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B-04

B. Tech CE/ME/TE/CSE/IT/ECE II/III Semester Examinations (Dec 2025)
Environmental Studies/Sciences (BT-CE-102A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1	Write short answers.	**Marks**
(a)	Classify natural resources?	2
(b)	Give an example of food chain?	2
(c)	What do you mean by Soil pollution?	2
(d)	Define water conservation?	2
(e)	What do you understand by biological disaster?	2
(f)	Explain Environmental Protection Act?	2
	UNIT-I	
Q.2(a)	Explain "Land as a resource".	6
Q.2(b)	Discuss a case study about deforestation?	6
Q.3(a)	Describe the role of individual for conservation of natural resources?	6
Q.3(b)	Write about the alternate sources of energy?	6
	UNIT-II	
Q.4(a)	Write the role of Producers, Consumers and decomposers in an ecosystem?	6
Q.4(b)	State the threats to biodiversity?	6
Q.5(a)	Explain the structure and functions of an ecosystem?	6
Q.5(b)	Discuss the Hot spots of biodiversity of India?	6
	UNIT-III	
Q.6(a)	Describe the causes and effects of air pollution?	6
Q.6(b)	Mention the control measures to be considered for Urban waste?	6
Q.7(a)	Write a short note on flood as disaster?	6
Q.7(b)	Discuss Fire as man – made disaster?	6
	UNIT-IV	
Q.8(a)	Explain about rain-water harvesting system?	6
Q.8(b)	Write the concept of green buildings?	6
Q.9(a)	State the main features of Water Act.	6
Q.9(b)	Discuss the role of IT in human health.	6

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A 641

BCA, BCA-DS, BCA-CTIS, BCA-AIML, BBA I/II Semester Examinations (Dec 2025)
Environmental Studies (BT-CE-104A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

		Marks
Q.1		**Marks**
(a)	Define ecosystem.	2
(b)	What is renewable energy? Explain with examples.	2
(c)	Define endangered species.	2
(d)	What is water pollution? Mention one effect.	2
(e)	Define global warming.	2
(f)	What is e-waste?	2
	UNIT-I	
Q.2(a)	Explain the over-exploitation of natural resources with case studies.	6
Q.2(b)	Discuss the importance of alternative energy sources.	6
Q.3(a)	Describe soil erosion and desertification.	6
Q.3(b)	Explain the role of an individual in the conservation of natural resources.	6
	UNIT-II	
Q.4(a)	Describe producers, consumers, and decomposers with examples.	6
Q.4(b)	Write a detailed note on the biogeographical classification of India.	6
Q.5(a)	Explain threats to biodiversity, including habitat loss and poaching.	6
Q.5(b)	What are endemic species? Provide Indian examples.	6
	UNIT-III	
Q.6(a)	Describe causes, effects, and control measures of water pollution.	6
Q.6(b)	Explain solid waste management techniques for urban areas.	6
Q.7(a)	Discuss the impacts of earthquakes, cyclones, and landslides.	6
Q.7(b)	Explain industrial and nuclear disasters with case studies.	6
	UNIT-IV	
Q.8(a)	Explain environmental ethics and their significance.	6
Q.8(b)	Write short notes on: (i) Ozone layer depletion (ii) Climate change	6
Q.9(a)	Explain the role of modern technologies (IoT, sensors, digital tools) in environmental management.	6
Q.9(b)	Discuss the Environment Protection Act with reference to air and water provisions.	6

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C-131

B. Tech. Civil Engineering III Semester Examinations (Dec 2025)
Structural Mechanics (BT-CE-201A)

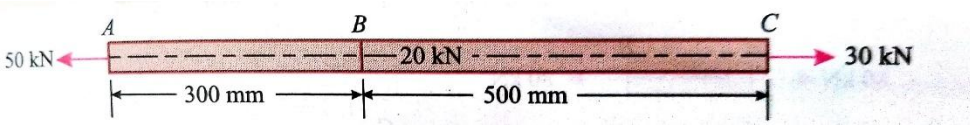
Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	What are principal stresses and principal planes?	02
(b)	Define shear force and bending moment at a section of a beam.	02
(c)	Define flexural shear stress.	02
(d)	What is strain energy in a member under load?	02
(e)	Write Euler's critical load formula for a column with hinged ends.	02
(f)	What is a statically determinate truss?	02

