Vidya Academy of Science & Technology Technical Campus
Accredited by NAAC with 'B++' Grade
"A Unit of Vidya International Charitable Trust"

Department of Civil Engineering

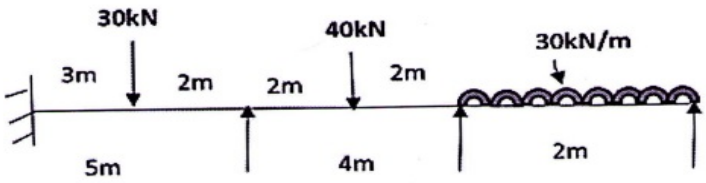
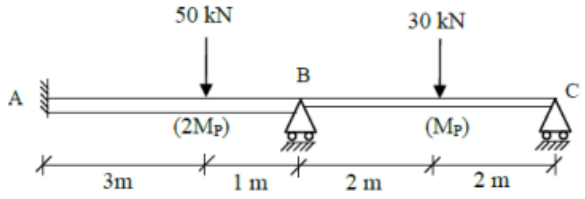
S6 - Even Semester Question Bank

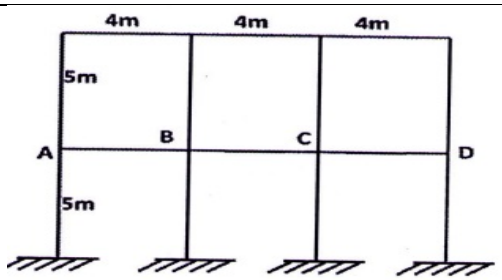
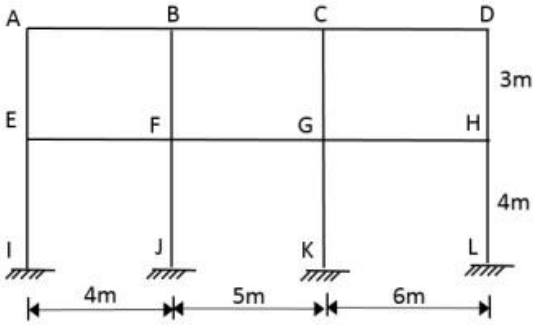
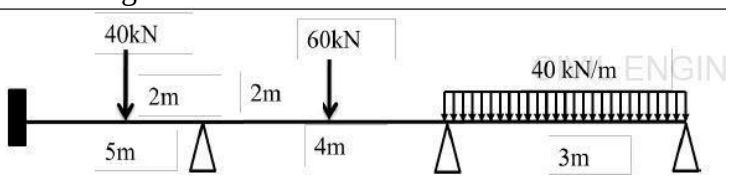
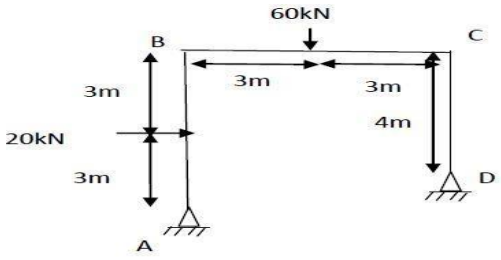
VIDYA ACADEMY OF SCIENCE AND TECHNOLOGY TECHNICAL CAMPUS, KILIMANOOR, THIRUVANANTHAPURAM - 695 602

(Accredited by NAAC with 'B++' grade)

DEPARTMENT OF CIVIL ENGINEERING
QUESTION BANK
CET302 STRUCTURAL ANALYSIS - II

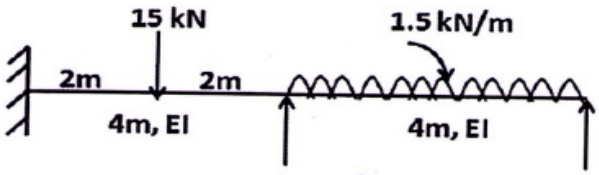
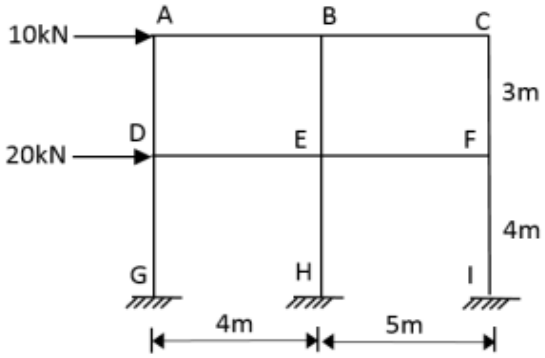
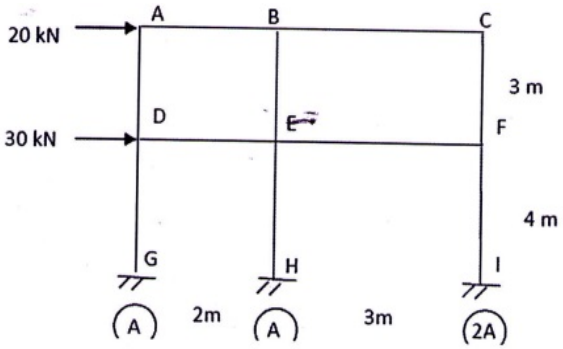
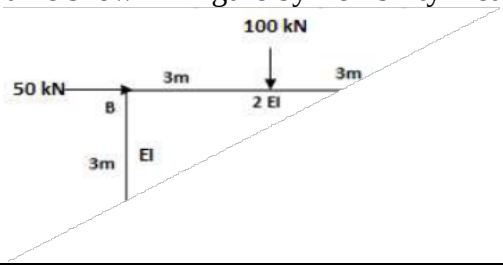
MODULE 1

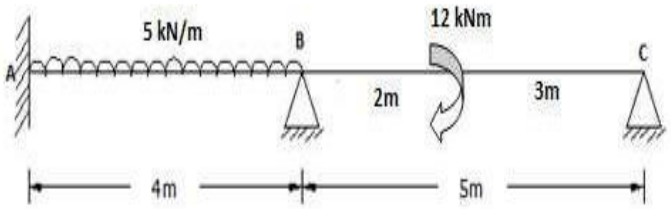
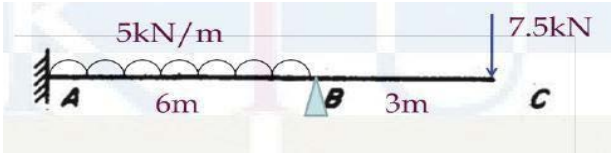
No	Questions	Year	Marks
1.	a. Define shape factor and load factor. Obtain the shape factor for a solid circular section of diameter D.	**KTU June 2022 QP/**	**3 Marks**
	b. Derive an expression for the shape factor of a rectangular cross section. c. Mention the advantages and disadvantages of approximate method of analysis. d. What are the advantages and disadvantages of approximate methods of structural analysis? e. Explain plastic section modulus.	**Model QP**	
	f. Explain the concept of plastic hinge.		
2.	Find the plastic moment capacity of the beam shown in the figure. Assume uniform section throughout. 	**KTU May 2023**	**14 Marks**
3.	Determine the plastic moment carrying capacity Mp for the continuous beam shown in figure below. Take load factor = 1.5. 	**KTU Jun 2022**	**14 Marks**
4.	In a multi-storeyed building, the frame shown is spaced at 4m intervals. Dead load from the slab is 2kN/m2 and the live load is 4kN/m2. Analyse the beam BC for maximum negative bending moment by substitute frame method. Self-weight of the beams may be ignored. Assume any missing data suitably.	**KTU May 2023**	**14 Marks**

			
5.	Analyse the frame shown below for mid-span positive moment on span FG, using Substitute frame method. Total dead load is 15kN/m and total live load is 30kN/m. Flexural rigidity EI is same for all members. 	**KTU May 2023**	**14 Marks**
6.	Find the plastic moment capacity of the beam shown in figure. Assume uniform section throughout. 	**KTU May 2023**	**14 Marks**
7.	Determine the shape factor of T- Section with flange width 120 mm. Depth of the web is110 mm. Thickness of flange and web is 10 mm. If the value of yield stress is 250N/mm2, find the plastic moment capacity of the section.		
8.	Find the value of Mp for the frame of uniform section under the applied factored loads. 	**KTU Dec 2019 QP**	**14 Marks**

