Total No. of Questions : **08** Roll No. : 0701...

B.Tech THIRD SEMESTER EXAMINATION JUNE-2025

(Branch : Civil Engineering)

CE-3401 CONSTRUCTION MATERIAL & TECHNOLOGY

Time : Three Hours

Maximum Marks : 70
Min. Pass Marks : 22

Note : Attempt any five questions.

1(a)	Write the general characteristics and laboratory test required for the stones.	*07*
(b)	What are the defects of timber? Also discuss the seasoning and treatment for timber.	*07*
2	Write short notes on **any four** of the following : (i) Fly ash bricks and stabilized mud blocks (ii) D.P.C. Materials (iii) Building materials made by industrial and agricultural waste (iv) Clay products (v) Advance materials for flooring, doors and windows	*14*
3(a)	What is plumbing? Write in brief about the plumbing materials and accessories.	*07*
(b)	Discuss with neat sketch the various types of deep foundation in brief.	*07*
4(a)	What are the causes of failure of foundation and their remedial measures?	*07*
(b)	Explain the various types of foundation techniques for black cotton soil.	*07*
5(a)	Explain with neat sketch the various types of brick masonry for one brick wall.	*07*
(b)	What are the different types of doors? Explain following types of doors with neat sketches: (i) Battened ledged and braced door (ii) Glazed or Sash door	*07*
6(a)	What do you understand by acoustics of a building? Describe the ways to rectify the acoustical defects of building.	*07*
(b)	Explain P.V.C. materials with its uses and benefits in building and construction.	*07*
7(a)	How will you prevent the cracks and leaks in the building? Also explain the process of repairing the cracks and leaks.	*07*
(b)	Discuss with neat sketch the various types of deep foundation in brief.	*07*
8	Write notes on **any two** : (i) Dog-legged stair-case (ii) Dampness and its protection (iii) L-Panel (iv) Pitched Roof	*14*

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Total No. of Questions : **08** Roll No. : 0701......................................

B.Tech THIRD SEMESTER EXAMINATION JUNE-2025

(Branch : Civil Engineering)

CE-3402 / CE-3301 ENGINEERING GEOLOGY

Time : Three Hours

Maximum Marks : 70
Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks.

1(a)	Define weathering. Name the different types of weathering.	***04***
(b)	Write in detail about the structure of the earth and its composition with a neat diagram.	***10***
2(a)	Explain plate tectonics and name the plate boundaries.	***04***
(b)	Describe in detail about the earthquake belts of India.	***10***
3(a)	Define crystallography. Name the different crystal systems.	***04***
(b)	Discuss the various physical properties which help in identification of minerals.	***10***
4(a)	What are rock forming minerals?	***04***
(b)	Explain the physical properties quartz, biotite, calcite, and hematite.	***10***
5(a)	Explain the different types of rocks.	***04***
(b)	Give the classification, texture and structure of igneous, sedimentary and metamorphic rocks.	***10***
6(a)	Write a note on physical features of India.	***04***
(b)	Describe in detail about the mineral composition, structure, texture, origin, engineering properties and uses of basalt, granite, sandstone and marble.	***10***
7(a)	What is a fault? Explain its parts.	***04***
(b)	Discuss the various types of faults and write about the engineering applications.	***10***
8(a)	Explain engineering properties of rocks.	***04***
(b)	Give a detailed account of the various geological structures and their role in selection of sites for engineering projects.	***10***

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Total No. of Questions : **08** Roll No. : 0701......................................

B.Tech THIRD SEMESTER EXAMINATION JUNE-2025

(Branch : Civil Engineering)

CE-3403 STRENGTH OF MATERIAL

Time : Three Hours ***Maximum Marks : 70***
Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks.

1(a) A steel bar of 20 mm diameter is subjected to forces as shown in ***fig.1*** below. Determine the total deformation of bar, taking E for Steel 2.1×10^5 N/mm^2. ***07***

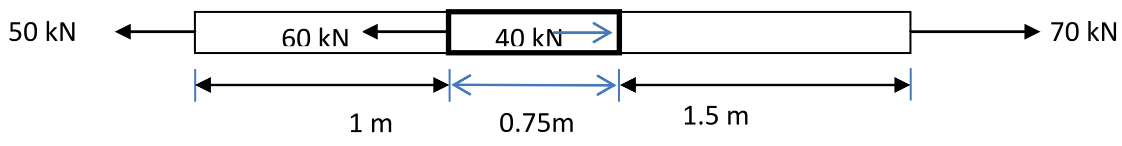

Fig.1

(b) A C I Flat 300 mm long and 40 mm × 50 mm uniform section, is acted upon by following forces over the respective cross section : 50 kN (tensile) in the direction of length, 350 kN (compressive) in the direction of width (40 mm) and 200 kN (tensile) in the direction of thickness (50 mm). Determine change in volume of flat. ***07***