UNIT-I

Q.2(a)	Explain the procedure for finding out the stresses developed in a body due to change of temperature.	05
Q.2(b)	A steel bar of cross-sectional area 200mm2 is loaded as shown in fig. Find the change in length of the bar. Take E as 200 GPa.	07



Q.3(a)	A solid steel bar, 40 mm diameter, 2 m long passes centrally through a copper tube of internal diameter 40 mm, thickness of metal 5 mm and length 2 m. The ends of the bar and tube are brazed together and tensile load of 150 kN is applied axially to the compound bar. Find the stress in the steel and copper bar. Assume E_c = 100 GN/m^2 and E_s = 200 GN/m^2	07
Q.3(b)	Explain the concept of principal stresses and principal strains. Draw and explain Mohr's Circle for a two-dimensional state of stress and state its practical significance.	05

UNIT-II

Q.4(a)	A beam of 6 m long rests on two supports 5 m apart. The right end is overhanging by 1 m. The beam carries a uniform distributed load of 1.5 kN/m over the entire length of the beam. Draw S.F and B.M diagram and find out the amount and position of maximum bending moments.	09

Q.4(b)	Define shear force and bending moment in a beam. Explain the sign conventions used for each with neat sketches.	03
Q.5(a)	Describe in detail the behaviour of composite beams under bending. Explain how stresses are shared between different materials and define modular ratio.	05
Q.5(b)	A cantilever beam of length 3 m carries a UDL of 5 kN/m over its entire length. The beam has a rectangular section of 150 mm × 250 mm. Find the maximum bending stress induced in the beam.	07

UNIT-III

Q.6(a)	Explain the Moment-Area Method for determining slope and deflection in beams. State and prove the moment-area theorems with neat sketches.	06
Q.6(b)	A beam of span 5 m is simply supported and carries two equal point loads of 10 kN each at 1.5 m from each support. Determine the deflection at mid-span using the conjugate beam method.	06
Q.7(a)	A circular shaft of length 1.5 m and diameter 60 mm is subjected to a torque of 2.5 kN-m at one end. Find the strain energy stored due to torsion. (Take G = 80 GPa)	08
Q.7(b)	State and explain elastic torsional formula.	04

UNIT-IV

Q.8(a)	Define slenderness ratio of a column. Explain its importance and classify columns into short, intermediate, and long columns based on slenderness ratio.	05
Q.8(b)	A column of length 4 m is fixed at one end and free at the other. Its cross-section is rectangular 100 mm × 80 mm. Calculate the Euler's critical load. (Take E = 200 GPa)	07
Q.9(a)	Explain the method of sections for analysing plane trusses. Under what situations is this method preferred over the method of joints?	05
Q.9(b)	A simply supported plane truss of span 7 m and height 2.5 m carries a point load of 25 kN at its mid joint. The truss consists of 4 equal panels. Determine the forces in the members meeting at the mid joint using the method of joints.	07

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C-132

B. Tech. Civil Engineering III Semester Examinations (Dec 2025)

Building Construction & Materials (BT-CE-203A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	Explain the seasoning of stone.	2
(b)	Explain the different classes of bricks.	2
(c)	Enumerate the properties of distempers.	2
(d)	Define the medullary rays and its function in a tree.	2
(e)	Explain the coping and throating.	2
(f)	Discuss details about the distempering and its process.	2