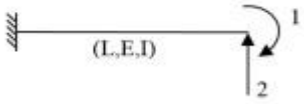
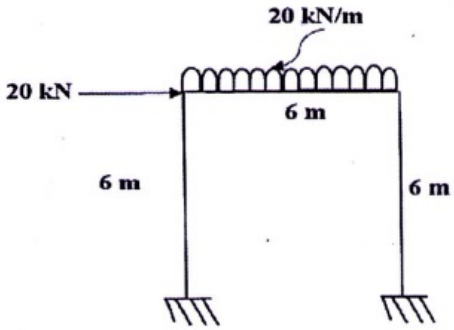
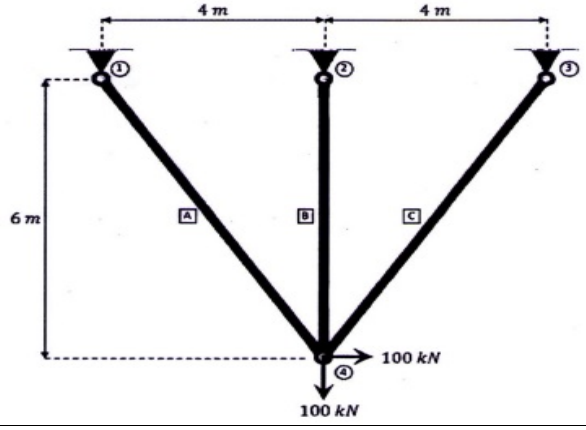
MODULE 2

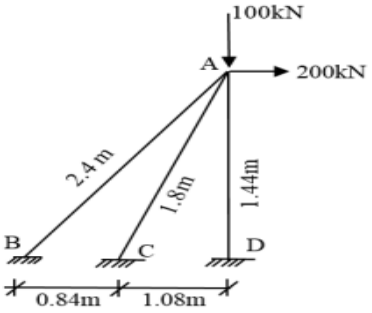
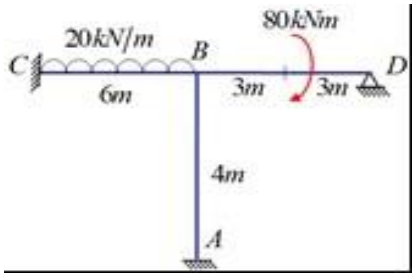
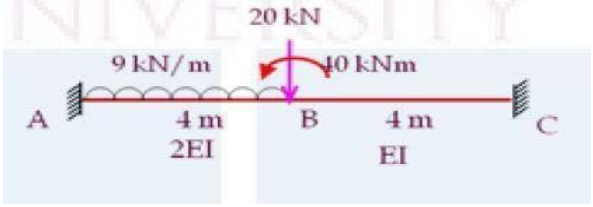
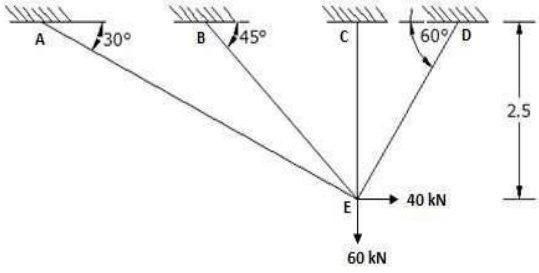
1.	a.What are the assumptions made in the portal method of analysis for horizontal loads? b.Derive flexibility matrix for the coordinates for the beam element shown below.  c.What are the assumptions involved in the cantilever method of analysis?	**KTU Jun 2022 QP**	**3 Marks**

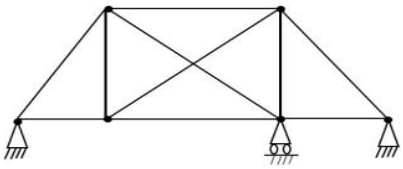
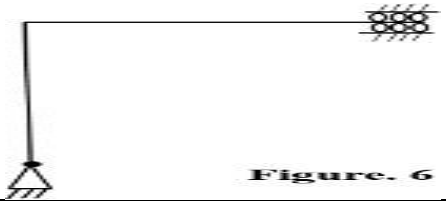
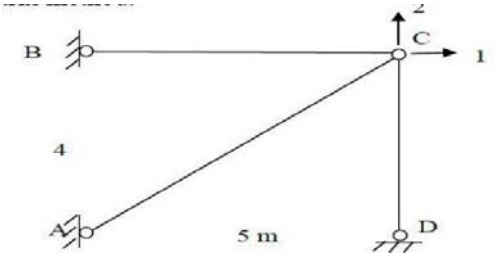
	d.what are the assumptions involved in cantilever method of analysis?	**KTU May 2023 QP**	
	e.Explain how the effect of lack of fit is considered in the flexibility matrix method of Analysis. f.Derive the relationship between force transformation matrix and displacement transformation matrix.	**KTU Dec 2020 QP**	
	g.What are the assumptions in the portal method of analysis?	**KTU May 2019 QP**	
2.	Analyze the continuous beam shown in figure below by flexibility method and draw the BMD. 	**KTU May 2023 QP**	**14 Marks**
3.	Analyse and determine the beam and column moments for the frame shown in figure below by Portal method. Flexural rigidity EI is same for all members. 	**KTU Jun 2022 QP**	**14 Marks**
4.	Analyze the rigid frame loaded as shown in the figure using cantilever method. Compute the BM in beams and columns and draw the BMD for beams and columns. Cross-section areas of columns are given as A, A, and 2A. 	**KTU May 2023 QP**	**12 Marks**
5.	b.Analyse the frame shown in figure by flexibility method. 	**KTU Dec 2020 QP**	**12 Marks**

6.	Analyse the continuous beam shown in Figure, using the flexibility matrix method and find the bending moments. 	**KTU Dec 2020 QP**	**10 Marks**
7.	Analyse the beam in figure using flexibility method. 	**KTU Model QP**	**14 Marks**
8.	a. Explain the load transformation matrix approach in flexibility method. b. Explain analysis of plane trusses by flexibility method.	**KTU May 2019 QP**	**8 Marks** **7 Marks**

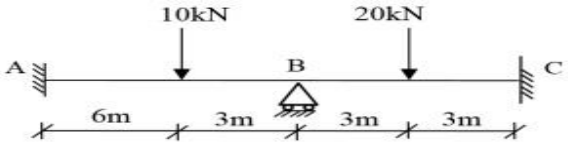
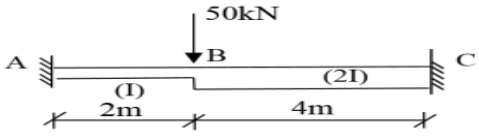
MODULE 3

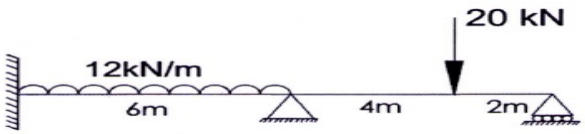
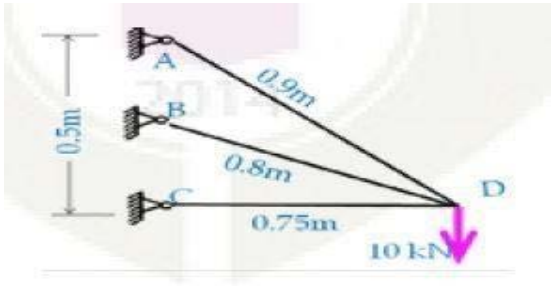
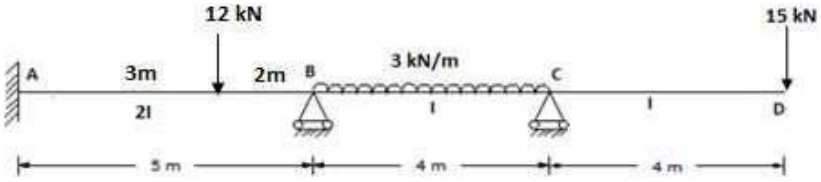
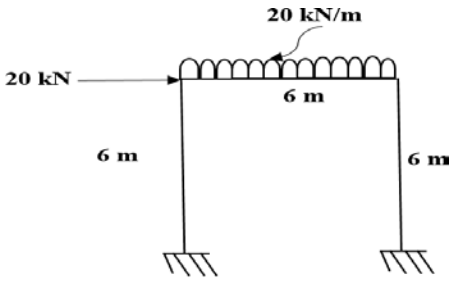
1.	a. Compare force method and displacement method of analysis. b. Derive the stiffness matrix for the co-ordinates shown in figure below. 	**KTU Jun 2022 QP**	**3 Marks**
2.	Analyze the portal frame by stiffiress matrix method. Take EI constant. 	**KTU May 2023 QP**	**14 Marks**
3.	Find the forces in the members of the truss loaded as shown in figure using stiffiless method. Assume axial rigidity same for all members. 	**KTU May 2023 QP**	**14 Marks**
4.	Find the vertical and horizontal deflection at joint A for the truss shown in figure below by stiffness method. Axial rigidity AE is same for all members.	**KTU Jun 2022 QP**	**14 Marks**

