B.Tech. (CIVIL ENGG.) 3rd Semester (G-Scheme) Examination, December–2025

ECONOMICS FOR ENGINEERS

Paper– HSMC-01-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt **five** questions in all, selecting **one** question from each unit. **Question No. 1 is compulsory** All Questions carry equal marks.*

1. (a) Explain the role of Engineering Economics.

   (b) State the Law of Supply.

   (c) Explain the meaning of Privatization.

   (d) What are the merits of Globalization?

   (e) Explain the features of Monopolistic competition.

   (f) What is Fixed cost and Variable cost? 6×2.5=15

Unit-I

2. What do you understand by production possibility curve? Discuss its implications and uses. 15

3. State and explain the meaning and degrees of elasticity of demand. 15

Unit-II

4. Explain various Internal Economies and external Economies. What is their impact on a firm. 15

5. Bring out the relationship between Average cost and Marginal cost in the short Run. 15

Unit-III

6. Explain the meaning and features of monopolistic competition. State the difference between monopoly and monopolistic competition. 15

7. Explain the concept of elasticity of supply and describe the factors that affect elasticity of supply. 15

Unit-IV

8. What features of the Indian Economy have been responsible for its slow growth? 15

9. Discuss the progress of Privatization in India since 1991. 15

B.Tech. (ME) 5th Semester (G-Scheme)
Examination, December–2025

COMPUTER AIDED DESIGN & MANUFACTURING
Paper– PCC-ME-301-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt any five questions in all, selecting* one *question from each unit.* ***Question No.1 is*** **compulsory.** *All Questions carry equal marks.*

1. (a) Explain CAD & CAM.

   (b) Explain Additive Manufacturing

   (c) Explain Homogeneous coordinates representation system.

   (d) Discuss application of AM.

   (e) Discuss the basic properties for curve designing.

   (f) Explain FMS 2.5

Unit-I

2. Explain the Generic AM Process.

3. Discuss the Importance and Necessity of CAD. 15

Unit-II

4. A triangle is defined in 2D ICG system by its vertices (0,3), (0, 5) and (3, 4). Scale and rotate the Original

triangle by a factor of 2.5 and 45° respectively by assuming (0,3) as fixed point. Determine vertices of transformed triangle. 15

5. Compare Constructive Solid Geometry (CSG) and Boundary representation (B-rep). 15

Unit-III

6. Discuss what are the advantages of using FEM for engineering analysis problems? Derive an expression for stiffness matrix of ID truss element. 15

7. Explain any two of them:

   (a) Photo polymerization Processes

   (b) Powder bed fusion processes

   (c) Extrusion Based systems $2 \times 7.5 = 15$

Unit-IV

8. What is CAPP? What is its type? Explain anyone of them. 15

9. Explain, what are the types of FMS? Enlist advantages and disadvantages of FMS. 15

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B.Tech. (Mechanical Engg.) 5th Semester (G-Scheme) Examination, December–2025

SOLID MECHANICS

Paper– PCC-ME-303-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt any **five** questions in all, selecting* **one** *question from each Unit.* ***Question no. 1 is*** **compulsory.** *All questions carry equal marks.*

1. Explain the following $6 \times 2.5 = 15$

   (a) Stain energy

   (b) Product on inertia

   (c) Lame's equation

   (d) Leaf spring

   (e) Thick and thin cylinder

   (f) What is difference between rotating rim and discs?

Unit-I

2. Derive the expression for strain energy store in a body when load is applied: 15

   (a) Gradually

   (b) Suddenly

   (c) Impact

3. According to the theory of maximum shear, determine the diameter of a bolt which is subjected to axial pull of 9 kN together with a transverse shear force of 4.5 kN. Elastic limit in tension if 225 MP a, factor of safety 3 and Poissons ratio 0.3. 15

Unit-II

4. A steel bar of rectangular cross section 6cm × 4cm is arranged as a cantilever projecting horizontally 50 cm beyond the support. The broad face of bar makes 30° with horizontal. A load of 200 N is hung from the free end. Find out the neutral axis, maximum tensile stress. E=200 GPa. 15

5. Derive the expression for stresses and deflection in open coiled helical spring subjected to axial load and couple. 15

Unit-III

6. A thick cylinder with internal radius of 8cm and external radius of 16 cm is subjected to internal fluid pressure of 80 MPa. Draw the variation of radial and hoop stresses in cylinder wall. Also find out maximum shear stress in the cylinder wall. 15

7. Derive an expression for maximum value of hoop stress and radial stress in a hollow disc of uniform thickness with a pin hole at the center and disc rotating at uniform speed 'w'. 15

Unit-IV

8. What is difference in stresses in bars of initial large radius of curvature and bar of initial small radius of curvature? Explain in detail. 15

9. A proving ring is 25 mm mean diameter 40 mm wide and 6mm thick. Maximum stress permitted is 550 MPa. Find out the load to cause this stress and the load to give 6mm deflection along the load line, E=200 GPa. 15

B.Tech. (ME) 5th Semester (G-Scheme)
Examination, December–2025
MANUFACTURING TECHNOLOGY - I
Paper– PCC-ME-305-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions in total at least one question from each unit. **Question Number 1 is compulsory**. Each question carries equal marks.*

1. Write about: $6 \times 2.5=15$

   (a) What do you understand by cutting speed?

   (b) Define orthogonal metal Cutting

   (c) What is jig?