UNIT-I

Q.2(a)	Enlist various laboratory tests performed on stone. Explain any four tests in detail.	6
Q.2(b)	Briefly describe the working of Bull's trench kiln for the burning of brick.	6
Q.3(a)	Draw the flow diagrams for mixing of raw materials by dry process and wet process for the manufacture of ordinary cement.	6
Q.3(b)	Describe the uses of stones. Explain chemical classification of rocks and its types.	6

UNIT-II

Q.4(a)	Why is artificial seasoning adopted? Describe its various methods.	6
Q.4(b)	What are the different types of steel used in construction? Also, explain methods to prevent corrosion in steel.	6
Q.5(a)	Discuss the composition, characteristics and applications of composite construction materials.	6
Q.5(b)	A glass window of area 2 m^2 and thickness 8 mm separates air at 30 °C inside from 10 °C outside. Calculate the rate of heat transfer through the glass also determine the heat loss per hour through the window.	6

UNIT-III

Q.6(a)	Discuss the various types of masonry and the bonds used in brickwork with neat sketches.	6
Q.6(b)	Explain the types of shallow and deep foundations and their suitability for different soil conditions.	6
Q.7(a)	A formwork panel 1.2 m × 0.6 m supports fresh concrete exerting a pressure of 35 kN/m^2. Calculate the total load on the panel, also if the plywood	6

thickness is 10 mm and allowable stress = 8 N/mm², check whether the panel is safe.

Q.7(b) Explain types of scaffolds with neat sketches and safety measures during erection and dismantling. 6

UNIT-IV

Q.8(a) Discuss the ledged doors with diagram. Differentiate flush doors and louvered doors. 6

Q.8(b) Explain roof of a building. Describe the Curved roof, Madras terrace roof and Bengal terrace roof with sketches. 6

Q.9(a) Mention the different types of varnishes and describe the process of varnishing on woodwork. 6

Q.9(b) Explain the methods of damp-proofing in detail. 6

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C-133

B. Tech. Civil Engineering III Semester Examinations (Dec 2025)

Fluid Mechanics I (BT-CE-205A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	Explain briefly the following terms: (i) Mass density (ii) specific volume (iii) Non-Newtonian fluids (iv) Ideal fluids	2
(b)	Differentiate among stream lines, streak lines and path lines	2
(c)	Draw a neat sketch between Pressure-density-height relationship	2
(d)	State Buckingham theorem	2
(e)	List the assumptions made in the derivation of Bernoulli's equation.	2
(f)	What is meant by separation, in boundary layer formation	2

UNIT-I

Q.2(a)	State and explain the Newton's law of viscosity.	5
Q.2(b)	A plate having an area of 0.5 m2 is sliding down the inclined plane at 30° to the horizontal with a velocity of 0.35 m/s. There is a cushion of fluid 1.8 mm thick between the plane and the plate. Find the viscosity of the fluid if the weight of the plate is 300 N.	7
Q.3(a)	What is capillarity? Derive expression for height of capillary rise.	6
Q.3(b)	A soap bubble 62.5 mm diameter has an internal pressure in excess of the outside pressure of 20 N/m^2. What is tension in the soap film?	6

UNIT-II

Q.4(a)	A body of size 3 m long x 2 m wide x 1 m deep floats in water. What is the weight of the body if the depth of immersion is 0.8 m? Also determine the metacentric height.	6
Q.4(b)	In a pipeline water is flowing. A manometer is used to measure the pressure drop for flow through the pipe. The difference in level was found to be 20 cm. If the manometric fluid is CCl_4, find the pressure drop in S.I units (density of CCl_4 = 1.596 g/cm3). If the manometric fluid is changed to mercury (ρ = 13.6gm/cm3) what will be the difference in level?	6
Q.5(a)	Derive expressions for total pressure and centre of pressure for a vertically immersed surface.	6

Q.5(b) A rectangular plane surface 1 m wide and 3 m deep lies in water in such way that its plane makes an angle of 30^0 with the free water surface. Determine the total pressure and position of centre of pressure when the upper edge is 2 m below the free surface. 6

UNIT-III

Q.6(a) Define continuity equation. Obtain the expression for continuity equation in three dimensions. 6

