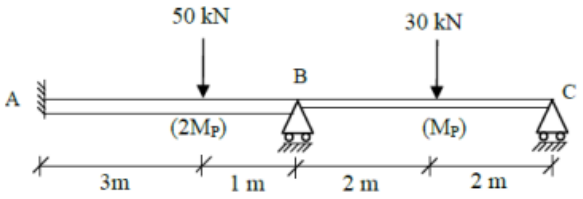
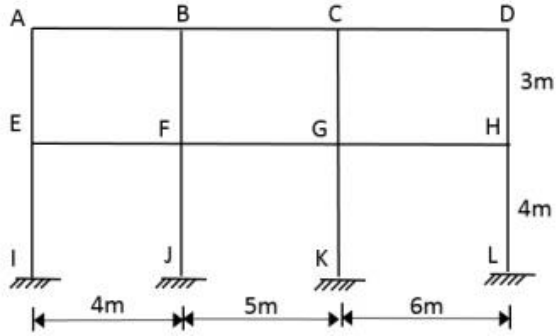
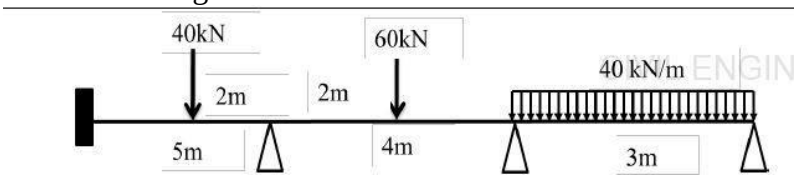
VIDYA ACADEMY OF SCIENCE AND TECHNOLOGY TECHNICAL CAMPUS, KILIMANOOR, THIRUVANANTHAPURAM - 695602

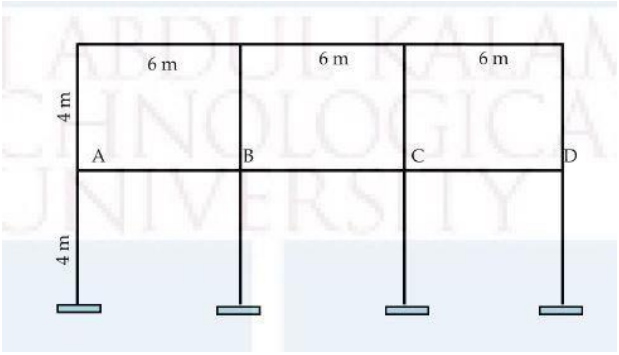
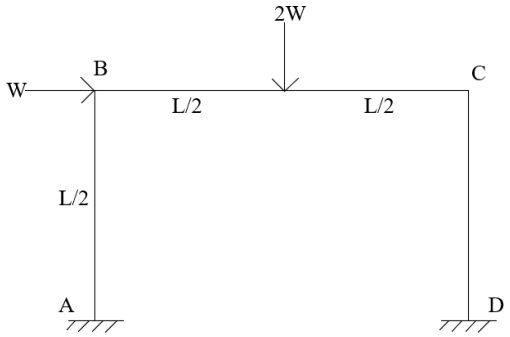
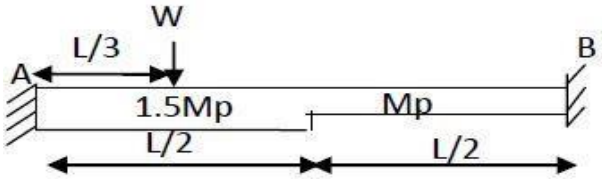
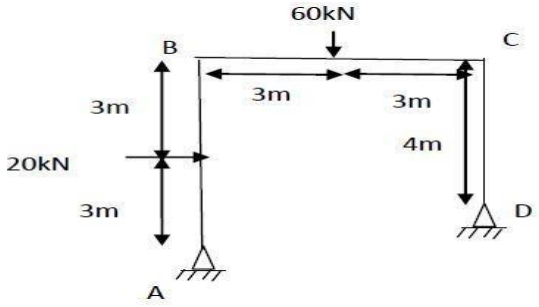
Accredited by NAAC with 'B++' grade

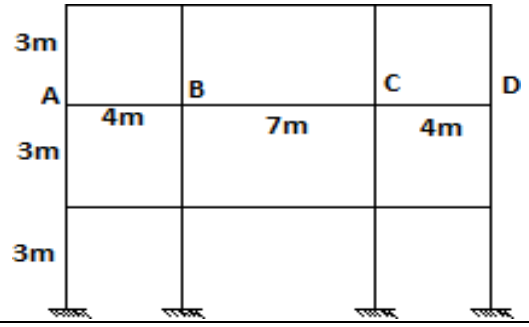
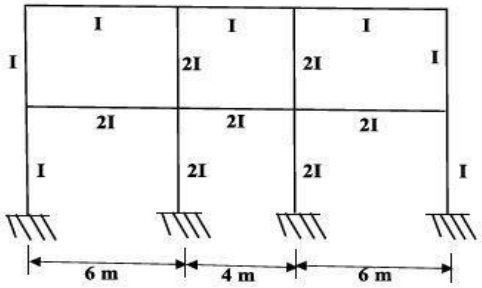
QUESTION BANK

STRUCTURAL ANALYSIS - II

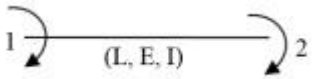
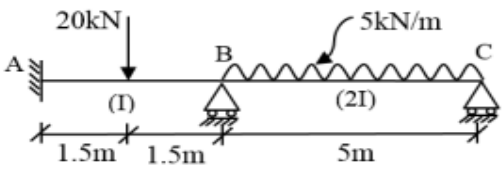
MODULE 1

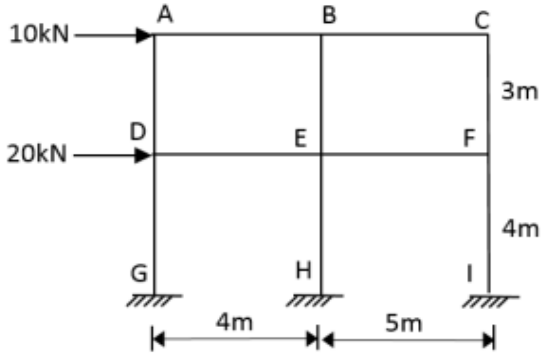
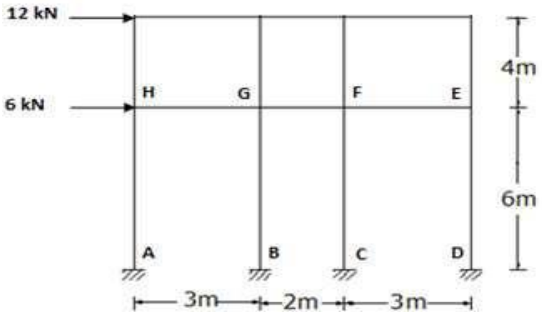
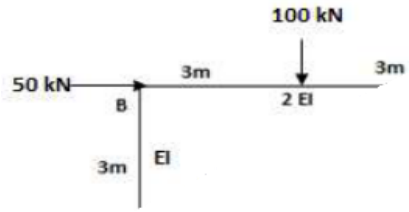
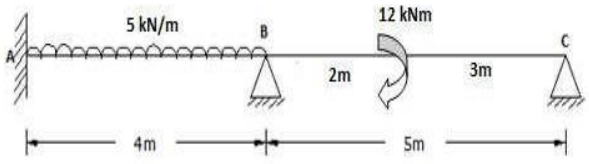
1.	Define shape factor. Obtain the shape factor for solid circular section of diameter D.	**KTU June 2022 QP**	**3 Marks**
2.	Mention the advantages and disadvantages of approximate method of analysis.	**KTU June 2022 QP**	**3 Marks**
3.	Determine the plastic moment carrying capacity Mp for the continuous beam shown in figure below. Take load factor = 1.5. 	**KTU June 2022 QP**	**14 Marks**
4.	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 June 2022 QP**	**14 Marks**
5.	Find the plastic moment capacity of the beam shown in figure.Assume uniform section throughout. 	**KTU Model QP**	**14 Marks**