			
5.	Determine all the member end moments for the frame shown in figure, using stiffness method. 	**KTU Model QP**	**14 Marks**
6.	Determine the displacements at B for the beam shown in figure, using stiffness method. 	**KTU Model QP**	**14 Marks**
7.	Find the forces in the members of the truss loaded as shown in figure using stiffness method. 	**KTU Dec 2020**	**10 Marks**

8.	Find the Kinematic indeterminacy and Static indeterminacy of the continuous beam (Figure.4), pin jointed frame (Figure.5) and rigid frame (Figure.6).  Figure. 4- Discard axial forces  Figure. 5  Figure. 6	**KTU Dec 2019**	**9 Marks**
9.	Analyse the truss shown in Fig. 4 (with active global coordinates, as shown) and find the joint displacements, support reactions and bar forces. The truss is subjected to direct loads F1=50kN; F2=30kN, and a lack of fit due to bar AC being too long by 5mm. Assume all bars to have same axial rigidity AE=6000kN. Use Stiffnes matrix. 	**KTU May 2019**	**10 Marks**

MODULE 4

1.	a.What are the steps involved in the direct stiffness method of analysis. b.Differentiate between local coordinates and global coordinates. c.How element stiffness matrix in global coordinates is derived from the local coordinate system for a truss element?	**KTU Jun 2022 QP KTU May 2023 QP**	**3 Marks**
2.	Analyse the continuous beam shown in figure below by direct stiffness method and draw the BMD. Flexural rigidity EI is constant throughout the beam. 	**KTU Jun 2022 QP**	**14 Marks**
3.	Determine the slope and deflection at B for the fixed beam shown in figure below by direct stiffness method. 	**KTU Jun 2022 QP**	**14 Marks**

4.	Analyse and draw bending moment dlagram for the continuous beam shown in figure using direct stiffrress method.fisume constant EI for all the members. 	**KTU May 2023 QP**	**14 Marks**
5.	Find the joint displacements for the pin-jointed truss shown in figure, using direct stiffness method. 	**KTU Model QP**	**14 Marks**
6.	a. How global stiffness matrix can be derived from the element stiffness matrix. b. Analyse the continuous beam shown in Figure, using direct stiffness method and find the bending moments. 	**KTU Dec 2020**	**5 Marks** **15 Marks**
7.	Analyse and draw bending moment diagram for the frame shown in Figure 9. using direct stiffness method.  **Figure. 9**	**KTU Dec 2019**	**14 Marks**

MODULE 5

1.	a.Explain the components of a basic dynamic system b.Define logarithmic decrement.	**KTU May 2023 QP**	**3 Marks**
	c.Compare transient and steady state response of a SDOF system subjected to harmonic load. d.Define the following terms: (i) free and forced vibration (ii) damped and undamped vibration.	**KTU Jun 2022 QP**	
	e.Discuss the concepts of vibration isolation and its applications. f.State and explain D'Alembert's principle.	**KTU Dec 2020 QP**	**3 Marks**
	g. What is critical damping h. What is the magnification factor?	**KTU Dec 2019**	**3 Marks**

	i. Person standing on a spring produces a deflection of 1.0mm to the spring. Find the natural frequency and Time period. j. Write the equation of motions corresponding to the damped and undamped free and forced vibration.		
2.	Calculate the natural frequency of transverse vibrations of a cantilever beam 40mm diameter circular cross-section, carrying a load of 500N at the free end. Span of the cantilever beam is 800mm. E: 200kN/mm2. If a spring of stiffness 52.75kN/m is introduced between the mass and the beam. Calculate the change in natural frequency.	**KTU May 2023 QP**	**14 Marks**
3.	Derive an expression for the free vibration response of a damped SDOF system (under damped case). Draw the displacement response diagram.	**KTU May 2023 QP**	**14 Marks**
4.	A vibrating system consists of a weight of W = 100kN and a spring with stiffness k=20N/m is viscously damped so that the ratio of two consecutive amplitudes is 1/0.85. Determine a) the natural frequency of the undamped system, b) the damping ratio, c) the damping coefficient and d) the damped natural frequency.	**KTU Model QP**	**14 Marks**
5.	A system vibrating with a natural frequency of 6Hz starts with an initial amplitude of 2cm and an initial velocity of 25cm/s. Determine the natural period, amplitude, maximum velocity, maximum acceleration and phase angle. Also write the equation of motion of a vibrating system.	**KTU Dec 2020**	**8 Marks**
6.	A vibrating system consists of mass of 10kg, spring of stiffness 240N/m and a damper with a damper coefficient of 10N-s/m. Determine a. Damping factor b. Natural frequency of damped vibration c. Ratio of successive amplitudes d. Number of cycles after which initial amplitude reduced to 25%.	**KTU Dec 2019**	**8 Marks**

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DEPARTMENT OF CIVIL ENGINEERING
QUESTION BANK

CET 304: ENVIRONMENTAL ENGINEERING

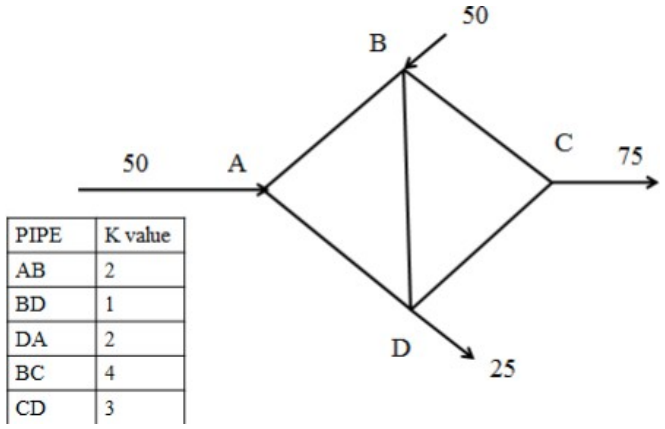
MODULE I

No.	Questions	Marks	Year
1	a) Discuss the merits & demerits of separate and combined system of sewage b) Differentiate population equivalent and design period.	3 3	KTU June 2023
2	a) The following is the population data of a city available from past censusrecords. Determine the population of the year 2011, 2021 by (a) Geometrical increase method (b) Incremental increase method. year: 1931 | 1941 | 1951 | 1961 | 1971 | 1981 | 1991 population: 12000 | 16500 | 26800 | 41500 | 57500 | 68000 | 74100 b) Explain about canal and river intake with neat sketch	7 7	KTUJune 2023
3	a) The total area of a district is 36 hectare and in which 20% of area is roof with C=0.9, 20 % is pavement (C=0.85), 5 % is paved yard (C=0.8), 15% is Mecadam road (C=0.4), 35% is lawns (C=0.1) and 5 % is miscellaneous (C=0.05). The intensity of rain is 5cm/ hr, Find out the runoff. b) Explain about different types of pumps for water conveyance.	8 6	KTU June 2023
4	a) What are the factors on which natural forces of purification depend? b) Compare pressure flow and gravity flow systems adopted for water conveyance	3 3	KTU June 2022
5	a) Explain briefly the different methods for population forecasting of a city? b) What are the various factors affecting water consumption?	12	KTU June 2022
6	Explain the different types of raw water intakes with sketches?	10	KTU June 2022
7	Define the term "per capita demand". Write the factors affecting "per capita demand" and state the reasons for variations in demand.	4	KTU May 2020
8	a) Define Design period. What are the factors governing the design period? b) Determine the daily water demand of the city in 2031, if the per capita water demand is 135 lpcd and the city population records is as given below Year 1961 1971 1981 1991 2001	5 10	KTU May2019

	Population 25000,52000,94000,164000,247000		
9	In two periods each of 20 years a city has grown from 50000 to 110000 and 160000 find the population expected in the next 20 years and also the saturation population	8	KTU Dec 2019
10	a) Explain Dry weather flow and wet weather flow b) What is fire demand? How will you calculate fire demand	9 5	KTU Dec 2018
11	Explain any three types of raw water intakes with sketches?	7	December 2024
12	Define per capita water demand?	2	December 2024