Q.6(b) A 30 cm diameter pipe carries oil of specific gravity 0.9 at a velocity of 3 m/s. At another section the diameter is 20 cm. Find the velocity at this section and also mass rate of flow of oil. 6

Q.7(a) Discuss applications and various limitations of Bernoulli's equation 6

Q.7(b) A horizontal venturimeter with inlet diameter 200 mm and throat diameter 100 mm is employed to measure the flow of water. The reading of the differential manometer connected to the inlet is 180 mm of mercury. If the co-efficient of discharge is 0.98, determine the rate of flow 6

UNIT-IV

Q.8(a) Find the displacement thickness and energy thickness for the velocity distribution in the boundary layer is given by 6

$$\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - \left(\frac{y}{\delta}\right)^2$$

Q.8(b) What is a boundary layer? Why does it increase with distance from the upstream edge? 6

Q.9(a) What are the various methods of dimensional analysis to obtain a functional relationship between various parameters influencing a physical phenomenon. 6

Q.9(b) The discharge Q over a rectangular weir depends upon the head H over the weir, acceleration due to gravity g, length of the weir crest L, height of the weir crest over the channel bottom Z and the kinematic viscosity 'v' of the liquid. By the method of dimensional analysis, obtain an expression for the discharge Q in terms of dimensionless parameters. 6

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C-134

B. Tech. Civil Engineering III Semester Examinations (Dec 2025)
Surveying & Geomatic Engineering (BT-CE-207A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	What are the two principles of Surveying?	2
(b)	Discuss any two temporary adjustments of a theodolite.	2
(c)	What do you understand by fly levelling?	2
(d)	Explain any two applications of a GPS.	2
(e)	Differentiate between the constants used in the Tacheometric survey.	2
(f)	Discuss the two-point problem in a plane table survey.	2

UNIT-I

Q.2(a) Imagine you have to design a sustainable city. Explain how knowledge of surveying would play a crucial role in your planning process from start to finish. Also, discuss the importance of modern advancements in surveying technology, like drones and satellite imagery, which may influence your approach. 4

Q.2(b) The following consecutive readings were taken by 4m staff on continuously sloping ground at 30m intervals: 0.585 on A, 0.936, 1.953, 2.846, 3.644, 3.938, 0.962, 1.035, 1.689, 2.534, 3.844, 0.956, 1.579, 3.016 on B. The elevation of A is 520.450m. Calculate RLs of all the remaining points. 8

Q.3(a) A river flows from West to East. To determine the width of the river, two points P & Q, are selected on the southern bank such that PQ = 100m. Point P is westward. The bearing of a tree R on the Northern bank is observed to be 38^0 and 338^0 respectively from P & Q. Calculate the width of the river. 4

Q.3(b) The following consecutive readings were taken with a level: 3.150, 2.245, 1.125, 3.860, 2.125, 0.760, 2.235, 0.470, 1.935, 3.225, 3.890. The instrument was shifted after the 3rd and 7th readings. The chain line is 20m. The first reading was taken on 140m. The RL of the first point was 103.565m. Tabulate the readings in a proper format and find the reduced levels using HI method. 8

UNIT-II

Q.4 Adjust the traverse using Gales's Traverse Table (Transit Method) for the following data: 12

Line	AB	BC	CD	DE	EA
Length	186	164	303	162	240
Bearing	$N24^030'E$	$N73^018'W$	$S63^044'W$	$S42^030'E$	$N86^008'E$

Q.5	With reference to contouring in surveying, explain five important characteristics of contour lines. Describe in detail any one Indirect Method of locating contours, highlighting the step-by-step procedure for each. Compare the Direct and Indirect methods of contouring in a tabular form, based on accuracy, time required, suitability of terrain, economy, and manpower requirements.	12