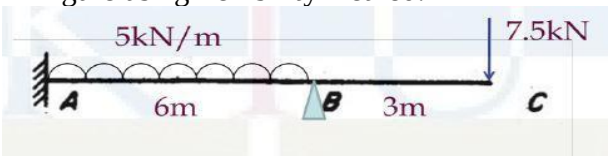
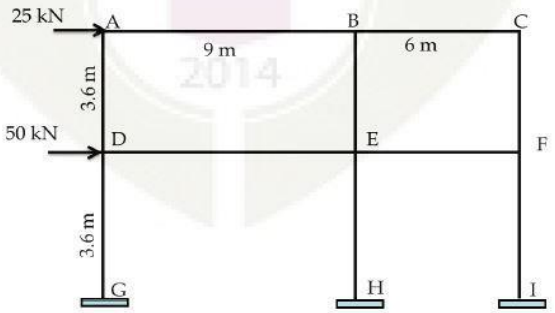
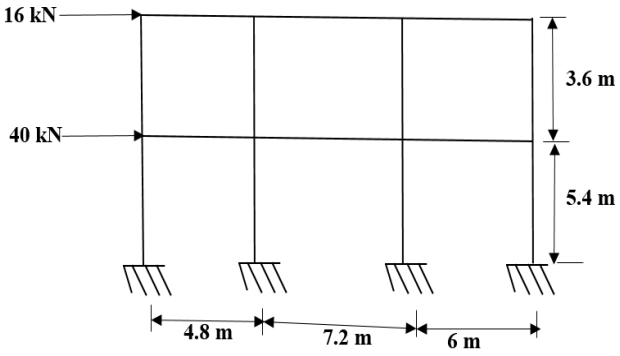
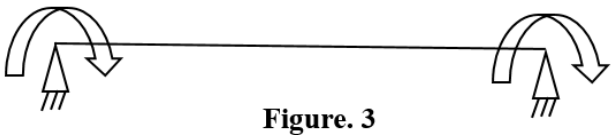
6.	Total dead load is 12kN/m and total live load is 20kN/m on ABCD. Analyse the frame for mid-span positive moment on BC, using substitute frame method. 	**KTU Model QP**	**14 Marks**
7.	Determine the shape factor of T- Section with flange width 120 mm. Depth of web is110 mm. Thickness of flange and web is 10mm. If the value of yield stress is 250N/mm2, find the plastic moment capacity of the section.	**KTU May 2019 QP**	**10 Marks**
8.	Determine the value of collapse load for the portal frame shown in fig. All the members have the same plastic moment of resistance. 	**KTU May 2019 QP**	**20 Marks**
9.	a. Explain plastic section modulus. b. State the three theorems of plastic collapse. c. Determine the collapse load (W_c) for the fixed beam bykinematic method. 	**KTU Dec 2019 QP**	**2 Marks** **5 Marks** **13 Marks**
10.	Find the value of Mp for the frame of uniform section under theapplied factored loads. 	**KTU Dec 2019 QP**	**15 Marks**

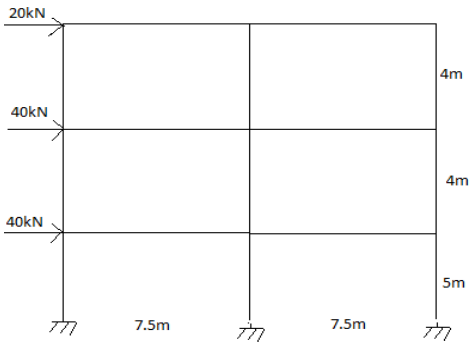
11.	In a multi-storey building frame spaced at 5.5m interval. The DLon the slab is 3kN/m^2 and LL is 6kN/m^2. Analyse the second floor beam BC for maximum positive bending moment at the midspan. Self-weight of the beam for 4m span is 4kN/m and that of 7m span is 5kN/m. Use substitute frame method, Assume that I ofthe columns=36X10^{4}cm^4 and I of all girder=50X10^{4}cm^4. 	**KTU Dec 2012 QP**	**10 Marks**
12.	Find the maximum hogging moment and shear force at the supportdue to gravity loading in the frame shown in Figure. Frames arespaced at 3m c/c. Dead load = 3kN/m^2, Live load = 2kN/m^2, Weight of beam=2kN/m and storey and height 3m. 	**KTU Dec 2019 QP**	**10 Marks**
13.	Derive an expression for the shape factor of a rectangular crosssection.	**KTU Model QP**	**3 Marks**
14.	What are the advantages and disadvantages of approximatemethods of structural analysis?	**KTU Model QP**	**3 Marks**

MODULE 2

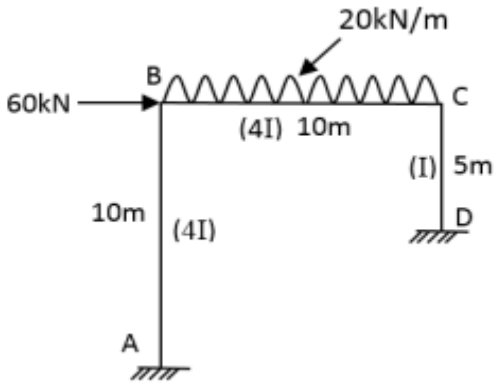
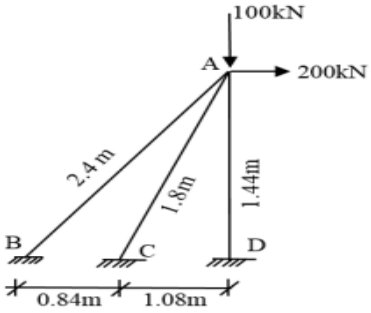
1.	What are the assumptions made in the portal method of analysis for horizontal loads?	**KTU Jun 2022 QP**	**3 Marks**
2.	Derive flexibility matrix for the co-ordinates for the beam element shown below. 	**KTU Jun 2022 QP**	**3 Marks**
3.	Analyse the continuous beam shown in figure below by flexibility method and draw the BMD. 	**KTU Jun 2022 QP**	**14 Marks**