MODULE 2			
1	a) What are the objectives of providing aerators in water treatment plant? b) Explain any three coagulants used in water treatment plant	3 3	KTU June 2023
2	a) Discuss about different types of screens. b) Design a plain sedimentation tank for water supply scheme having capacity totreat water=10 MLD. Assume the data which is required.	7 7	KTU June 2023
3	a) Define stokes law b) Explain about wet feeding and dry feeding devices	4 10	KTU June 2023
4	a) Explain the function of a clariflocculator in a water treatment plant? b) Explain the objectives of providing aeration in the water treatment process?	3 3	KTU June 2022
5	a) Explain the different types of settling in a sedimentation tank? b) What are the factors to be considered while selecting a site for a water treatment plant?	10 4	KTU June 2022
6	The maximum daily demand at a water purification plant has been estimated as 12 million litres per a day. design the dimension of a suitable sedimentation tank (fitted with mechanical sludge removal arrangements) for the raw supplies, assuming a detention period of 6 hours and velocity of a flow as 20 cm per minute.	14	KTU June 2022
7	Find the settling velocity of a particle of 0.06mm diameter, having a specific gravity of 2.65 in water at a temperature of 20C. Take kinematic viscosity as 1.007*10^-6 m2/sec	6	KTU Dec 2019
8	Describe any two mixing devices of coagulants with figure.	6	KTU Dec 2019
9	Water has to be purified for a town whose daily demand is 9 x 10^6 litres/day. Design a suitable sedimentation tank of the water works fitted with sludge remover. Assume the velocity of flow, in the sedimentation tank as 22cm/min and the detention period as 8 hrs.	10	KTU Dec 2019
10	Explain the mechanisms of coagulation	5	
11	The maximum daily demand at a water purification plant has been estimated as (14) l2 million litres per day. design the dimension of a suitable sedimentation	6	KTU DECEMBER 2024

	tank (fitted with mechanical sludge removal arangements) for the raw suppliesassuming a detention period of 6 hours and velocity of a flow as 20 cm per minute.		
12	Explain the process of sedimentation aided with coagulation in process?	7	KTU DECEMBER 2024

	MODULE 3		
1	a) Discuss about theory of filtration. b) Explain about different layout of distribution of water.	3 3	KTU June 2023
2	a) Explain the working of a rapid sand filter. Discuss about backwashing of rapidsand filter. b) What is equivalent pipe method.	10 4	KTU June 2023
3	a) Discuss any two disinfection methods b) Analyse the given network using Hardy cross method.	4 10	KTU June 2023
	 PIPE / K value AB 2 BD 1 DA 2 BC 4 CD 3		
4	Compare slow sand filters with rapid sand filters? Explain any three types of chlorination in a water treatment plant	3 3	KTU June 2022
5	Design a rapid sand filter to treat 4 million litres of raw water per day allowing 4% of filtered water for backwashing. Half hour per day is used for backwashing. Assume necessary data.	14	KTU June 2022
6	a) Explain the working of a pressure filter with a neat sketch b) Explain the Hardy cross method for water distribution network analysis	7 7	KTU June 2022
7	Design a rapid sand filter to treat 10 million litres of raw water per day allowing 0.5% of filtered water for backwashing. Half hour per day is used for backwashing. Assume necessary data.	14	
8	Enlist and explain the different layout of distribution networkswith their merits and demerits ?	7	KTU Sept 2020
9	Explain and compare various disinfection methods	9	

10	Write a note on different types of filters	9	
11	Explain the requirements of a good disinfectant?	7	KTu December 2024
12	Write a note on operation troubles in rapid sand filters?	8	KTU DECEMBER 2024

MODULE 4			
1	a) What are the factors considered during site selection of waste water treatmentplant. b) What are the secondary treatment units of waste water?	3 3	KTU June 2023
2	a) Discuss about flow equalization tank. b) Explain the construction and working of trickling filter with neat sketch.	4 10	KTU June 2023
3	a) What are the unit processes and operations in waste water treatment plant b) Explain about activated sludge process with neat sketch	4 10	KTU June 2023
4	What are the advantages of providing a flow equalization tank in asewage treatment plant?	3	KTU June 2022
5	Compare aerobic and anaerobic wastewater treatment processes?	3	KTU June 2022
6	Explain the mechanism of functioning of a trickling filter plant with a neat sketch and also explain its advantages and disadvantages?	14	KTU June 2022
7	Design activated sludge treatment unit following data: Population – 65000 Avg. sewage flow – 210 l/capita/day BOD of raw sewage – 210 mg/l Suspended solid in raw sewage - 300mg/lBOD removal in primary treatment – 40% Overall BOD removal desired – 90%	10	Cusat2010
8	a) Explain attached and suspended growth processes b)Give the flow diagram of a conventional municipal wastewater treatment.	3 5	KTU 2019
9	Discuss in detail various biological processes available for treating waste water	10	
10	Design an activated sludge plant treat 6.0 Mld of domestic sewage having a BOD of 210 mg/l. The final effluent should have a BOD of 30 mg/l.	9	
11	Explain primary, secondary and teniary waste water treatment process	7	KTU DECEMBER 2024
12	Discuss the unit operations and unit procjsses in a wastewater treatment plant	8	KTU DECEMBER 2024
MODULE 5			
1	a) Explain about oxidation pond b) Write notes on sludge thickening process.	3 3	KTU June 2023
2	a) Explain about UASB reactor b) Design a septic tank for disposing the waste water from a community of 150 people, and the quantity of water supplied at a rate of 120 litres/person/day. Assume any data may required	7 7	KTU June 2023

3	a) Explain sludge digestion process with neat sketch of sludge digestion tank. (10) b) Explain the principle by which wetlands treat wastewater.	10 4	KTU June 2023
4	Explain the advantages of a septic tank? What are constructed treatment wetlands?	3 3	KTU June 2022
5	What is meant by sludge thickening? List out various methods for sludge thickening	6	Cusat2011
6	What are the advantages and disadvantages of oxidation ponds?	6	KTU 2019
7	Explain the working of an Up flow Anaerobic Sludge Blanket (UASB) reactor. Discuss any three drawbacks of UASB.	10	KTU 2019
8	What are the various factors affecting sludge digestion?	6	KTU 2019
9	Discuss any two types of sludge disposal	5	KTU 2020
10	Discuss natural waste water treatment systems with neat sketches	14	
11	Explain the working of an oxidation pond with a neat sketch which includes its (14) plan and sectional views?	14	KTU DECEMBER 2024
12	Explain the working of a septic tank with a neat sketch which includes its plan (14) and sectional views?	14	KTU DECEMBER 2024

VIDYA ACADEMY OF SCIENCE AND TECHNOLOGY TECHNICAL CAMPUS, KILIMANOOR, THIRUVANANTHAPURAM - 695 602

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DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

CET. 306 DESIGN OF HYDRAULIC STRUCTURES

MODULE I

Sl.No	Questions	Mark	Question paper
1.	Distinguish between Bligh's theory and Khosla's theory	9	KTU June 2023
2.	Explain the failure of hydraulic structures by sub surface flow.	5	KTU May 2024
3.	Explain piping failure of hydraulic structures and state remedial measures	3	KTU June 2023
4.	Explain causes of failures of weirs on permeable soils and state remedial measure	6	KTU January 2024 (S, FE)
5.	Explain limitations of Bligh's theory	5	KTU May 2024
6.	Explain the Design of vertical drop weir on Bligh's theory	5	KTU May 2024
7.	Explain Khosla's theory	6	KTU Model Qn
8.	Explain Exit gradient	5	KTU May 2024
9.	Explain the components of diversion head works	6	KTU Model Qn
10.	What are the functions of a divide wall and silt excluder in a diversion headwork?	5	KTU May 2024

MODULE 2

1.	Draw the section of the unlined canal partly in cutting and partly in filling.	5	KTU June 2023
2.	What is a Cross Drainage work? Explain the types of Cross drainage work.	10	KTU June 2023
3.	Compare Kennedy's theory and Lacey's theory for design of canals through alluvial soils.	9	KTU May 2024
4.	Explain the different classifications of canal?	6	KTU May 2024

5.	Explain different types of Aqueducts	6	KTU May 2024
6.	Explain the types of canal	5	KTU May 2019
7.	Design an irrigation canal through alluvial soils for the following data : Discharge =20 m^3 /sec; Lacey's silt factor =1	9	KTU May 2024
8.	Write a short note on alignment of irrigation canals. Classify the canal based on alignment.	6	KTU January 2024 (S,FE)
9.	Explain type of canal falls	6	KTU January 2024 (S, FE)
10.	Explain Aqueduct and Super passage	5	KTU Model Qn

