Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2022

BC3ES06 Basic Mechanical Engineering

Programme: B.Sc.(CS) Branch/Specialisation: Computer Science

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q1 i. _____ is the resistance of a material to plastic deformation by indentation. **1**

(a) Toughness (b) Resilience (c) Hardness (d) Stiffness

ii. Modulus of Elasticity depends on- **1**

(a) Stress (b) Strain

(c) Applied force (d) None of these

iii. Entropy is a- **1**

(a) Path function, intensive property

(b) Path function, extensive property

(c) Point function, intensive property

(d) Point function, extensive property

iv. Which of the following is true for a closed system? **1**

(a) Mass entering = mass leaving

(b) Mass does not enter or leave the system

(c) Mass entering can be more or less than the mass leaving

(d) None of these

v. Which one is a part of four stroke diesel engine? **1**

(a) Ports (b) Spark Plug (c) Camshaft (d) None of these

vi. Which one is a link between piston and crank? **1**

(a) Connecting rod (b) Push rod

(c) Crankshaft (d) Flywheel

vii. Which of the following equipment is a boiler accessory? **1**

(a) Blow off cock (b) Water level indicator

(c) Safety valve (d) Economiser

P.T.O.

viii. Which one of the externally fired boiler? **1**
(a) Babcock and Wilcox (b) Lancashire
(c) Cochran (d) None of these

ix. Centre of gravity of a thin hollow cone lies on the axis of symmetry at a height of- **1**
(a) One-half of the total height above base
(b) One-third of the total height above base
(c) One-fourth of the total height above base
(d) None of these

x. What will be the radius of gyration of a circular plate of diameter 10 cm? **1**
(a) 10 cm (b) 5 cm (c) 2.5 cm (d) None of these

Q2 i. Determine the taper angle 'θ' of a workpiece as shown in figure 1. if the two precision rollers have radii 8 mm and 5 mm and the total thickness of slip gauge inserted between the rollers is 15.54 mm. **4**

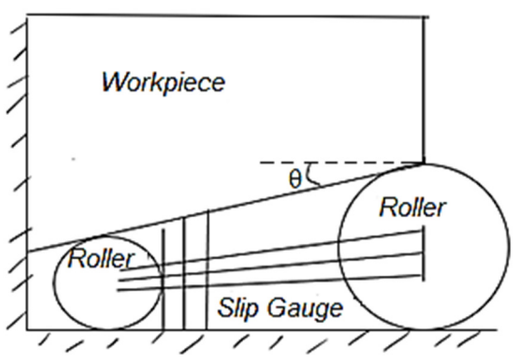

Figure 1

ii. Draw and explain stress-strain curve for mild steel bar under tensile testing. **6**

OR iii. Define the following material properties: hardness, toughness, elasticity, plasticity, ductility and creep. **6**

Q.3 i. A gas contained in a cylinder is compressed, the work required for compression being 5000 kJ. During the process, heat interaction of 2000 kJ causes the surrounding to be heated. Calculate the changes in internal energy of the gas during the process. **4**

ii. State Second law of thermodynamics. Explain its importance. **6**

OR iii. Explain various desirable properties of refrigerants. **6**

Q.4 i. Write the function of the following: **4**
(a) spark plug (b) piston pin (c) piston rings and (d) flywheel in an engine.

ii. With the help of a neat diagram explain the working of four stroke diesel engine. **6**

OR iii. Compare two stroke and four stroke internal combustion engines. **6**

Q.5 i. A boiler is having a chimney of 35 m height, the draught produced in terms of water column is 20 mm. the temperature of flue gas inside the chimney is 365°C and that of air outside the chimney is 32°C. Calculate the mass of air used. **4**

ii. Write the function of following mountings in a boiler- **6**
(a) Blow off cock (b) Water level indicator
(c) Fusible plug (d) Steam stop valve

OR iii. Write the differentiate between- **6**
(a) Water tube boiler and fire tube boiler
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Q.6 i. Derive an expression for moment of inertia of a triangular section (with base 'b' and height 'h') about an axis passing through its base. **4**

ii. Determine moment of inertia about X -Axis for a beam that has the following cross-sectional area as shown in figure 2. All dimensions are in mm. **6**

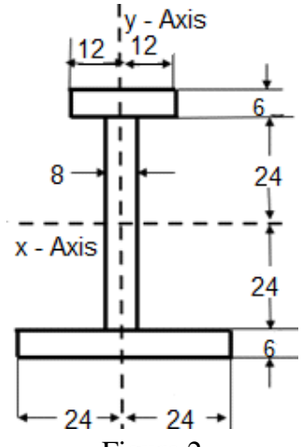

Figure 2

OR iii. State & prove parallel & perpendicular axis theorem. **6**

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24/12 (1)

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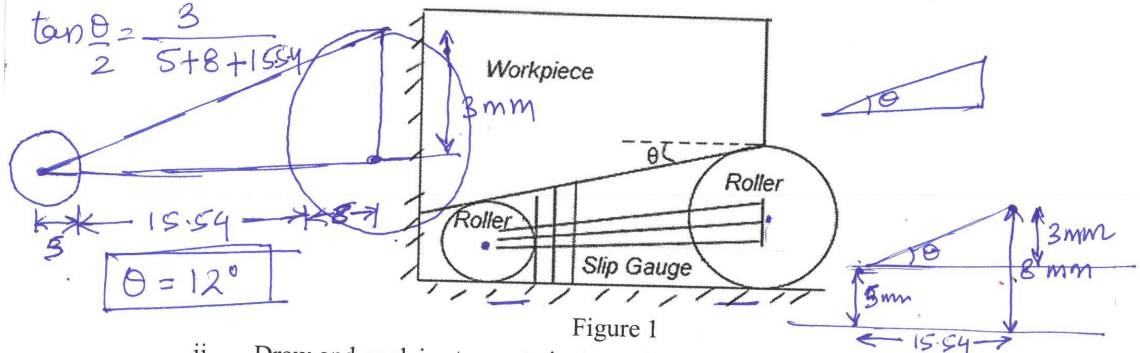

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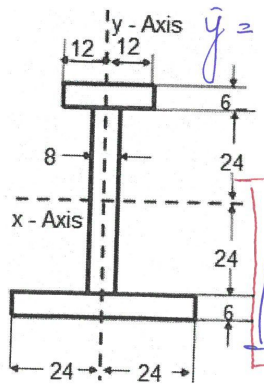

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