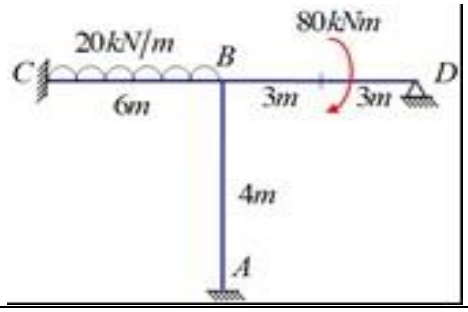
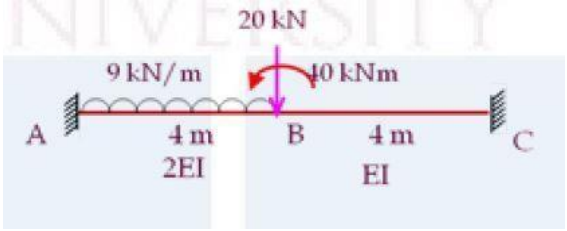
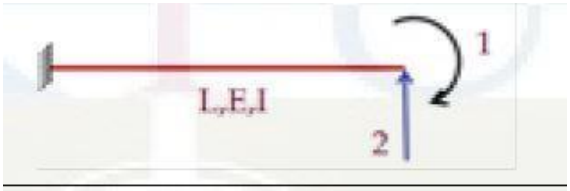
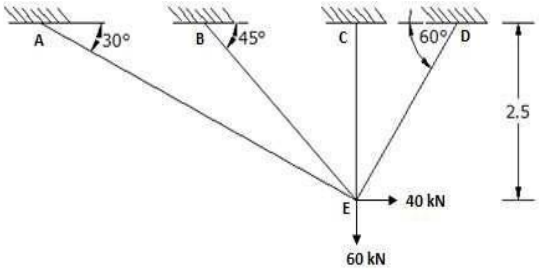
4.	Analyse and determine the beam and column moments for the frame shown in figure below by Portal method. Flexural rigidity EI is same for all members. 	**KTU Jun 2022 QP**	**14 Marks**
5.	a. List the assumptions to analyse a frame by cantilever method b. Analyse using portal method and find the axial force in columns, shear force in beams and columns, bending moments in beams and columns. Draw the BMD of beams and columns. 	**KTU Dec 2020 QP**	**3 Marks** **12 Marks**
6.	a. Explain how the effect of lack of fit is considered in flexibility matrix method of Analysis. b. Analyse the frame shown in figure by flexibility method. 	**KTU Dec 2020 QP**	**3 Marks** **12 Marks**
7.	a. Derive the relationship between force transformation matrix and displacement transformation matrix. b. Analyse the continuous beam shown in Figure, using flexibility matrix method and find the bending moments. 	**KTU Dec 2020 QP**	**5 Marks** **10 Marks**

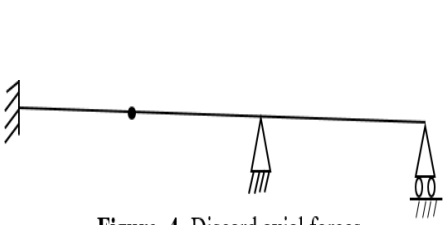
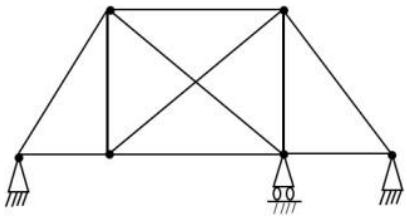
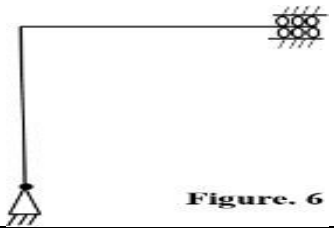
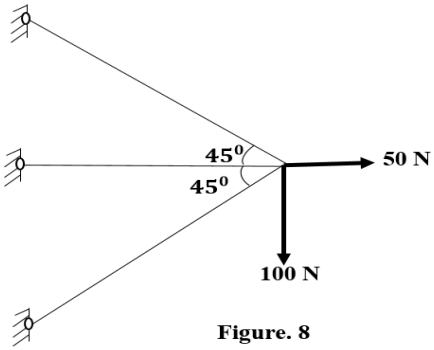
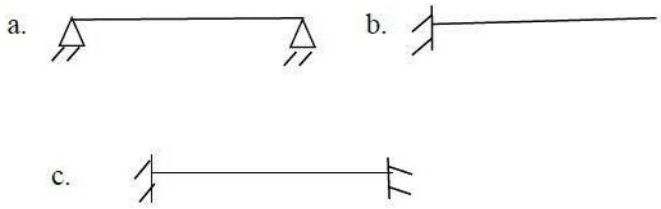
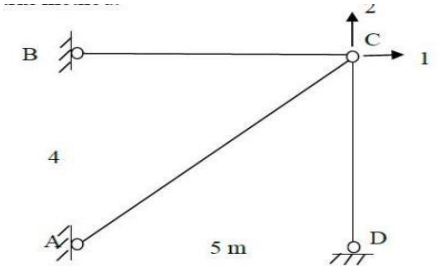
8.	Analyse the beam in figure using flexibility method. 	**KTU Model QP**	**14 Marks**
9.	Analyse the frame in figure using portal method. 	**KTU Model QP**	**14 Marks**
10.	Analyse the frame in Figure.1 using portal method. Beams and columns have same size.  **Figure. 1**	**KTU Dec 2019 QP**	**12 Marks**
11.	Derive Flexibility matrix for the following beam element in Fig.3.  **Figure. 3**	**KTU Dec 2019 QP**	**5 Marks**
12.	Derive flexibility matrix for the co-ordinates shown for the beam in Figure. 	**KTU Model QP**	**3 Marks**
13.	a. What are the assumptions in portal method of analysis? b. Analyse the frame shown in fig.1 using portal method.	**KTU May 2019 QP**	**2 Marks** **13 Marks**

			
14.	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**

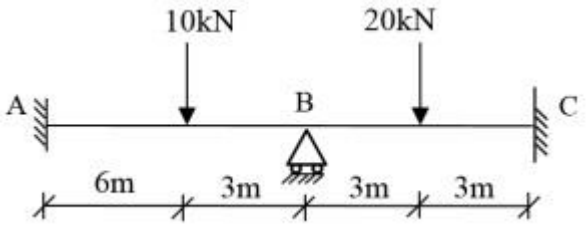
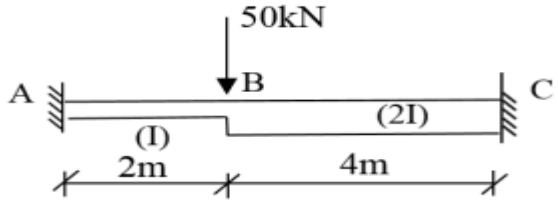
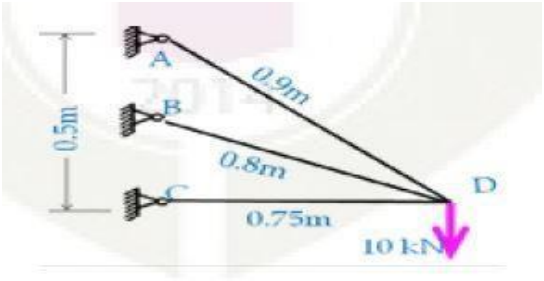
MODULE 3

