR

**Dated: - 30/09/2016.**

Course: ETD-234, Thermodynamics

Assignment No: 1

Due date of submission: 10/11/2016

### Instructions

1. Write the responses to the assignment in your own handwriting.
2. Submit the responses to your HoD within due date.
3. Write your name, programme, and Enrollment no. clearly at the top of the page.
4. Each question's part carries 5 marks.

### Q.1

a) Prove that the polytropic specific heat,  $C_n$  is given by equation

$$C_n = C_v (n - \gamma / n - 1) * \text{work done}$$

b) 10 kg of air is heated at constant pressure from a temperature of 1000c to 2000c.

Calculate the heat added during the process and also the change in internal energy.

Take gas constant R 0.287 KJ/KG and ratio of specific heats,  $\gamma = 1.4$

### Q.2

a) State the limitations of first law of thermodynamics and explain the second law. Also state the significance of Carnot cycle and Carnot engine in thermodynamics.

b) A reversible engine takes in 4800 kJ of heat from a reservoir at 800 K per minute and develops 20 kW power. Engine rejects heat to two reservoirs at 300 K and 360K.

Determine the heat rejected to each sink in kJ/min.



# DEPARTMENT OF MECHANICAL ENGINEERING

## MONAD UNIVERSITY, HAPUR

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**Dated: - 30/09/2016.**

Course: EIS 235, Industrial Sociology (All Branch)

Assignment No: 1

Due date of submission: 10/11/2016

### Instructions

1. Write the responses to the assignment in your own handwriting.
2. Submit the responses to your HoD within due date.
3. Write your name, programme, and Enrollment no. clearly at the top of the page.
4. Each question's part carries 5 marks.

Q1.

- (a) Discuss concept of industrialization.
- (b) Define the factory System.

Q2.

- (a) Discuss various scope of Industrial Sociology.
- (b) Make a comparison between Industrial Sociology and Economics.



**DEPARTMENT OF MECHANICAL ENGINEERING**  
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**Dated: - 30/09/2016.**

Course: EEM-236, ENGINEERING MATHEMATICS-III (All Branch)

Assignment No: 1

Due date of submission: 10/11/2016

Instructions

1. Write the responses to the assignment in your own handwriting.
2. Submit the responses to your HoD within due date.
3. Write your name, programme, and Enrollment no. clearly at the top of the page.
4. Each question's part carries 5 marks.

Q.1

a) If  $f(z)$  is a harmonic function of  $z$ , show that

$$\left\{ \frac{\partial}{\partial x} |f(z)| \right\}^2 + \left\{ \frac{\partial}{\partial y} |f(z)| \right\}^2 = |f'(z)|^2$$

b) Use residue calculus to evaluate the following integral.

$$\int_0^{2\pi} \frac{1}{5 - 4 \sin \theta} d\theta$$

Q.2

a) By contour integration, prove that  $\int_0^x \frac{\sin mx}{x} dx = \frac{\pi}{2}$

b) fit a straight line to the following data

X	0	1	2	3	4
Y	1.0	2.9	4.8	6.7	8.6