UNIT-III

Q.6(a)	The vertical angles to vanes fixed at 1m and 3m above the foot of the staff held vertically at station Q were $+3^0 20'$ and $+6^0 40'$ respectively from instrument station P. If the elevation of the instrument axis at station P is 101.520m calculate (1) the horizontal distance between P & Q and (2) the elevation of the staff station Q.	5
Q.6(b)	Elaborate two-point problem in plane table surveying. Also, discuss two methods of orientation in plane table surveying.	7
Q.7(a)	The vertical angles to vanes fixed at 1m and 3m above the foot of the staff held vertically at station Q were $-3^0 20'$ and $-6^0 40'$ respectively from instrument station P. if the elevation of the instrument axis at station P is 101.520m calculate (1) the horizontal distance between P & Q and (2) the elevation of the staff station Q.	5
Q.7(b)	Explain the principle of plane table surveying. Also, discuss temporary adjustments along with the necessary accessories in the plane table surveying.	7

UNIT-IV

Q.8	Write Short notes on the following:	
	a) Baseline measurements and corrections	6
	b) Elements of a curve with a neat sketch	6
Q.9	Write Short notes on the following:	
	a) Order of triangulation	6
	b) Method of setting out a circular curve by offset from the chord produced	6

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C-135

B. Tech. Civil Engineering III Semester Examinations (Dec 2025)
Soil Mechanics (BT-CE-209A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q 1. a. The water content of a saturated soil is 15%. What will be the void ratio and dry density of the soil, if specific gravity is 2.65.
b. Define liquid limit and plastic limit of the soil.
c. What are the factors affecting permeability of the soil?
d. Write the assumptions of Boussinesq's theory.
e. Differentiate between compaction and consolidation.
f. What is Mohr-Coulomb failure criteria?

UNIT-I

Q 2. a. Explain how the specific gravity of the soil is determined in the laboratory?

b. The liquid, plastic and shrinkage limits of a clayey soil are 30%, 20% and 10% respectively. Determine the plasticity index and shrinkage index of the soil. Also classify the soil as per IS code.

Q 3. a. With neat sketches explains single grained structure, honey comb structure, flocculant structure and dispersed structure.

b. The results of sieve analysis are as follows-

Sieve size (mm)	4.75	2.36	1.18	0.600	0.300	0.150	0.075	Pan
Mass Retained(g)	85.0	140.0	160.0	150.0	80.0	40.0	25.0	Nil

Draw the gradation curve and determine coefficient of uniformity & coefficient of curvature.

UNIT-II

Q 4. a. Define equipotential function and stream function. Prove that they are mutually orthogonal.

b. Determine the intensity of vertical stress at a point 3 m directly below a concentrated point load of 50 kN. What will be the vertical stress at a point 2 m horizontally away from the axis of loading but at the same depth of 3m?

Q 5. a. What is quick sand phenomena? Determine the critical hydraulic gradient for a loose deposit of sand having void ratio of 0.65 and specific gravity of 2.65.

b. What is contact pressure? What are the factors affecting contact pressure?

UNIT-III

Q 6. a. Explain compaction characteristics of clayey soil. What is zero air void line?

b. Determine the time required for 50% consolidation of a clay layer of 8 m thickness. The coefficient of consolidation is $2x10^{-7}$ sqm/sec. Assume double drainage.

Q 7. a. In the laboratory compaction test was performed on a soil. The maximum dry density was found to be 17 kN/cum at optimum moisture content of 16%. Determine the degree of saturation and percentage air voids at maximum dry density.

b. Define compression index, coefficient of compression and coefficient of volume change.

UNIT-IV

Q 8.a. What is shear strength of the soil? Explain any one method for finding the shear strength of the soil in the laboratory.

b. The results of a direct shear test are as follows-

Normal stress (kN/sqm)	25	75	150	250
Shear stress (kN/sqm)	60	80	105	145

Determine the shear parameters (cohesion and angle of shearing resistance).

Q 9. a. What are the factors affecting shear strength of cohesionless soils?

b. What are the advantages of triaxial shear test?

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