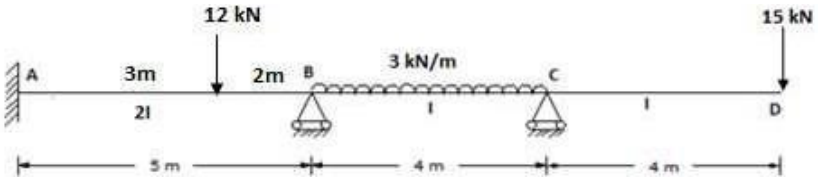
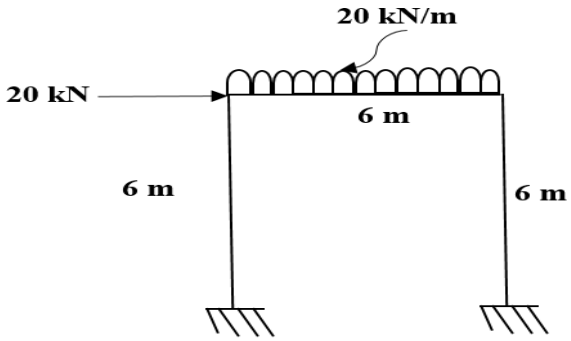
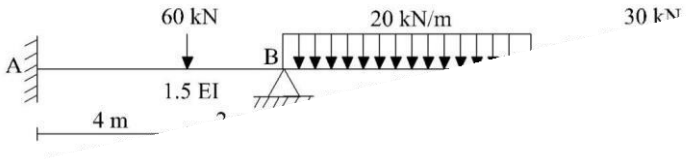
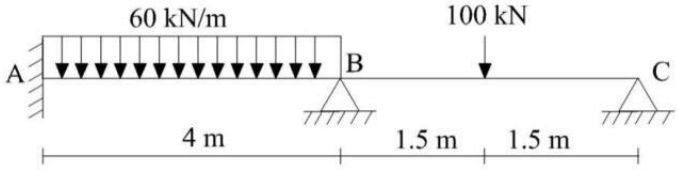
1.	Compare force method and displacement method of analysis.	**KTU Jun 2022 QP**	**3 Marks**
2.	Derive the stiffness matrix for the co-ordinates shown in figure below. 	**KTU Jun 2022 QP**	**3 Marks**
3.	Determine the end moments for the frame shown in figure below by stiffness method. 	**KTU Jun 2022 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.	Derive stiffness matrix for the degrees of freedom shown for the beam in figure. 	**KTU Model QP**	**3 Marks**
8.	Prove that flexibility matrix is the inverse of stiffness matrix for a given set of actions and corresponding displacements.	**KTU Model QP**	**3 Marks**
9.	Find the forces in the members of the truss loaded as shown in figureusing stiffness method. 	**KTU Dec 2020**	**10 Marks**
10.	Derive the stiffness matrix for the given structures. 	**KTU Dec 2020**	**5 Marks**

11.	Find the Kinematic indeterminacy and Static indeterminacy of the continuous beam (Figure.4), pin jointed frame (Figure.5) and rigidframe (Figure.6).  Figure. 4- Discard axial forces  Figure. 5  Figure. 6	**KTU Dec 2019**	**9 Marks**
12.	Find the member forces in the truss shown in Figure.8 using stiffness method.  Figure. 8	**KTU Dec 2019**	**15 Marks**
13.	Define kinematic indeterminacy. Determine the kinematic indeterminacy of the following structures in fig.  	**KTU May 2019**	**5 Marks**
14.	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.	What are the steps involved in direct stiffness method of analysis.	**KTU Jun 2022 QP**	**3 Marks**
2.	Differentiate between local coordinates and global coordinates.	**KTU Jun 2022 QP**	**3 Marks**
3.	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**
4.	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**
5.	Write down the steps involved in direct stiffness method.	**KTU Model QP**	**3 Marks**
6.	Find all the joint displacements for the beam in Figure 5, using directstiffness method. 	**KTU Model QP**	**14 Marks**
7.	Find the joint displacements for the pin-jointed truss shown in figure, using direct stiffness method. 	**KTU Model QP**	**14 Marks**

8.	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**
9.	Analyse and draw bending moment diagram for the frame shown in Figure 9. using direct stiffness method.  **Figure. 9**	**KTU Dec 2019**	**15 Marks**
10.	1.What is direct stiffness method? 2.Analyse a continuous beam ABCD by direct stiffness method. Assume EI is constant for all the members. The three spans AB, BC and CD are 4 m long. The extreme ends A and D are fixed. At the continuous joints B and C, roller supports are provided. BC span carries a central concentrated load of 10kN and CD span carries a UDL of 2kN/m. Draw the BMD.	**KTU Dec 2019** **KTU Dec 2020**	**3 Marks** **15 Marks**
11.	Discuss the procedure of Direct Stiffness Method in the matrix analysis.	**KTU May 2019**	**5 Marks**
12.	Analyse the continuous beam shown in fig. 5 using Direct Stiffness Method shown in figure and develop the BMD. 	**KTU May 2019**	**15 Marks**
13.	Explain Direct Stiffness Method in the matrix analysis.	**KTU May 2019**	**5 Marks**
14.	Analyse the beam shown in figure 6 using Direct Stiffness Method shown in figure and determine the member forces and moments. 	**KTU May 2019**	**15 Marks**

MODULE 5

1.	Compare transient and steady state response of a SDOF system subjected to harmonic load.	**KTU Jun 2022 QP**	**3 Marks**
2.	Define the following terms: (i) free and forced vibration (ii) damped and undamped vibration.	**KTU Jun 2022 QP**	**3 Marks**
3.	Derive an expression for response of SDOF system subjected to damped free vibration in 'x' direction with mass m, spring constant k and damping constant c.	**KTU Jun 2022 QP**	**14 Marks**
4.	Determine the natural frequency of the system shown in figure below. A weight of 300N is connected to the cantilever through a spring of stiffness 30N/cm. The beam is 3.5cm wide and 0.5cm deep in cross section and of span 10cm. Given the modulus of elasticity $E = 2\times10^5$ N/mm^2.	**KTU Jun 2022 QP**	**14 Marks**
5.	Derive an expression for the free-vibration response of a damped SDOF system (Under damped case only).	**KTU Model QP**	**14 Marks**
6.	A vibrating system consists of a weight of W = 100kN and a springwith 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**
7.	Discuss the concepts of vibration isolation and its applications.	**KTU Dec 2020**	**5 Marks**
8.	State and explain D'Alembert's principle.	**KTU Dec 2020**	**4 Marks**
9.	Derive the equations for response of SDOF system subjected to damped free vibration in 'x' direction with inertia constant m, spring constant k and damping constant c. Draw the response diagram also.	**KTU Dec 2020**	**8 Marks**
10.	A system vibrating with a natural frequency of 6Hz starts with aninitial 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 equationof motion of a vibrating system.	**KTU Dec 2020**	**8 Marks**
11.	a. What is critical damping b. What is magnification factor? c. Person standing on a spring produces a deflection of 1.0mm to the spring. Find the natural frequency and Time period.	**KTU Dec 2019**	**3 Marks** **3 Marks** **4 Marks**
12.	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. Logarithmic decrement d. Ratio of successive amplitudes e. Number of cycles after which initial amplitude reduced to 25%.	**KTU Dec 2019**	**10 Marks**
13.	Write the equation of motions corresponding to the damped and undamped free and forced vibration.	**KTU May 2019**	**3 Marks**