MODULE 3

1.	**Design a suitable cross drainage works for the following hydraulic particulars (25marks)** Full supply depth =1.25 m Side slope = 1.5H:1V Left bank is 3 m wide. Right bank is 4.5 m wide and the cross drainage work carries a roadway of 4.5 m over it. Drainage Maximum flood discharge = 500 cumecs Bed level of drainage=198 m General gd level=200m Lacey's silt factor = 1 Rugosity coefficient N = 0.016 (b)Prepare following drawing **(25marks)** 1.Half plan at top and half plan at the foundation level 2.Longitudinal section along drain	50	KTU June 2023
2.	**Design a 1.8 m trapezoidal notch fall for the following data (25marks)** Details above drop Full supply discharge = 5.5 cumecs Bed width = 5 m Canal bed level = 19.8 Full supply depth = 1.6 m= 20 m Level at top of the bank = 22.4 The bank top width is 1.8 m Details below drop Full supply discharge = 5.5cumecs Bed width = 5 m Full supply level = 19.6 Level at the top of bank = 20.6 The bank top width is 1.8 m Prepare the following drawings (not to scale) **(25marks)**	50	KTU May 2024

	i) Half sectional plan at foundation level ii) Section through centre line		
3.	**Design a 1.5m Sarda type fall for a canal having a discharge of 15 cumecs for the following data..** Bed level at u/s = 108.00m Side slope of channel = 1:1 Bed level at d/s = 105.5 m Full supply depth at u/s = 109.5 m Bed width u/s and d/s = 10 m Soil is good loam Khosla's safe exit gradient = 1/6 **(25marks)** b) Prepare the following drawings (not to scale)**(25marks)** i. Half sectional plan at the foundation level. ii. Section along the centre line of the canal.	50	KTU June 2023
4.	a) **Design a suitable cross drainage work, for the following data at the crossing of canal and a drainage**.**(25marks)** Canal: Full supply discharge = 42 cumecs Full supply level = 192.7 m Canal bed level = 191.0 m Canal bed width =26 m Trapezoidal canal section with 1.5 H: 1 V slopes Canal water depth = 1.7 m. Drainage: High flood discharge = 340 cumecs. High flood level = 189.0 m High flood depth = 2.7 m. General ground level = 191.5 m. b) Prepare the following drawings (not to scale) **(25marks)** i) Half plan at top and half at foundation level. ii) Section through the centre line of the drain. **5.** a) Design a Sarda Type fall with drop of 1.4 m for a canal carrying a discharge of **(25marks)** 35 cumecs with the following data: Bed level upstream = 104 m Bed level downstream = 102.6 m Side slopes of channel = 1:1 Full supply level upstream = 105.6 m Bed width u/s and d/s = 27 m Safe exit gradient = 1/5 b) Prepare the following drawings (not to scale)**(25marks)** i) Half plan at top and half at the foundation level. ii) Section through the centre line of the canal.	50	KTU Model Qn

MODULE 4

1.	What are the functions of galleries in dams?	6	KTU June 2023
2.	What is the Limiting height of a gravity dam?	4	KTU June 2023
3.	What are the functions of gallery in a gravity dam?	2	KTU September 2020
4.	Check the stability of gravity dam for the following data. Top width = 5 m, freeboard = 3m, u/s FRL depth = 60 m, u/s batter = 1/10, d/s slope = 0.7H to 1V, u/s remains vertical to a depth of 1.2m from the top. There is no tail water and silt.	10	KTU June 2023
5.	Explain the features of different types of spillways	5	KTU May 2024
6.	Obtain the expressions for principal stress and shear stress at the toe of a gravity dam	5	KTU May 2024
7.	Differentiate low dams and high dams	5	KTU May 2024
8.	What are the forces acting on a gravity dam?	5	KTU May 2024
9.	What are the functions of gallery in a gravity dam?	3	KTU Model Qn
10.	What is meant by elementary profile of a gravity dam?	3	KTU January 2024 (S, FE)

MODULE 5

1.	What is a Stilling basin? Explain Type I and Type II stilling basins.	7	KTU June 2023
2.	Explain the thin cylinder method of design of the Arch dam.	3	KTU June 2023
3.	Explain the features of Ogee type spillway.	4	KTU June 2023
4.	Explain in detail the design criteria of an earth dam.	6	KTU June 2023
5.	Explain any five causes of failure of earth dams	4	KTU May 2024
6.	Explain the type of earth dams with neat sketch	6	KTU May 2024
7.	Explain stilling basin	4	KTU May 2024
8.	Derive the most economical central angle of arch dam	5	KTU May 2024

9.	Explain the types of arch dam	5	KTU January 2024 (S, FE)
10.	What is spillway? Explain ogee type of spillway with a neat sketch	5	KTU January 2024 (S, FE)

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DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

SUB CODE CET322 SUBJECT NAME GEOTECHNICAL INVESTIGATION

No	Questions	Marks	Year
	MODULE I		
1	Explain in detail a site investigation programme.	10	KTU 2022
2	What is the criteria for fixing the number and spacing of boreholes?	4	KTU 2022
3	What should be the borehole spacing for the following cases i) An industrial complex covering large area ii) A compact building covering an area of 4000 m2	4	KTU 2019
4	Differentiate between preliminary and detailed soil investigation. What are the details to be collected in these two stages of investigation?	5	KTU 2018
5	List different methods of soil exploration	2	KTU 2018
6	Explain Site reconnaissance in soil investigation program	3	KTU 2023
7	Define Significant Depth	3	KTU 2023
8a)	Discuss on the guidelines laid down in IS code for fixing the number of boreholes and depth of exploration	7	KTU 2023
8b)	Explain in detail Auger Boring with a neat sketch	7	KTU 2023
9a)	What are the stages in Sub-surface Exploration and explain	8	KTU 2023
9b)	Differentiate between Pits & Trenches	6	KTU 2023
9c)	What are the procedures to be carried out for preliminary and detailed ground investigation?	10	KTU 2020
10a)	As per IS guidelines, what should be the minimum number of borehole in the following cases. i) A large multi-storey building. ii) A compact building covering an area of 4000 m2	3	KTU 2024
10b)	List any three types of Augers. For which type of soil, auger boring is preferred?	4	KTU 2024
10c)	Explain the IS guidelines for fixing the depth of exploration.	7	KTU 2024
	MODULE II		
1	Explain the various corrections to be applied for SPT test	10	KTU 2022
2	The observed SPT N value in a deposit of fully submerged fine silty sand was 45 at a depth of 6.5 m. The average saturated unit weight of soil is 19.5 kN/m2. Find the corrected SPT number.	4	KTU 2022
3	List any three advantages of static cone penetration test.	3	KTU 2022
4	Explain the Overburden correction to be applied to the N value	3	KTU 2023
5	List any three advantages of Static Cone Penetration test	3	KTU 2023
6a)	The field N value in a deposit of fully submerged fine sand was 50 at a depth of 7.5m. The average saturated unit weight of soil is 19kN/m3. Calculate the corrected N value	9	KTU 2023
6b)	Describe Sounding methods in soil exploration, with examples	5	KTU 2023
7a)	What are the factors influencing SPT results and explain the precautions to obtain reliable results	9	KTU 2023