   (d) Define forging.

   (e) What is Mould?

   (f) What is Forming?

Unit-I

2. What are different types of chips and their characteristics? Also explain the mechanics of chips formation. 15

3. Discuss about :

   (a) Economics of Metal Machining. 7

   (b) Geometry of twist drill.

Unit-II

4. Explain different locating and clamping devices: 15

5. Write about:

   (a) Auto-Collimator 8

   (b) Factors influencing surface finish. 7

Unit-III

6. What do you understand by indexing in milling operation? Discuss various operations that can be performed on milling machine. 15

7. Explain with neat sketches various types of pattern. 15

Unit-IV

8. Write note on:

   (a) TIG welding 8

   (b) Brazing 7

9. Discuss about :

   (a) Hot working processes 8

   (b) Shearing and punching 7

B.Tech. (M.E.) 5th Semester (G-Scheme)
Examination, December–2025

KINEMATICS OF MACHINE

Paper– PCC-ME-307-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt any **five** questions in all, selecting* **one** *question from each unit. **Q. No.1 is** **compulsory.** All questions carry equal marks.*

1. Write about : $6 \times 2.5 = 15$

(a) Kutzbach Criterion to Plane Mechanisms.

(b) Different types of instantaneous centers and write formula to find the number of IC for four bar mechanism.

(c) Factors on which power transmission of belt pulley system depends.

(d) Pitch circle and pressure angle for a cam profile.

(e) Function of friction clutch.

(f) Law of gearing.

Unit-I

2. (a) Define and explain with neat sketch types of constrained motions.

(b) Sketch and explain any two inversions of single slider crank chain.

3. Explain the procedure to construct Klein's construction to determine the velocity and acceleration of a slider crank mechanism.

Unit-II

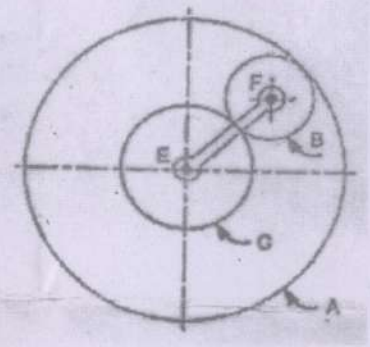
4. A cam operates a roller, in line reciprocating follower, while rotating at 300 rpm, The further specifications are: Minimum radius of cam = 25mm, lift of follower = 50mm (SHM in nature), Diameter of roller = 15mm, Angle of lift = 120°, dwell angle = 30°, Angle of return= 150° (Uniform retardation in nature). 15

Draw the cam profile and fine the maximum velocity and acceleration of the follower during lift as well as return.

5. Define the fundamental law of gearing. Derive the condition that must be satisfied for two bodies having constant velocity ratio. 15

Unit-III

6. An epicyclic gear consists of three gears A, B and C as shown in figure. The gear A has 72 internal teeth and gear C has 32 external teeth. The gear B meshes with both A and C and is carried on an arm EF which rotates about the centre of A at 18 rpm. If the gear A is fixed, determine the speed of gears B and C. 15



7. What is Freudenstein's equation? How is it helpful in designing a four-bar mechanism when three positions of input (θ_1, θ_2, θ_3,) and the output links (Φ_1, Φ_2, Φ_3,) are known? 15

Unit-IV

8. Derive the equation for minimum force required to drag a body on rough inclined surface. 15

9. Find the length of a cross belt and power transmitted by a belt. 15

B.Tech. (ME) 5th Semester (G-Scheme)
Examination, December–2025
FLUID MACHINES
Paper– PCC-ME-309-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, by selecting **one question** from each unit. **Question Number 1 is compulsory**.*

1. Write about :

(a) What is an Impulse turbine?

(b) Hydraulic efficiency of turbine.

(c) Inward flow reaction turbine.

(d) Working principle of centrifugal pump

(e) Function of Hydraulic accumulator.

(f) Discharge of a reciprocating pump. 6×2.5=15

Unit-I

2. A jet of water 50 mm diameter and moving with a velocity of 26 m/s is impinging normally on a plate. Determine the pressure on the plate when (a) it is fixed, and (b) it is moving with a velocity of 10m/s in the direction of the jet. Also determine the work done per second by the jet. 15

3. Discuss with neat sketches construction, operation and governing mechanism of a pelton wheel. 15

Unit-II

4. A Francis' turbine, working under a head of 14 meters, has guide blade angles of 20° and radial vanes at inlet. The ratio of inlet and outlet diameters is 3 to 2. The velocity of flow of water, at exit, is 4m/s. Assuming the velocity of flow to be constant, determine the peripheral velocity of water at inlet and the vane angle at outlet. 15

5. Write about: 15

   (a) Difference between the Francis and Kaplan turbines. 8

   (b) Draft tube and its function. 7

Unit-III

6. Write about:

   (a) Ray leigh's method for dimensional analysis. 8

   (b) Thomas cavitation factor. 7

7. A centrifugal pump delivers 30 liters of 'water per second to a height of 18 meters through a pipe 90 metres long and of 100mm diameter. If the overall efficiency of the pump is 75%, find the power required to drive the pump. Take F = 0.012. 15

Unit-IV

8. Write about:

   (a) Indicator diagram of a reciprocating pump. 8

   (b) Air vessels and their utility. 7

9. Write on:

   (a) Hydraulic Crane 8

   (b) Torque Converter 7