14.	a. Explain logarithmic decrement. Derive the equation for logarithmic decrement. b. Derive the response of the free vibration system with damped case and calculate the free vibration response of a SDOF system at time t=0.20sec for the following data: Natural frequency ω=12rad/sec Damping coefficient ξ=0.15, Initial velocity=10cm/sec, Initial displacement=5 cm.	**KTU Dec 2018**	**15 Marks**

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CET 304: ENVIRONMENTAL ENGINEERING

MODULE1

No.	Questions	Marks	
1	What are the factors on which natural forces of purification depend?	3	KTU June 2022
2	Compare pressure flow and gravity flow systems adopted for water conveyance	3	KTU June 2022
3	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
5	Explain the term design period for a water treatment plant?	4	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	The population figures of a town during the four decades i.e. 1960, 1970, 1980 and 1990are 25,000, 30,500, 35,500 and 42, 000 respectively. Predict its population in the year 2000 and compare the results through Arithmetical progression. Geometrical progression, Incremental increase method and Decreasing Rate method	10	KTU May 2020
9	Define Design period. What are the factors governing the design period?	5	KTU May2019
10	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
11	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 Population 25000,52000,94000,164000,247000	10	KTU May2019
12	What are various type of water demand, explain	10	KTU May2019
13	Discuss the method of arriving at the quantity of water to be supplied to a community.	9	KTU Dec 2019
14	Explain Dry weather flow and wet weather flow	9	KTU Dec 2018
15	Explain the different types of sewerage system	6	
16	What is fire demand? How will you calculate fire demand	5	

MODULE 2			
1	Explain the function of a clariflocculator in a water treatment plant?	3	KTU June 2022
2	Explain the objectives of providing aeration in the water treatment process?	3	KTU June 2022
3	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
4	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
5	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
6	Describe any two mixing devices of coagulants with figure.	6	KTU Dec 2019
7	Compare alum and iron salts as coagulants.	5	KTU Sept 2020
8	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
9	Define intake works in a water supply scheme? With the help of a neat figure, explain any one type of intake structure?	5	KTU Sept2020
10	Explain the mechanisms of coagulation	5	
11	Design a plain sedimentation tank for treating 6 MLD of water. Make suitable assumption. Prepare a neat sketch	9	
12	Explain with sketches the types of aerators with advantages and limitations	6	
13	Explain different types of settling	8	

MODULE 3			
1	Compare slow sand filters with rapid sand filters?	3	KTU June 2022
2	Explain any three types of chlorination in a water treatment plant?	3	KTU June 2022
3	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

4	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
5	Design a rapid sand filter for a town having a population of 80,000 with an average rate of demand180lpcd. Assume suitable data	14	
6	With the help of a neat sketch explain the construction, working and back washing of a rapid sand filter.	10	KTU Dec 2019
7	Enlist and explain the different layout of distribution networks with their merits and demerits ?	7	KTU Sept2020
8	What are the different method of analyzing a given distribution system? Explain HardyCross method of pipe network analysis.	10	KTU Sept2020 KTU Dec 2019
9	Explain Equivalent pipe method of water distribution network analysis.	6	KTUSept 2020, KTU May2019
10	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	
11	Explain the theory of filtration	5	
12	Explain and compare various disinfection methods	9	
13	Write a note on different types of filters	9	

MODULE 4			
1	What are the advantages of providing a flow equalization tank in a sewage treatment plant?	3	KTU June 2022
2	Compare aerobic and anaerobic wastewater treatment processes?	3	KTU June 2022
3	Explain the working of an activated sludge wastewater treatment plant with a neat sketch?	14	KTU June 2022
4	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
5	Define a) Sullage b)Sewage c)Storm water d) Night soil	4	KTU 2019
6	Differentiate between dry weather flow and wet weather flow.	2	KTU 2020
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/l BOD removal in primary treatment – 40% Overall BOD removal desired – 90%	10	Cusat2010
8	Difference between sanitary & storm sewer	5	AU 2015

9	Explain attached and suspended growth processes	5	
10	Define the term population equivalent.	2	KTU2020
11	Give the flow diagram of a conventional municipal wastewater treatment.	3	KTU 2019
12	Discuss the role of an equalization tank at a waste water treatment plant	4	
13	Discuss in detail various biological processes available for treating waste water	10	
14	Explain primary, secondary and tertiary treatment phases	5	
15	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	

MODULE 5			
1	Explain the advantages of a septic tank?		KTU June 2022
2	What are constructed treatment wetlands?		KTU June 2022
3	Explain the working of an upflow anaerobic sludge blanket reactor with a neat sketch?		KTU June 2022
4	Design the dimensions of a septic tank for a small colony of 150 persons provided with an assured water supply from the municipal head works at a rate of 120 litres per person per day, assume any other data you need. Provide a neat sketch of the designed septic tank.		KTU June 2022
5	Design the dimensions of a septic tank for a small colony of 150 persons provided with an assured water supply at a rate of 120 litres per person per day. Assume any other data if required	10	KTU 2020
6	Explain oxidation ditch with a neat sketch.	4	KTU 2019
7	What is meant by sludge thickening? List out various methods for sludge thickening	6	Cusat 2011
8	What are the advantages and disadvantages of oxidation ponds?	6	KTU 2019
9	Explain the working of an Up flow Anaerobic Sludge Blanket (UASB) reactor. Discuss any three drawbacks of UASB.	10	KTU 2019
10	What are the various factors affecting sludge digestion?	6	KTU 2019
11	Describe the different stages in sludge digestion process	4	KU 2016
12	Discuss any two types of sludge disposal	5	KTU 2020
13	Explain wetlands and root zone systems in natural waste water treatment systems	5	
14	Discuss natural waste water treatment systems with neat sketches	14	

QUESTION BANK

DESIGN OF HYDRAULIC STRUCTURES (CET 306)

MODULE 1

1. State the function of under sluices and divide walls (KTU MODEL QN)(6 marks)

2.Explain Khoslas corrections (May 2019) (5marks)

3.State and explain Blighs theory (Apr 2018) (6marks)

4.Explain causes of failures of weirs on permeable soils and state remedial measure (Sep 2020)(6marks)

5.Explain the failures of hydraulic structures by sub surface flow (Sep 2020)(5marks)

6.Explain types of weirs with neat sketches (KTU model qn)(6marks)

7.What are the limitations of Blighs theory of design of impermeable foundation(May 2019) (6marks)

8.Explain Khoslas theory (KTU model qn)(5marks)

9.Explain the components of diversion head works(Sep2020)(6marks)

10.Explain Khoslas theory of independent variable(May2019)(6marks)

11.a)Sketch the layout of a diversion headworks and mark the components (June 2022)(4marks)

b) Explain different types of weirs with neat sketches (6marks)

c) Briefly explain Khosla's method of independent variables. Mention the various

corrections to be used(5marks)

12.a) What are the causes of failure of hydraulic structures on pervious foundation?