<table>
<tr><td>7b)</td><td>What are the drawbacks of Dynamic cone penetration test</td><td>5</td><td>KTU 2023</td></tr>
<tr><td>8</td><td>How does overburden pressure and dilatancy affect the measured Standard penetration number or N value?</td><td>5</td><td>KTU 2020</td></tr>
<tr><td>9a)</td><td>Explain dynamic cone penetration test with a neat diagram.</td><td>7</td><td>KTU 2020</td></tr>
<tr><td>9b)</td><td>If it is required to find the friction resistance of soil at a given site, which cone penetration test would you recommend? Also explain the procedure of obtaining skin friction and end resistance from that test with suitable sketches.</td><td>5</td><td>KTU 2019</td></tr>
<tr><td>10a)</td><td>Describe the advantages of static cone penetration test.</td><td>3</td><td>KTU 2024</td></tr>
<tr><td>10b)</td><td>In a standard penetration test, the following observations were taken at a depth of8 m below the ground level:
<table><tr><th>Location (cm)</th><th>No.of blows</th></tr><tr><td>0 -15</td><td>18</td></tr><tr><td>15-30</td><td>32</td></tr><tr><td>30-45</td><td>23</td></tr></table>The water table is located at a depth of 3m below ground level. Estimate thecorrected SPT value. The average unit weight of soil above water table is 18kN/m3and saturated unit weight below water table is 20 kN/m3γw =10 kN/m3</td><td>8</td><td>KTU 2024</td></tr>
<tr><td>10c)</td><td>Explain how SPT N value is correlated with the unconfined compressive strengthof cohesive soil.</td><td>6</td><td>KTU 2024</td></tr>
<tr><td colspan="4">MODULE III</td></tr>
<tr><td>1</td><td>With a neat diagram, explain the process of seismic refraction method.</td><td>10</td><td>KTU 2022</td></tr>
<tr><td>2</td><td>Differentiate between electrical profiling and electrical sounding method</td><td>4</td><td>KTU 2022</td></tr>
<tr><td>3</td><td>A seismic refraction study of an area has given the following data
<table><tr><td>Distance from impact point to geophone (m)</td><td>15</td><td>30</td><td>60</td><td>90</td><td>120</td></tr><tr><td>Time to receive wave (s)</td><td>0.025</td><td>0.05</td><td>0.10</td><td>0.11</td><td>0.12</td></tr></table>Plot the time travel data and determine the seismic velocity for the surface layer and underlying layer. Also determine the thickness of the upper layer.</td><td>7</td><td>KTU 2018</td></tr>
<tr><td>4</td><td>If you are given the velocity of shock-waves in different soils, which geophysical test would you recommend and also explain the procedure. Can it be used to identify the soil profile of an area where there are buried conduits? Explain.</td><td>4</td><td>KTU 2019</td></tr>
<tr><td>5</td><td>Data set from a seismic refraction test is given below.
<table><tr><td>Distance from impact point to geophone (m)</td><td>10</td><td>20</td><td>40</td><td>80</td><td>140</td></tr><tr><td>Time to receive wave (s)</td><td>0.025</td><td>0.050</td><td>0.100</td><td>0.110</td><td>0.120</td></tr></table>i) Plot the time travel data and determine the seismic velocity for the surface layer and underlying layer.
ii) Determine the thickness of the upper layer.</td><td>8</td><td>KTU 2022</td></tr>
</table>

6	How the thickness of subsurface layers is computed using seismic refraction method?	5	KTU 2020
7	What are geophysical methods and their limitations?	3	KTU 2023
8	Define Stabilization of Bore hole with casing	3	KTU 2023
9a)	Explain the procedure for conducting Electrical Profiling method	8	KTU 2023
9b)	Explain the limitations of Electrical Resistivity Method	6	KTU 2023
9c)	Explain the estimation of ground water level	7	KTU 2023
10a)	Explain Seismic refraction method with a neat sketch	7	KTU 2023
10b)	Give a critical comparison of Standard penetration test and Cone penetration test.	6	KTU 2024
10c)	Explain the limitations of seismic refraction method.	4	KTU 2024
MODULE IV			
1	Sketch a piston sampler and explain its working.	10	KTU 2019
2	Briefly explain the method of collecting sand samples from beneath the water table.	5	KTU 2019
3	During a sampling operation, a thin walled sampler was pushed into soft clay to a distance of 600 mm. The recovered length of the sample was found to be 589 mm. What is the recovery ratio? Also mention the sample quality.	5	KTU 2019
4	Explain the factors affecting sample disturbance and ways to reduce them.	10	KTU 2019
5	Differentiate between Disturbed & Un-disturbed Samples	3	KTU 2023
6	What are the factors affecting Sample disturbance during sampling operation	3	KTU 2023
7a)	What are the measures that you are going to adopt while handling and transporting the soil sample?	8	KTU 2023
7b)	Explain chunk & tube samples	6	KTU 2023
8a)	What are the methods adopted to minimize the disturbance of the sample?	7	KTU 2023
8b)	Explain the Shelby Tube Sampler with a sketch	7	KTU 2023
9a)	What are representative soil samples? How are they obtained?	7	KTU 2022
9b)	What are the precautions to be followed while handling and transporting soil samples? Why is it necessary?	7	KTU 2022
10a)	During a sampling operation, a thin walled sampler was pushed into soft clay to adistance of 450 mm. The recovered length of the sample was found to be 441 mm.What is the recovery ratio? Also mention the sample quality.	3	KTU 2024
10b)	Describe any one method for the collection of sand samples from beneath thewater table with a neat sketch.	7	KTU 2024
10c)	Explain the precautions to be taken in handling and transporting soil samples?	7	KTU 2024
MODULE V			
1	With a figure, explain the test procedure for plate load test.	8	KTU 2019
2	The results of two plate load tests are given in the following table	5	KTU 2019

<table>
<tr><td></td><td>
<table>
<tr><th>Plate diameter, B (m)</th><th>Total load, Q (kN)</th><th>Settlement (mm)</th></tr>
<tr><td>0.305</td><td>32.2</td><td>20</td></tr>
<tr><td>0.610</td><td>71.8</td><td>20</td></tr>
</table>
A square column footing has to be constructed to carry a total load of 715 kN. The tolerable settlement is 20 mm. Determine the size of the foundation.
</td><td></td><td></td></tr>
<tr><td>3</td><td>What are the limitations of plate load test?</td><td>5</td><td>KTU 2019</td></tr>
<tr><td>4</td><td>What is the significance of pressure meter modulus and limit pressure? Explain the test procedure to obtain the same</td><td>8</td><td>KTU 2019</td></tr>
<tr><td>5</td><td>Calculate core recovery and rock quality designation from the following borehole core logging data. Core run length=150 cm.
<table>
<tr><th>Core recovery (cm)</th></tr>
<tr><td>25</td></tr>
<tr><td>5</td></tr>
<tr><td>5</td></tr>
<tr><td>7.5</td></tr>
<tr><td>10</td></tr>
<tr><td>12.5</td></tr>
<tr><td>7.5</td></tr>
<tr><td>10</td></tr>
<tr><td>15</td></tr>
<tr><td>10</td></tr>
<tr><td>5</td></tr>
<tr><td>12.5</td></tr>
</table>
</td><td>5</td><td>KTU 2019</td></tr>
<tr><td>6</td><td>Explain Flat Dilatometer test</td><td>3</td><td>KTU 2023</td></tr>
<tr><td>7</td><td>Define Rock quality designation</td><td>3</td><td>KTU 2023</td></tr>
<tr><td>8a)</td><td>Explain the procedure for Pressure meter test</td><td>8</td><td>KTU 2023</td></tr>
<tr><td>8b)</td><td>Discuss the limitations of Plate load test</td><td>6</td><td>KTU 2023</td></tr>
<tr><td>9a)</td><td>Explain the preparation of a geotechnical investigation report and sketch a bore log chart</td><td>10</td><td>KTU 2023</td></tr>
<tr><td>9b)</td><td>Define modulus of subgrade reaction</td><td>4</td><td>KTU 2023</td></tr>
<tr><td>9c)</td><td>A loading test was conducted with a 300 mm square plate at a depth of 2 m below the ground surface in a cohesive soil. The water table is located at a depth of 3.5 m below the ground surface
<table>
<tr><td>Pressure kN/m^2</td><td>50</td><td>100</td><td>200</td><td>300</td><td>400</td><td>500</td><td>600</td></tr>
<tr><td>Settlement, mm</td><td>1.5</td><td>2.0</td><td>4.0</td><td>7.5</td><td>12.5</td><td>20.0</td><td>40.0</td></tr>
</table>
i)Plot the pressure-settlement curve and determine the failure stress.
ii) Determine the size of a square column footing to carry a net load of 2500 kN at 2 m depth.
</td><td>7</td><td>KTU 2018</td></tr>
<tr><td>10a)</td><td>Name a test to determine the stress- deformation characteristics of a soil in its natural condition. Briefly explain the procedure.</td><td>3</td><td>KTU 2024</td></tr>
</table>

10b)	Calculate core recovery and rock quality designation from the following boreholecore logging data. Core run length=150 cm. Core recovery (cm): 20, 5, 4, 8, 14, 16, 6.5, 10.5, 15, 12, 8, 13	6	KTU 2024
10c)	Explain the following with the help of neat sketches (i) Borelog (ii) Soil Profile	8	KTU 2024

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DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

