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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? $6 \times 2.5 = 15$

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

3024-P-2-Q-9 (25)

[P.T.O.]

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

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B.Tech. (Civil Engg.) 3rd Semester (G-Scheme)
Examination, December-2025
INTRODUCTION TO CIVIL ENGINEERING
Paper- PCC-CE-201-G

Time allowed : 3 hours]

[Maximum marks : 75

Note: Attempt any five questions. All questions carry equal marks. Question No. 1 is compulsory, Attempt one question from each Section.

1. (a) Name three eminent works of civil engineer.
- (b) Describe dressing of stones.
- (c) Write function of cavity walls.
- (d) What are the main causes of dampness?
- (e) Write the constitute of varnish.
- (f) Write the properties and uses of two emerging construction materials. $2.5 \times 6 = 15$

Section-A

2. (a) Write a short note on Flemish bond. Draw two brick thick Flemish Bond. 6
- (b) Write a note on various defects in brick masonry. 5
- (c) Describe the construction of glass block masonry. 4
3. (a) Describe the contribution of civil engineering to the society? 6
- (b) Write a short note on green building concept. 5

3025-P-3-Q-9 (25)

[P. T. O.]

(2)

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- (c) Explain the importance of Civil Engineering in short. 4

Section-B

4. Explain briefly- 3×5=15
- (a) Tiles and its types
 - (b) Dressing of stones
 - (c) Terracotta tiles
5. (a) Differentiate between paints & varnishes. 8
- (b) Write advantages of plywood and fiber boards. 7

Section-C

6. (a) Explain with sketches Collapsible doors, revolving doors and Louvered doors. 4×3=12
- (b) Write briefly about fixtures and fasteners used for doors and windows. 3
7. (a) Define non load bearing partition walls. Write its types also. 8
- (b) Classify types of foundations with neat sketches. What do you mean by sub soil investigation. 4+3

Section-D

8. (a) Name and explain different methods used for water proofing in roofs. 8
- (b) Write a short note on steps taken to prevent dampness. 7

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(3)

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9. (a) Explain the different types of sound absorbents. 5
- (d) What are the causes of excessive reverberation and formation of echoes? 6
- (c) How do you insulate ceiling of a hall against external sound? 4

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B.Tech. (Civil Engg.) 3rd Semester (G-Scheme)
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MATHEMATICS-III

Paper- BSC-MATH-205-G

Time allowed : 3 hours]

[Maximum marks : 75

Note : Attempt five questions in all, by selecting one from each unit. Question Number 1 is compulsory. All questions carry equal marks.

1. (a) Write Charpit's Auxiliary equation in general.
- (b) Solve $z = px + 2y + \sqrt{1 + p^2 + q^2}$
- (c) Define interpolation and write name of two formulas for it.
- (d) Evaluate $\Gamma(\cosh a) = ?$
- (e) Evaluate $L^{-1} \left(\frac{3}{(s-a)^2 + b^2} \right) = ?$
- (f) Find the number of distinct permutations that can be formed from the letters of word RADAR.

Unit-I

2. (a) Solve $px + qy = (p + q)^{-1}$
- (b) Solve $pz - q^2 = 1$

3026-P-3-Q-9 (25)

[P.T.O.]

3. (a) Use method of separation of variable solve the equation $\frac{\partial^2 u}{\partial x^2} - \frac{\partial u}{\partial y} = 2u$
- (b) A rod of length l with insulated sides is initially at a uniform temperature u_0 . Its ends are suddenly cooled to 0°C and are kept at that temperature. Find the temperature function $u(x, t)$.

Unit-II

4. (a) Use Newton-Raphson method to find a root of the equation $x^3 - 2x - 5 = 0$
- (b) Using Newton's forward difference formula find the sum $S_m = 1^3 + 2^3 + 3^3 + \dots + m^3$.
5. Evaluate $\int_0^1 \frac{1}{1+x} dx$ by both Trapezoidal and Simpson's rules with values $n = 0.25, 0.125, 0.5$ respectively.

Unit-III

6. (a) Evaluate $\int_0^\infty \frac{\cos 6t - \cos 4t}{t} dt$ by Laplace Transforms. 15
- (b) If $L(f(t)) = F(s)$, prove
- $$L\{(\cos ht)(f(t))\} = \frac{1}{2} [F(s-b) + f(s+b)].$$
- Hence evaluate $L(\cos ht \cos 5t)$.