What remedies would you suggest to prevent them? (June 2022)(9marks)

b) Obtain an expression for computation of floor thickness based on Bligh's creep

theory(3marks)

c) Define a weir and barrage with the help of a neat sketch. (3marks)

MODULE 2

1Explain the components of unlined canal section with sketches (Sep2020)(6marks)

2.Explain Kennedys theory(Sep2020)(5marks)

3.Compare Kennedys theory and Lacys theory for design of canals through alluvial soils(Sep2020)(6marks)

4.Explain different types of aqueduct(Sep2020)(5marks)

5.What are the general considerations for canal alignment(Sep2020)(6marks)

6.Explain the types of canal(May2019)(5marks)

7.Draw the section of unlined canal partly in cutting and partly in filling and expalin the parts(May2019)(6marks)

8.Explain cross drainage works(Ktu model qn)(5marks)

9.Explain type of canal falls(Ktu model qn)(6marks)

10.Explain Aqueduct and Super passage(Ktu model qn)(5marks)

11.a) What is a canal fall? Explain its necessity. (June 2022)((3marks)

b) What are the factors that affect the alignment of a canal? (3marks)

c) Explain different types of aqueducts based on the canal cross section at the

crossing. Where will you adopt each type?(3marks)

12.a) Draw the cross section of canal in partly cutting and partly filling and mark the

components(June 2022)(4marks)

b) What are the different regime conditions in Lacey's theory? (3marks)

c) Design an irrigation channel by Kennedy’s theory to carry a discharge of 5

cumecs. Take m=1, N=0.0225 and B/D ratio = 4.40.?(8marks)

MODULE3

1.(a)Design a suitable cross drainage works for the following hydraulic particulars(May2019)(25marks)

Design of the canal =28cumecs

Bed width of the canal=20m

Depth of water in the canal=1.6m

Bed level of canal=250m

High flood discharge of the drainage=253m

Bed level of drainage=248m

General gd level=250m

(b)Prepare following drawing (25marks)

1.Half plan at top and half plan at the foundation level

2.Longitudinal section along drain

2. Design a suitable cross drainage work for the following data at the crossing of a canal and a draina(May2019)(25marks)

CANAL

Full supply discharge = 45 cumecs

Full Supply level = RL 217.00

Canal bed level = RL 213.00

Canal bed width = 20 m

Canal water depth = 1.7 m

Trapezoidal canal section with 1.5 H : 1V slope

DRAIN

High flood discharge = 280 cumecs

High flood level = RL 210

High flood depth = 2.5 m

General ground level = RL 214.00

Prepare the following drawings (not to scale)(25marks)

i) Half sectional plan at foundation level

ii) Section through the centre line of the drain

3. Design a 1.2m Sarda type fall for the following data.

Full supply discharge through the canal = 35 cumecs.

Bed level at u/s = 110.00m

Full supply depth at u/s = 1.60m

Bed width u/s and d/s = 26.0m

Safe exit gradient = 1/5

Impervious floor design is to be carried out as per Khosla's theory(Sep2020)(25marks)

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.

4. a) Design a suitable cross drainage work, for the following data at the crossing of a canal and a drainage.(Sep2020)(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(Sep2020)(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.

6. a) Design a suitable cross drainage work for the following hydraulic

particulars:

Canal

Full supply discharge = 25 cumecs

Bed level = 112.00

Full supply level = 113.50

Bed width = 18.0m

Side slope =1.5 H :1 V

Left bank is 3.0m wide. Right bank is 4.5m wide and the cross drainage work

carries a roadway of 4.5m over it.

Drainage

Catchment area = 175 sq.km

Ryve's coefficient =10

Bed level = 106.80

High flood depth = 3.2 m

General ground level = 113.20

b) Prepare the following drawings (not to scale)

i. Half sectional plan at the foundation level. (15 marks)

ii. Section along the centre line of the canal. (10 marks)

MODULE 4

1. What is meant by Elementary profile of a gravity dam? (Apr2018)(2marks)

2. What are the functions of Water stops in gravity dam?(Apr2018)(2marks)

3. What are the functions of gallery in a gravity dam?(Apr2018)(2marks)

4. Determine the maximum and minimum vertical stresses at heel and toe, major principal stress at toe and intensity of shear stress on a horizontal plane near toe of the dam.

Weight of concrete = 23.5 kN/m 3 . Top width of dam = 8m, Bottom width = 24m

Allowable stress in concrete = 2500 kN/m 2 (Apr2019)(10marks)

5. Obtain the condition for no-tension criteria in a gravity dam.(Apr2019)(3marks)

6. Distinguish between a low dam and a high dam(May2019)(3marks)

7. Write a brief note on joints in gravity dam.(May2019)(4marks)

8. List the forces acting in a gravity dam.(Sep2020)(2marks)

9. What are the functions of gallery in a gravity dam?(Sep2020)(3marks)

10. What is meant by elementary profile of a gravity dam?(Sep2020)(3marks)

11. a) Explain the failure of gravity dam by means of overturning(june2022) (5marks)

b) Explain galleries and their functions in gravity dam. (5marks)

MODULE 5

1. Explain chute spillway and side channel spillway.(Sep2020)(4marks)

2. What is a stilling basin? Explain Type I and Type II stilling basins.(Sep2020)(4marks)

3. With the help of a neat sketch, derive the expression for thickness of arch ring at a depth 'h' m below the water surface in the reservoir.(Sep2020)(4marks)

4. Derive the most economical central angle of an arch dam.(May2019)(4marks)

5. Explain chute spillway and side channel spillway.(May2019)(4marks)

6. Draw the cross-sections of the zoned earth dam you would select if the materials

available are gravel and clayey silt.(May2019)(3marks)

7. What is a Spillway? Explain Ogee type of spillway.(Apr 2018)(4marks)

8. Explain thin cylinder method of design of Arch dam(Apr2018)(2marks)

9.Explain the causes of failure of earthen dams(Ktu model qn)(3marks)

10.Discuss about energy dissippators(Ktu model qn)(3marks)

11. a) List the types of spillways. Explain any one in detail with neat sketch.(June 2022) (6marks)

b) Explain energy dissipation below spillways.(4marks)

12. a) Derive the expression for thickness of an arch dam using thin cylinder theory.(June 2022) (5marks)

b) Write in detail the design criteria of earth dam.(5marks)