(HUT 300) INDUSTRIAL ECONOMICS AND FOREIGN TRADE

No	Questions	Marks	Year
	MODULE 1		
1	What are the factors affecting demand and state the law of demand	3	,KTU Dec 2021, KTU-2024
2	Explain Production possibility curve? With the help of a production possibility curve, explain (i) Trade Off (ii) Why PPC is concave to the origin?	3, 10	KTU 2024,KtuDec2021 KTU June 2023
3	Explain consumer equilibrium? Explain consumer surplus? Explain producer surplus?	3	KTU Dec 2024
4	Define deadweight loss?	3	KTU Dec 2024 KTU DEC 2022
5	What are the central problems of an economy?	3	KTU Dec 2024, KTU Dec 2022
6	a. Explain Dead weight loss.?	7	KTU Dec 2024, KTU Dec 2022 KTU June 2023
7	What are the merits and demerits of Joint stock companies? What are the merits and demerits of Propritership.	7, 3	KTU 2024, KTU June 2023
8	a. Prepare a utility schedule showing units of consumption, total utility and marginal utility. Point out any three limitation of the law. b. Draw total utility and marginal utility curves and derive the three relations between marginal utility and total utility.	10	KTU Dec 2024, KTU Dec 2022
9	How is elasticity of demand measured according to the percentage method? How is the measurement of elasticity of demand useful for the government.	7, 4	KTU 2024

	Explain Types of Elasticity of Demand.		
10	Calculate the marginal utility from the following data X 1 2 3 4 5 6 7 TU 11 19 26 31 34 36 36	4	KTU June 2023
	MODULE 2		
1	a.In the production function θ = 2L½ K ½If L + 36 how many units of capital one needed to produce 60 units of output. b. A firm's total cost function is given by the equation, TC = 4500 + 10Q +25Q2 .Write the expression for the following cost concepts. (a) AFC (b) AVC (c) AC (d) MC	4 4	KTU 2024 KTU June 2023
2	a. In the short run AVC <P <AC. Will the firm produce or shut down? Give reason ? b. Explain shut down point in the short run with the help of diagram	3 4	KTU Dec 2024 KTU June 2023
3	Define Isoquants and properties, Explain Isocost line, Explain Expansion path, Explain Cobb-Douglas production function	7,4	KTU 2024
4	Differentiate explicit cost and implicit cost, Explain Sunk cost	3	KTU Dec 2024
5	Suppose monthly fixed cost of a firm is Rs.40000 and its monthly total variable cost is Rs.60000. If the monthly sales is Rs.120000 estimate contribution and break even sales. ii. If the firm wants to get a monthly profit of Rs.40000 what should be the sales? iii. The total cost function of a firm is given as TC=100+50θ- θ2+ θ3. Find marginal cost when output equals 5 units. b. The total sales of a manufacturing firm are Rs.20000 in this year. Its variable costs one Rs.8000 where its fixed costs are Rs.6000 for that year. Find out the break-even point of this firm. c. Suppose a firm pays Rs.10000 as monthly rent and Rs.10000 as interest payment.Its monthly expenditure on raw materials is Rs.40000 and it get monthly sales revenue of Rs.80000. The price of one unit of output is Rs.40. Estimate i) PV Ratio ii) Break even sales iii) Break-even output iv) Profit earned v) Margin of safety	7 10	KTU2024, KTU Dec 2024 KTU June 2023

	d. Consider the following data of a company for the year 2022. Sales Rs.80000, Fixed Cost is Rs. 15000, Variable cost is Rs. 35000. Find the following (a) Breakeven Sales (b) Contribution (c) Margin of safety (d) Profit.		
6	Explain Law of variable Proportions with a diagram.	7 10	KTU 2024 KTU June 2023
7	What are the advantages of large-scale production? Explain producer equilibrium with the help of a diagram.	7,4	KTU Dec 2024,2023
8	Explain producer equilibrium with the help of isoquants and is cost line. What is expansion path.	7	KTU, KTU Dec 2022
9	Explain Returns to scale OR Long run production function, Represent it using a figure.	7	KTU, KTU Dec 2022
10	The total cost function of firm is given as TC=500+5Q 4Q2+Q3. Estimate TVC, TFC and MC when output equals 10 units.	7	KTU, KTU Dec 2022
	MODULE 3		
1	What is collusive oligopoly? What is non-price competition under Oligopoly? Give examples of non-price competition under oligopoly? Explain linked demand curve model.	7,4	KTU 2024,KTU Dec 2021
2	What is Predatory pricing? Describe on product pricing and explain the different methods used for pricing.	7 10	KTU 2024,Dec 2022 KTU June 2023
3	Explain the equilibrium of a firm earning supernormal profit under monopolistic competition. Draw figures showing the determination of equilibrium under both.	3	KTU KTU Dec 2022
4	Make comparison between monopoly and perfect competition and Oligopoly	7,10	KTU2024, KTU June 2023
5	What is inelastic demand?	3	KTU Dec 2022
6	Suppose AC>Price>AVC. Will a producer produce or shutdown in the short run? Give reason. Answer:Refer Module 2,Qstion 2 answer	3	KTU Dec 2022
7	Why a firm under perfect competition is called a price taker? What are the features of Perfect Competition.	3, 10	KTU 2024,Dec 2022
8	Explain Price rigidity under oligopoly with the help of	7	KTU Dec 2024,

	kinked demand curve. Why price is rigid under oligopoly?		KTU Dec 2022
9	a. With the help of a diagram explain equilibrium under monopolistic competition. b. What are the features of Monopolistic competition, Suppose a firm under monopolistic competition is getting supernormal profit. Draw a diagram and explain this situation	7,10	KTU 2024, KTU Dec 2022
10	Explain Kinked Demand Curve	7 4	KTU Dec 2024 KTU June 2023
	MODULE 4		
1	Explain in detail the circular flow of income in a four sector model with a neat diagram.	3,4, 10	KTU 2024 KTU June 2023
2	Explain the GNP Deflator, GDP and GNP	3	KTU KTU June 2023
3	Explain demand pull inflation , Explain cost push inflation. Are the monetary or fiscal measures more effective in controlling inflation?	7 10	KTU 2024 KTU June 2023
4	Distinguish between a bond and a share?	3 4	KTU 2024 KTU June 2023
5	Distinguish between NSE and BSE , Distinguish between NIFTY and SENSEX	7	KTU
6	Distinguish between Demat Account and Trading Account.	3	KTU
7	Distinguish between final goods and intermediate goods.	3	KTU Dec 2024
8	a. GDP of a country = 1500 crores, Depreciation =150 Crores NFIA= 50 crores. Estimate GNP,NDP and NNP b. Estimate GDPmp. GNPmp and National income. Private consumption expenditure - 2000 (in 1000 crores) Govt. Consumption - 500 ,NFIA - (300) ,Investment - 800 Net Export – 700, Depreciation - 400 Net internal tax – 300 c. From the given below estimate Gross National Product, Net National Product and National Income. GDP - 5000 (in 100 billion)	7,10	KTU Dec 2024, KTU Dec2021, KTU Dec 2022, KTU June 2023

	NFIA - 50 Indnet - 70 Subsidies- 20 Depreciation- 30 d. From the data given below estimate the NDP using Item Rs Consumption Expenditure 3000 Investment Expenditure 2000 Govt. Expenditure 700 Exports 600 Imports 300 Intermediate consumption 2000 Wages and Salaries 2000 Rent 500 Interest 500 Profit 1000 e. How is national income estimated according to the income method? Estimate NDP and NNP from the given data (all figures in Rs. Crores). Wages and salaries = 800, Rent = 300, Depreciation = 200, Interest = 400, Net Indirect tax = 400, NFIA = 100, Profit = 400. f. Suppose the national income of a country is Rs1000 and depreciation equals Rs300. If NFIA equals Rs (-400) and Indirect Taxes equals Rs300, estimate NNP, NDP, GDP and GNP (all figures in Rs. Crores). g. Estimate GDPMP , GNPMP and National Income. Private consumption expenditure = 2000 (in 000 crores), Government consumption = 500, NFIA= -300, Investment=800, Net exports=700, Depreciation=400 and Net-indirect tax=300.		
9	Distinguish between money market and capital market ?	7,	KTU Dec 2021
10	What is monetary policy? What are the monetary policy measures?	7,10	KTU 2024,KTUDec 2022
	MODULE 5		
1	What is free trade? What is Devaluation? Explain the J-curve effect? Suppose the sum of elasticity of export and import is less than one. What will be the effect of devaluation? What are the merits of quota restrictions?	7, 4	KTU 2024,Dec 2021

	What are the arguments in favour of free trade? What are the tariff barriers? Explain its impact on the economy.		
2	Effects of International Trade	4,3	KTU 2024,June 2023
3	How is National income estimated under Product method and expenditure method, income method	7,10	KTU 2024
4	What are the monetary and fiscal policy measures to control inflation?	3,10	KTU 2024,Dec 2021
5	What is international trade? List out the advantages of foreign trade ? What are the disadvantages of foreign trade? Examine the effects of quotas on international trade.	7,3	KTU, 2024 KTU Dec 2022
6	What do you mean by labour augmenting technical progress?	3	KTU Dec 2022
7	What is a Trading account? Point out any three items coming under unilateral transfers account. What is balance of payments?	3,10	KTU 2024,Dec 2022 KTU June 2023
8	Examine the comparative cost theory. Point out any two criticisms against this theory. Explain absolute advantages theory with the help of an example	7,10	KTU De 2024,Dec 2022 KTU June 2023
9	What is protection? State any five arguments in favour of protection.	7,4	KTU Dec 2024, Dec 2022 KTU June 2023
10	Evaluate the success or failure of devaluation when the demand for import is more elastic or less elastic.	7	KTU Dec 2024 KTU June 2023