2(a) A bar of 25 mm diameter 425 mm long is subjected to a Pull of 40 kN. The change in the diameter and Elongation of bar are measured as 0.0030 mm and 0.16 mm respectively. Calculate the poisons ratio and value of three Moduli. ***07***

(b) A steel bar is placed between two copper bars, each having same area and length as steel bar at 20°C. At this stage they are rigidly held together at both the ends. When the temperature is raised to 320°C the length of bars increases by 1.5 mm. determine the original length and final stresses in the bar. Take E_s = 220 GN/mm^2, E_c = 110 GN/mm^2 and $\alpha_s = 12\times10^{-6}/^{o}C$, $\alpha_c = 17.5\times10^{-6}/^{o}C$. ***07***

3(a) Explain terms "neutral axis" and "section modulus". Explain variation of bending stress and shear stress across a rectangular section of a beam. ***07***

(b) Draw Bending Moment and Shear Force Diagram for the Beam Shown in ***fig.2*** below. ***07***

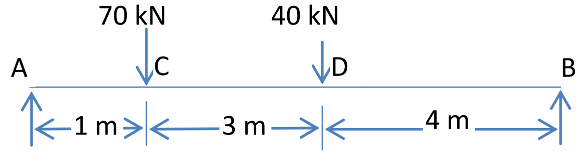

Fig.2

4(a) A cast iron water main 12 m long, 500 mm inside diameter and 25 mm wall thickness runs full of water and is supported at its ends. Calculate maximum stress in the metal if the density of cast iron is 7200 kg/m^3 and that of water is 1000 kg/m^3. ***07***

(b) Compare the weight of two beams of the same material and of equal strengths one being of circular section and solid and the other being of hollow circular section, the internal diameter being 3/4 of the external diameter. ***07***

P.T.O.

5(a) A Beam AB simply supported at its ends is subjected to a point load at C as shown in ***fig.3***. ***07***
Compute : (i) deflection at C (ii) Slope at B (iii) Maximum deflection.

Take $E = 2\times10^5$ N/mm^2 and $I = 6\times10^8$ mm^4.

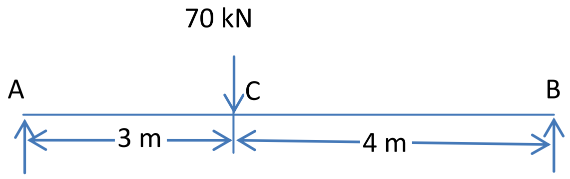

Fig.3

(b) Explain Strain Energy, Moment area theorem and conjugate beam method of calculating deflection along with their application for particular problem. ***07***

6(a) Note down assumptions in the theory of Torsion. A hollow Shaft transmits 200 kW power at 150 rpm. The total angle of twist in a length of 5 m is 3^o. Find the inner and outer diameter of the shaft if maximum shear stress should not exceed by 60 N/mm^2 for material of shaft. Take C = 80 GPa. ***07***

(b) A close coiled helical spring has stiffness 900 N/m in compression with maximum load of 45 N and maximum shear stress of 120 N/mm^2. The solid length of spring is 45 mm. find out wire diameter mean coil radius and no of coils. Take $G = 0.4 \times 10^5$. ***07***

7(a) Differentiate between short and long column. Note down various end conditions of the column and effective length of column under these end condition. ***07***

(b) A short column of hollow cylindrical section 25 cm outside diameter and 15 cm inside diameter carries a vertical load of 400 kN along one of the diameter planes 10 cm away from the axis of the column. Find extreme intensities of stresses and state their nature. ***07***

8 Write short note on **any three** : ***14***

(i) Hooks law, Yield point
(ii) Lateral and Linear Strain, Poisson’s ratio
(iii) Principal plane and Principal Stress
(iv) Assumptions in theory of simple bending
(v) Bulk Modulus, shear Modulus

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Total No. of Questions : **08** Roll No. : 0701...................................

B.Tech THIRD SEMESTER EXAMINATION JUNE-2025

(Branch : Civil Engineering)

CE-3404 / CE-3303 BUILDING DESIGN & DRAWING

Time : Three Hours

Maximum Marks : 70
Min. Pass Marks : 22

Note : Answer any five questions. All questions carry equal marks. Assume suitable data, wherever necessary and mention them clearly.

1(a) Enlist various principle`s of architectural composition. Explain briefly unity. ***1,5***

(b) Enlist various principle`s of planning building and explain circulation and Elegance. ***1,4,3***

2 A single storey residential building is to be planned on a plot of 140 m^2 consisting essentially of : Living cum dining room, two double bed rooms (provide attached WC cum Bath at least in one bed room), A front veranda, A kitchen etc. All other provisions such as sanitary units, built in cupboards etc. may be suitably provided. Draw the Plan of Residential building. ***14***

3 A single storey primary health centre is to be planned for rural area. The following accommodation needs to be provided : Waiting hall, office room, consulting rooms (3 numbers), Medicine store, Minor operation theatre, Labour room, Pathology laboratory, separate 10 beds male ward and 06 beds female ward with a nurse room. All other provisions such as : entrance, verandah, Separate sanitary units for males and females etc. may be suitably provided. Assume suitable plot area. Draw plan of Primary health centre. ***14***