SUB CODE	CET322	SUBJECT NAME	GEOTECHNICAL INVESTIGATION

	MODULE 1	Marks	Year	Instructional Objectives
1	Explain in detail a site investigation programme.	10	KTU 2019	
2	What is the criteria for fixing the number and spacing of boreholes?	5	KTU 2019	
3	Explain the relevance of significant depth. What is the minimum depth of exploration for square footing and multi - storeyed building?	5	KTU 2019	
4	Why soil exploration is considered important while planning and designing engineering structures?	4	KTU 2019	
5	What should be the major steps involved while planning exploration program of a structure.	4	KTU 2019	
6	Using neat sketches explain rotary drilling and its applications.	5	KTU 2019	
7	Give the minimum depth of exploration to be carried out for the following cases as per IS specifications. i) Isolated spread footing ii) Pile foundations iii) Road cuts iv) Well foundations v) Embankment fills	4	KTU 2019	
7	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	
8	Differentiate between preliminary and detailed soil investigation. What are the details to be collected in these two stages of investigation?	5	KTU 2018	
9	List different methods of soil exploration	2	KTU 2018	
10	What are the guidelines provided in IS code regarding spacing of boreholes? How is depth of borehole decided?	7	KTU 2018	
11	Explain open pit exploration clearly bringing out advantages and disadvantages.	2	KTU 2018	
12	List the objectives of soil exploration	5	KTU 2017	
13	What are the IS specifications for fixing the spacing of boreholes?	5	KTU 2017	
14	What is significant depth?	5	KTU 2017	
15	Explain wash boring method with the help of a sketch	5	KTU 2017	
16	Explain the different stages involved in the reconnaissance for a geotechnical investigation of a multi storey building?	7	KTU 2017, 2020	
17	What are the different types of augers? Draw neat sketches.	8	KTU 2017	
	What are the procedures to be carried out for preliminary and detailed ground investigation?	10	KTU 2020	
18	Differentiate between rotary drilling and auger boring.	7	KTU 2020	
	MODULE 2			
1	Explain the various corrections to be applied for SPT test	10	KTU 2019	
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.	3	KTU 2019	
3	List any two advantages of static cone penetration test.	2	KTU 2019	
4	Give a critical comparison between Standard Penetration test, Static cone penetration test and Dynamic Cone Penetration test.	7	KTU 2017, 2018, 2019	
5	Explain Standard Penetration Test. What are dimensions of the sampling tube used? What are the advantages and disadvantages of the SPT.	10	KTU 2018	

6	The Standard Penetration Resistance value (N value) obtained in a deep deposit of sand at a detpth of sand was 30. The unit weight of sand is 18.2 kN/m3. Determine the corrected N value.	5	KTU 2018	
7	An N value of 40 was obtained while conducting SPT in dense sand at a depth of 20m from the surface. If the density of sand deposit is 16kN/m3, find the actual N value corrected for overburden.	5	KTU 2019	
8	Explain the necessity of correcting the N value for Dilatancy.	5	KTU 2019	
9	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.	5	KTU 2019	
10	Give the advantages and disadvantages of Standard Penetration Test.	3	KTU 2019	
11	What are the precautions to be taken while conducting SPT test?	10	KTU 2020	
12	How does overburden pressure and dilatancy affect the measured Standard penetration number or N value?	5	KTU 2020	
13	Explain dynamic cone penetration test with a neat diagram.	7	KTU 2020	
14	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.	5	KTU 2019	
	``MODULE 3			
1	With a neat diagram, explain the process of seismic refraction method.	10	KTU 2019	
2	Differentiate between electrical profiling and electrical sounding method	5	KTU 2019	
3	Write down the procedure and limitations of seismic refraction method	7	KTU 2017	
4	A seismic refraction study of an area has given the following data Distance from impact point to geophone (m): 15, 30, 60, 90, 120 Time to receive wave (s): 0.025, 0.05, 0.10, 0.11, 0.12 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.	7	KTU 2018	
5	Explain electrical resistivity method. What are its limitations? Explain resistivity profiling and resistivity sounding.	8	KTU 2018	
6	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.	4	KTU 2019	
7	Explain the procedure to find the following, using Electrical Resistivity Method i. For finding the boundaries of soil within a strata ii. For finding changes in a strata with increasing depth	6	KTU 2019	
4	Data set from a seismic refraction test is given below. Distance from impact point to geophone (m): 10, 20, 40, 80, 140 Time to receive wave (s): 0.025, 0.050, 0.100, 0.110, 0.120 i) Plot the time travel data and determine the seismic velocity for the surface layer and underlying layer.	8	KTU 2019	

	ii) Determine the thickness of the upper layer.			
7	With neat diagrams, explain electrical sounding and electrical profiling methods.	10	KTU 2020	
8	How the thickness of subsurface layers is computed using seismic refraction method?	5	KTU 2020	
	MODULE 4			
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	Define i) Area ratio ii) Inside clearance iii) outside clearance iv) Recovery ratio	6	KTU 2017	
6	Explain with neat sketch piston sampler and split spoon sampler	7	KTU 2017	
7	Compute area ratio of thin walled tube sampler of external diameter 6.0 cm and wall thickness 2.25mm and comment on type of soil sample obtained using this sampler	7	KTU 2017	
8	Explain factors affecting sample disturbance. What are the precautions to be taken for handling and transporting soil samples?	10	KTU 2017	
9	A given sample tube has the following dimensions. Inside diameter – 38 mm. Outside diameter 50 mm. The sample tube has a cutting shoe of internal diameter 35mm and external diameter 52mm attached to it. Compute the inside clearance ratio, outside clearance ratio and area ratio of the sampling tube assembly. Do you recommend the sampler for obtaining undisturbed soil samples? Why?	8	KTU 2018	
10	Explain the operation of Piston sampler with neat sketches of various stages. What are the advantages of a piston sampler?	8	KTU 2018	
11	What is meant by (i) Recovery Ratio (ii) rock quality designation?	4	KTU 2018	
12	One sampler has an area ratio of 8% while another has 16%, which of these samplers do you prefer for obtaining undisturbed sample and why?	4	KTU 2018	
13	What are the properties of the sampler which govern whether the collected soil sample is undisturbed or not?	6	KTU 2019	
14	Explain the difference between undisturbed and disturbed samples.	6	KTU 2019	
15	What are the factors that cause sample disturbances and suggest remedies for preventing the same.	6	KTU 2019	
16	What is meant by undisturbed and disturbed samples? Mention the sampler which can be used to obtain undisturbed and disturbed samples?	6	KTU 2020	
17	An open drive sampler with an outside diameter 76 mm and inside diameter 72mm was used to obtain soil sample. Calculate the area ratio and also mention the quality of sample obtained?	4	KTU 2020	
18	Explain the different features of a sampling device which controls the	10	KTU 2020	

<table>
<tr><td></td><td>sample disturbance and ways to reduce them.</td><td></td><td></td><td></td></tr>
<tr><td>19</td><td>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 589mm. What is the recovery ratio? Also mention the sample quality.</td><td>10</td><td>KTU 2020</td><td></td></tr>
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<tr><td>21</td><td>What are representative soil samples? How are they obtained?</td><td>6</td><td>KTU 2019</td><td></td></tr>
<tr><td>22</td><td>What are the precautions to be followed while handling and transporting soil samples? Why is it necessary?</td><td>6</td><td>KTU 2019</td><td></td></tr>
<tr><td colspan="5">MODULE 5</td></tr>
<tr><td>2</td><td>With a figure, explain the test procedure for plate load test.</td><td>8</td><td>KTU 2019</td><td></td></tr>
<tr><td>3</td><td>The results of two plate load tests are given in the following table
<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>5</td><td>KTU 2019</td><td></td></tr>
<tr><td>4</td><td>What are the limitations of plate load test?</td><td>5</td><td>KTU 2019</td><td></td></tr>
<tr><td>5</td><td>Define modulus of subgrade reaction.</td><td>5</td><td>KTU 2019</td><td></td></tr>
<tr><td>6</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><td></td></tr>
<tr><td>7</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><td></td></tr>
<tr><td>8</td><td>What are the contents to be included in a preliminary soil investigation report?</td><td>5</td><td>KTU 2019</td><td></td></tr>
</table>