VIDYA ACADEMY OF SCIENCE AND TECHNOLOGY TECHNICAL CAMPUS, KILIMANOOR, THIRUVANANTHAPURAM-695602
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QUESTION BANK

CET352-ADVANCED CONCRETE TECHNOLOGY

MODULE 1

Sl no	Questions	Marks	
1	What are the properties of Bogue's compound?	3	KTU Model Qn Paper
2	What is the role of chemical admixtures in concrete?	3	KTU Model Qn Paper
3	Explain concrete flow behaviour using a Bingham model	6	KTU Model Qn Paper
4	Describe the influence of mineral admixtures in concrete. Explain any two mineral admixtures in detail	8	KTU Model Qn Paper
5	Describe various tests for determining the quality of aggregate to be used for concreting work. List any 3 characteristics of concrete aggregate and discuss their influence on properties of concrete	7 7	KTU Model Qn Paper
6	Discuss the hydration reaction of different cement compounds. Explain the effects of size and shape of coarse aggregates on properties of fresh concrete Describe the effect of fly ash as a mineral admixtures on properties of fresh concrete	7 7 7	KTU Model Qn Paper
7	Describe the Initial and final setting time of cement with their significance on the concrete construction practice Explain the effects any four chemical admixtures on different properties of concrete	3 7	KTU June 2022
8	Describe the classification of aggregate according to their sources Explain the products of hydration	3 3	KTU June 2022
9	Write short notes on i) air entraining admixtures ii) plasticizers	6	KTU June 2022

	Write a short note on artificial aggregates		
10	What are the different stages involved in the manufacture of cement? Write a short note on aggregate crushing value. What are accelerators and retarders? Explain their mechanism of action in concrete. What is GGBS? What is its effect on the performance of fresh concrete and hardened concrete?	10 6 10 7	KTU May 2024

MODULE 2

1	Describe the factors considered in mixture proportioning	3	KTU Model Qn paper
2	Explain statistical quality control measures of concrete	3	KTU Model Qn Paper
3	Design a concrete mix for the following data. Grade of concrete: M25, cement of 43 grade, moderate exposure, Zone III sand, compaction factor 0.9, 20mm maximum sized rounded aggregate	14	KTU Model Qn paper
4	Write down the procedure for concrete mix design by IS method Explain different methods of mix design	8 6	KTU Model Qn paper
5	Explain the factors affecting the strength of concrete	7	KTU Model Qn Paper
6	Explain the procedure of determining flexural strength of concrete under four point bending What are the objectives of concrete mix design?	7	KTU Model Qn paper
7	Differentiate between nominal mix and design mix Discuss the step-by-step procedure of ACI method of concrete mix design	3	KTU June 2022
8	List out the factors considered in the design of concrete mix Explain the relevance and measures of statistical control of concrte	3	KTU June 2022

9	Design a concrete mix the following data as per IS 10262:2019 grade of concrete M25 cement – OPC of 43 grade ,moderate exposure zone III sand, workability -75 mm (slump) ,20 mm maximum sized rounded coarse aggregate .SP gravity of cement 3.15, Sp of coarse aggregate 2.63, Sp gravity of fine aggregate 2.65. Assume all aggregates in SSD condition .Any other missing data may be assumed suitably	14	KTU June 2022
10	List out the variables involved in mix proportioning. Write short notes on mean strength, standard deviation and co-efficient of variation. Discuss the factors that engineers take into consideration while determining the mix proportions for concrete Design a concrete mix for the following data as per IS 10262:2019: Grade of concrete – M25, Cement – OPC grade 43, Exposure condition – severe, Zone II sand, slump – 75 mm, maximum size of aggregate – 20 mm, crushed, angular; specific gravity of cement – 3.1, specific gravity of fine and coarse aggregates – 2.7 and 2.8, admixture – superplasticizer. Assume all aggregates in SSD condition. Assume any other data suitably	3 6 8 14	KTU May 2024

MODULE 3

1	What is meant by shrinkage of concrete?	3	KTU Model
2	What are the factors affecting workability of concrete?	3	KTU Model
3	Explain the factors affecting the strength of concrete	3	KTU Model
4	Explain the procedure of determining flexural strength of concrete under four point bending	7	KTU Model
5	Explain the procedure for determining modulus of elasticity of concrete	7	KTU Model
6	Explain the term creep, its effects and factors affecting creep Explain the term shrinkage in concrete. What are the different forms of shrinkage in concrete	7	KTU Model

7	Explain any two properties of hardened concrete and suggest any two methods to improve it Describe any two tests to find out workability of concrete Define creep. Explain any three factors which affect creep of concrete .Explain plastic shrinkage and drying shrinkage	6 8 8	KTU JUNE 2022
8	Describe the effect of water cement ratio on fresh , hardened and durability properties on concrete	6	KTU JUNE 2022
9	Discuss any three properties of hardened concrete and their significance in the performance of a structure. Write a short note on modulus of elasticity of concrete. Elaborate slump test including its procedure, significance, and interpretation of results in terms of workability Define creep and shrinkage. How do these impact concrete structures?	10 4 8 6	KTU May 2024
10	Define autogenous shrinkage and carbonation shrinkage	3	KTU May 2024

MODULE 4

1	Describe the effect of fire on concrete.	3	KTU Model
2	Explain the pull-out test on concrete	3	KTU Model
3	Explain the sulphate attack on concrete and explain the effect of sea water in concrete	6	KTU Model
4	Explain any two non-destructive tests in concrete Explain Schmidt's rebound hammer test to assess the strength of concrete Discuss in brief the mechanism of chloride induced corrosion of steel and its control	8	KTU Model
5	Discuss the causes of corrosion of steel in concrete Explain any two non-destructive tests in concrete	8	KTU Model

6	What is meant by reinforcement cover? How is it measured? Explain the factors influencing test result of ultra sonic pulse velocity test	6	KTU Model Qn paper
7	Explain the effect of sea water on durability of concrete Explain the factors affecting the measurement of ultrasonic pulse velocity	3	KTU June 2022
8	Enumerate any three area where NDT can be effectively used in reinforced concrete systems List the factors which promote corrosion of embedded steel in concrete. Suggest any four methods to control corrosion of embedded steel in concrete. Explain any two control measures in detail	3	KTU June 2022
9	List three advantages of non-destructive testing over conventional testing. What are the causes of corrosion of embedded steel reinforcement in concrete?	3 3	KTU May 2024
10	Describe a test to measure the reinforcement cover in a beam. Define durability. Explain any six factors that affect durability of concrete. How exposure to sea water can affect concrete structures? Elaborate a test that shall assess the penetration resistance of concrete	6 8 6 8	KTU May 2024

MODULE 5

1	Write short notes on underwater concreting?	3	KTU Model
2	What are the applications of roller compacted concrete?	3	KTU Model
3	Explain any two methods for testing fresh stage properties of self-compacting concrete	8	KTU Model
4	Explain green concrete Explain in detail about the following special concrete a) ready mix concrete b) underwater concrete c) mass concrete	6	KTU Model

	d).green concrete		
5	What is the influence of prefabrication technology on modern construction industry	8	KTU Model
6	Describe sprayed concrete Explain in detail about the following special concrete a) Light weight concrete b) heavy weight concrete c) High strength concrete d) Self compacting concrete	6 14	KTU Model
7	List any three advantages and dis advantages of light weight aggregate concrete Explain the slip form construction and list out any two application of it	3 10	KTU June 2023
8	Explain short note on mass concreting Explain the types of polymer concrete highlighting its properties and applications	3 10	KTU June 2023
9	Explain any three properties of self compacting concrete .Specify any two field application of sel- compacting concrete What is fire reinforced concrete (FRC) Describe the factors affecting the properties of FRC	10 10	KTU Model
10	Compare and contrast high strength concrete and high performance concrete. List the advantages and disadvantages of ready-mix concrete. Explain the properties of self-compacting concrete. Write short notes on slipform construction and 3D printing of concrete.	6 8 6 8	KTU May 2024