7. (a) Apply convolution theorem to evaluate $L^{-1}\left\{\frac{s+2}{(s^2+4s+5)^2}\right\}$
- (b) Solve following differential equation by Laplace transforms $\frac{d^3x}{dt^3} - 2\frac{d^2x}{dt^2} + 5\frac{dx}{dt} = 0$; $x=0, \frac{dx}{dt} = 1$ at $t=0$ and $x=1$ at $t = \frac{\pi}{8}$.

Unit-IV

8. (a) A box contains 6 white balls and 5 red balls. In how many ways can four balls be drawn from it, if:
- They can be of any colours,
 - All balls of same colour.
- (b) Prove a non-empty subset H of G is a subgroup of G iff $ab^{-1} \in H \forall a, b \in H$.
9. (a) Let H be a normal subgroup of G . Then prove that $G/H = \{xH; x \in G\}$ be a group under multiplication defined as $(xH)(yH) = xyH$, If $x, y \in G$.
- (b) Let $H = \langle b \rangle$ be a cyclic group of order m . Then prove $a^p \in H, p \leq m$ is a generator of H iff p and m are co-prime.

B.Tech. (Civil Engg.) 3rd Semester (G-Scheme)
Examination, December-2025
ENGINEERING MECHANICS
Paper- PCC-CE-203-G

Time allowed : 3 hours] [Maximum marks : 75

Note: Attempt five questions in total. Question No 1 is compulsory. Attempt one question from each section. All questions carry equal marks.

1. (a) What is a determinate structure? How do we check the determinacy of a structure?
- (b) When several point loads are moving on a beam, what is the condition for maximum bending moment?
- (c) What is the difference between long column and short column? 5×3=15

Section-A

2. A steel bar 900 mm long has first 200 mm of diameter 40 mm, second 500 mm has diameter of 20mm and the last 200mm has diameter of 30mm. Determine the maximum axial pull which the bar is subjected if the maximum stress is limited to 100 N/mm². Find the total elongation of the bar. 15
3. (a) Define Mohr's circle. Calculate the principal stresses and strains for two unequal unlike principal stresses with the help of Mohr's circle. 7

3027-P-3-Q-9 (25)

[P.T.O.]

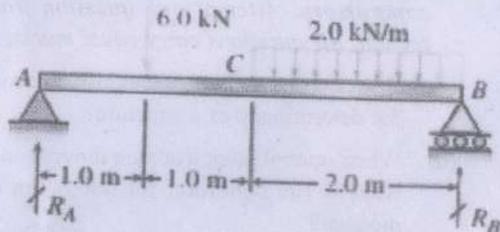
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- (b) Derive a relationship between Young's modulus, Bulk modulus and Poisson's ratio. 8

Section-B

4. Draw SF and BMD for the beam shown in figure. 15



5. (a) Explain the middle third rule in brief. 5
(b) What are the assumptions of pure bending theory? Also find out the moment of inertia of a symmetrical H-section whose vertical arms are 80 mm long and 20 mm thick and horizontal arm is 60 mm long and 20 mm thick including the common part of vertical and horizontal arms. 10

Section-C

6. Compare the maximum tensile stress, of a thin cylinder and a thin spherical shell having the same internal pressure and the diameter/thickness ratio. Take $\mu=0.3$ 15

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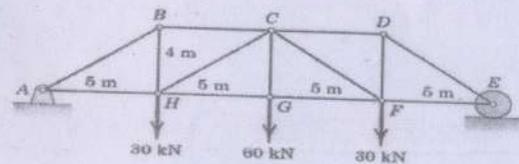
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7. A hollow circular column of length 6m, external diameter 200 mm and internal diameter 160 mm is fixed at one end & hinged at the other end. If the column carries a load of 160 kN applied at distance 40 mm from the column axis, determine extreme fibre stresses. Take E for column material as 120 GPa. 15

Section-D

8. Determine the force in each member of the truss using method of joint- 15



9. Explain:
(a) Maximum distortion theory 7
(b) Maximum Principal stress theory 8

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B.Tech. (Civil Engineering) 3rd Semester (G-Scheme)
Examination, December-2025

FLUID MECHANICS

Paper- PCC-CE-205-G

Time allowed : 3 hours]

[Maximum marks : 75

Note: Attempt five questions in total. Question No 1 is compulsory. Attempt one question from each section. All questions carry equal marks.