4(a) Write various sources of dampnes in buildings. Draw the neat sketch of the sky light. ***3,3***

(b) Compare English bond with Flemish bond in brick-work and explain briefly reinforced concrete lintel. ***5,3***

5 Draw perspective view of a hexagonal pyramid (using two point perspective methods) having sides 2 cm each and height 5 cm. The distance of station point from the picture plane is 10 cm and eye level 3 cm. ***14***

6(a) Discuss briefly about energy efficient buildings. ***06***

(b) Discuss the main components of holiday hostel and write the requirements of assembly hall in secondary school. ***4,4***

7(a) Write notes as per national building code provisions on building services of ventilation. ***06***

(b) Illustrate King Post Roof Truss with a neat sketch and discuss the requirements of well designed stairs. ***4,4***

8 Write technical short notes on **any four** : ***14***

(i) Site selection criteria of girls hostel building,
(ii) Objectives of building bye-laws,
(iii) Parallel and oblique perspective,
(iv) Grillage foundation,
(v) Main components of student's hostel

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Total No. of Questions : **08** Roll No. : 0701.......................................

B.Tech THIRD SEMESTER EXAMINATION JUNE-2025

(Branch : Civiil Engineering)

CE-3405 FLUID MECHANICS – I
CE-3304 FLUID MECHANICS

Time : Three Hours *Maximum Marks : 70*
Min. Pass Marks : 22

Note : Attempt any five questions. Answer one complete question continuously. Assume any missing data suitably.

1(a) A triangular plate of 1 m base and 1.5 m altitude is immersed in water. The plane of the plate is inclined at 30° with free water surface and the base is parallel to water surface and at a depth of 2m. Find the total pressure and position of centre of pressure. ***07***

(b) A solid cylinder 2 m in diameter and 2 m high is floating in water with its axis vertical. If the specific gravity of the material of cylinder is 0.65 find the metacentric height. Also state whether the equilibrium is stable or unstable. ***07***

2(a) What is metacenter? Derive an expression for analytical determination of metacentric height. ***07***

(b) An inverted U tube manometer is connected to two horizontal pipes A and B through which water is flowing. The vertical distance between the axes of these pipes is 30 cm. When an oil of specific gravity 0.8 is used as gauge fluid, the vertical height of water columns in two limbs of inverted manometer (when measured from the respective centre lines of the pipes) are found to be same and equal to 35 cm. Determine the difference of pressure between the pipes. ***07***

3(a) What are the different methods for description of fluid motion also describe different types of fluid flow. ***07***

(b) A jet of water from a 25 mm diameter nozzle is directed vertically upwards. Assuming that the jet remains circular and neglecting any loss of energy, what will be the diameter at a point 4.5 m above the nozzle, if the velocity with which the jet leaves the nozzle is 12 m/s. ***07***

4(a) Define and explain following–Stream line, Equipotential lines, flownet, also write uses and limitation of flow net. ***07***

(b) The velocity components in a two dimensional flow field for an incompressible fluid are as follows : $\mathbf{u = (y^3/3) + 2x - x^2y}$ $\mathbf{v = xy^2 - 2y - (x^2/3)}$ ***07***

Obtain an expression for the stream function Ψ.

5(a) A 1 m diameter circular tank contains water up to a height of 4 m. At the bottom of tank an orifice of 40 mm is provided. Find the height of water above the orifice after 1.5 minutes.($C_d = 0.6$). ***07***

(b) A venturimeter is installed in a pipeline carrying water and is 300 mm in diameter. The throat diameter is 125 mm. The pressure in pipeline is 140 kN/m^2, and the vacuum in throat is 375 mm of mercury. 4 percent of differential head is lost between the gauges. Working from first principle, find the flow rate in pipeline in l/s, assuming the venturimeter to be horizontal. ***07***

P.T.O.

6(a) Using Buckingham's π theorem, show that the velocity through a circular orifice is given by - **07**

$$V = \sqrt{(2gH)}\ \phi\ [(D/H), \mu/(\rho V H)]$$

H = head causing flow D = diameter of orifice **μ** = Coefficient of viscosity
ρ = mass density and g = acceleration due to gravity

(b) What is distorted model? Why it is necessary? What are the advantages and disadvantages of distorted model? **07**

7(a) Give the examples of laminar flow then write the characteristics of laminar flow. Also write Navier Stoke Equation of motion. **07**

(b) Derive the relationship between Shear Stress and Pressure Gradient for fluid flow. **07**

8(a) Explain all dimensionless numbers. **07**

(b) A laminar flow is taking place in a pipe of diameter 200 mm. The maximum velocity is 1.5 m/s. Find the mean velocity and the radius at which this occurs. Also calculate the velocity at 4 cm from the wall of the pipe. **07**

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