1. Write short note on the following: $2.5 \times 6 = 15$
- (1) Describe in brief compressibility and viscosity.
 - (2) Describe the different sub groups of non-Newtonian fluid, giving example of each.
 - (3) Explain Pascal's Law.
 - (4) Differentiate between Drag and Lift.
 - (5) Derive the equation for actual discharge in an orifice meter.
 - (6) What do you understand by Kinematic Similarity?

Section-A

2. Distinguish between solid and fluids. Explain with examples of each. 15
3. What is Newtonian and non - Newtonian fluid? Give examples of each. $2.5 \times 6 = 15$

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[P. T. O.]

Section-B

4. With the help of a neat diagram define the terms: absolute pressure, gauge pressure and vacuum pressure. What is the relation between absolute pressure and gauge pressure? 15
5. Explain the theoretical method of determination of metacentric height. 15

Section-C

6. In a steady flow two points A and B are 0.5 m apart on a straight streamline. What is the acceleration at each point if velocity of flow varies linearly between A and B? Velocity at A is 2m/s and velocity at B is 6m/s. 15
7. What is a venturimeter? Draw a neat sketch indicating different parts of venturimeter and explain the utility of each part. 15

Section-D

8. Explain the terms: 15
- (i) Laminar boundary layer
 - (ii) Turbulent boundary layer and
 - (iii) Laminar sublayer.
9. Explain the terms: 15
- (i) Geometric similarity
 - (ii) Kinematic similarity
 - (iii) Dynamic similarity

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B.Tech. (Civil Engg.) 3rd Semester (G-Scheme)

Examination, December-2025

SURVEYING

Paper- PCC-CE-207-G

Time allowed : 3 hours]

[Maximum marks : 75

Instructions:

- (1) Question number 1 will be compulsory and of short answer type.
- (2) Each question carry equal marks (15 marks).
- (3) Students have to attempt **five** questions in total by selecting **one** question from each section.

1. (a) The representative fraction for town planning map was 1:7500. What was the scale of the map? 2.5
- (b) Describe the terms "back sight" and "fore sight" in levelling. 2.5
- (c) Define the term magnetic bearing. 2.5
- (d) The quadrantal bearing of a line is S300°E. What is its Whole circle bearing? 2.5
- (e) Can a theodolite be used as level? 2.5
- (f) Define open traverse. 2.5

Section-A

2. (a) What is surveying? Explain its importance in Civil Engineering. 8
- (b) A 100 m tape is suspended between the ends under a pull of 300 N, the weight of the tap is 40 N. Find the correct distance between the tape ends. 7

3029-P-3-Q-9 (25)

[P. T. O.]

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3. Given below are the bearing observed in a traverse survey conducted with a prismatic compass at a place where local attraction was suspected: 15

Line	FB	BB
AB	124°30'	304°30'
BC	68°15'	246°00'
CD	310°30'	135°15'
DA	200°15'	17°45'

At what stations do you suspect local attraction? Find the correct bearings of the lines and the included angles.

Section-B

4. The following consecutive readings were taken with a level and 3 m leveling staff on a continuously sloping ground at a common interval of 50 m: 0.405, 1.502, 1.960, 2.874, 0.338, 0.914, 1.836, 2.772, 0.668, 1.724 and 2.822. R.L of first point was 256.321 m. Calculate R.L of points and gradient of line joining first and last points. 15
5. (a) Discuss the effect of curvature and refraction in leveling. Find the correction due to each and the combined correction. 8
- (b) How would you determine the difference in elevation of the instrument station and top of a chimney if base of the chimney is inaccessible? 7

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Section-C

6. (a) Describe briefly the various accessories of a plane table. What are their functions? 8
- (b) What do you mean by contour interpolation? Describe anyone method of contour interpolation. 7
7. What do you understand by 'Temporary adjustments'? Describe in brief the various temporary adjustments of a theodolite. 15

Section-D

8. (a) What do you understand by tacheometry? What is the utility of an anallactic lens in a tacheometer? 7
- (b) It was required to determine the distance between two points A and B by a tacheometer fitted with an anallactic lens ($k = 100$, $C = 0$). With the instrument at A and Staff at B, the observations made were a vertical angle of $+9^\circ 46'$ and staff intercept of 1.915 m. What is the horizontal distance AB? Later on it was found that the constants of the instrument were 100 and 0.5. What would be the percentage error in the horizontal distance computed? 8
9. What purpose do curves serve? What are the elements of a simple circular curve? Explain how a simple circular curve is designated. 15

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