SUB CODE	CET322	SUBJECT NAME	GEOTECHNICAL INVESTIGATION

9	Explain in detail pressure meter test	8	KTU 2017	
10	Differentiate bore log and soil profile	8	KTU 2017	
	Draw a typical bore log chart	4	KTU 2017	
11	What is rock quality designation?	4	KTU 2017	
12	A plate load test was conducted on a uniform deposit of sand and the following data were obtained. Pressure (kN/m^2): 5, 100, 200, 300, 400, 500, 600 Settlement(mm): 1.5, 2.0, 4.0, 7.5, 12.5, 20.0, 40.0 Size of the plate is 75 cm*75 cm and that of the pit is 3.75m*3.75mm *1.5 m. Plot the pressure settlement curve and determine the safe pressure corresponding to footing settlement of 15mm.	8	KTU 2017	
13	Explain plate load test with neat sketch with details of placing load increments. Explain how ultimate load is determined from the plate load test data for (i) dense sand (ii) loose sand..	8	KTU 2017	
14	What are the contents of a geotechnical investigation report? Give the sketch of a typical bore log.	8	KTU 2017	
15	Explain cyclic plate load test in detail giving sketches of load test setup and load deformation curve obtained from field. Explain the step by step procedure for separating skin friction and end bearing components.	16	KTU 2017	
16	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 Pressure kN/m^2: 50, 100, 200, 300, 400, 500, 600 Settlement, mm: 1.5, 2.0, 4.0, 7.5, 12.5, 20.0, 40.0 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.	7	KTU 2018	
17	With necessary sketches, explain how Plate Load Test is conducted for sandy soils if the level of water table is less than 1 m from the level of proposed foundation.	5	KTU 2018	
18	State the limitations of Plate Load Test that restrict its application.	6	KTU 2018	
19	Sketch a borehole log chart. Explain the preparation of a geotechnical investigation report	6	KTU 2018	
20	In a plate load test conducted on a cohensionless soil, a 550 mm square test plate settles by 10 mm under a load intensity of 0.2 N/mm2. All conditions remaining the same, what will be the settlement of 1 m square footing?	5	KTU 2020	
21	List the disadvantages of plate load test.	5	KTU 2020	
22	Sketch the figure for a plate load test under reaction truss loading with all detailing.	5	KTU 2020	
23	Define Rock quality designation and core recovery. How are core samples handled and transported to laboratory?	10	KTU 2020	

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.	7	KTU Model Qn Paper
6	Discuss the hydration reaction of different cement compounds.	7	KTU Model Qn Paper
7	Explain the effects of size and shape of coarse aggregates on properties of fresh concrete	3	KTU June 2022
8	Describe the effect of fly ash as a mineral admixtures on properties of fresh concrete	3	KTU June 2022
9	Describe the Initial and final setting time of cement with their significance on the concrete construction practice	6	KTU June 2022
10	Explain the effects any four chemical admixtures on different properties of concrete	8	KTU June 2022
11	Describe the classification of aggregate according to their sources	6	KTU June 2022
12	Explain the products of hydration	5	KTU 2017
13	List any 3 characteristics of concrete aggregate and discuss their influence on properties of concrete	6	KTU 2018
14	Write short notes on i) air entraining admixtures ii) plasticizers	6	KTU 2018

15	Write a short note on artificial aggregates	5	KTU 2018

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	a. Write down the procedure for concrete mix design by IS method b. 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	7	KTU Model Qn paper
7	Differentiate between nominal mix and design mix	3	KTU June 2022
8	List out the factors considered in the design of concrete mix	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	Explain the relevance and measures of statistical control of concrte	7	KTU June 2022

11	Describe the acceptance criteria to ensure the quality of concrete	7	KTU June 2022
12	Write down the procedure for concrete mix design by BIS method.	15	KTU 2017
13	What are the objectives of concrete mix design?	5	KTU 2018
14	Discuss the step-by-step procedure of ACI method of concrete mix design	15	KTU 2018

MODULE 3

1	What is meant by shrinkage of concrete?	3	KTU Model QN paper
2	What are the factors affecting workability of concrete?	3	KTU Model QN paper
3	Explain the factors affecting the strength of concrete	3	KTU Model QN paper
4	Explain the procedure of determining flexural strength of concrete under four point bending	7	KTU Model QN paper
5	Explain the procedure for determining modulus of elasticity of concrete	7	KTU Model QN paper
6	Explain the term creep, its effects and factors affecting creep	7	KTU Model QN paper
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	6 8	KTU JUNE 2022
8	Explain any six factors affecting the strength of concrete	6	KTU JUNE 2022

	Define creep. Explain any three factors which affect creep of concrete	8	
9	Describe the effect of water cement ratio on fresh , hardened and durability properties on concrete	3	KTU JUNE 2022
10	Compare compressive strength results of cube with cylinder test on concrete	6	KTU 2018
11	Explain the term shrinkage in concrete. What are the different forms of shrinkage in concrete	8	KTU 2018
12	Explain plastic shrinkage and drying shrinkage	6	KTU 2018

MODULE 4

1	Describe the effect of fire on concrete.	3	KTU Model Qn paper
2	Explain the pull-out test on concrete	3	KTU Model Qn paper
3	Explain the sulphate attack on concrete and explain the effect of sea water in concrete	6	KTU Model Qn paper
4	Explain any two non-destructive tests in concrete	8	KTU Model Qn paper
5	Discuss the causes of corrosion of steel in concrete	8	KTU Model Qn paper
6	What is meant by reinforcement cover? How is it measured?	6	KTU Model Qn paper
7	Explain the effect of sea water on durability of concrete	3	KTU June 2022
8	Enumerate any three area where NDT can be effectively used in reinforced concrete systems	3	KTU June 2022

9	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	8	KTU June 2022
10	Explain the factors influencing test result of ultra sonic pulse velocity test	6	KTU June 2022
12	Explain the factors affecting the measurement of ultrasonic pulse velocity	7	KTU 2017
13	Explain Schmidt's rebound hammer test to assess the strength of concrete	8	KTU 2018
14	Explain any two non-destructive tests in concrete	8	KTU 2018
15	Discuss in brief the mechanism of chloride induced corrosion of steel and its control	8	KTU 2018

MODULE 5

1	Write short notes on underwater concreting?	3	KTU Model Qn paper
2	What are the applications of roller compacted concrete?	3	KTU Model Qn paper
3	Explain any two methods for testing fresh stage properties of self-compacting concrete	8	KTU Model Qn paper
4	Explain green concrete	6	KTU Model Qn paper
5	What is the influence of prefabrication technology on modern construction industry	8	KTU Model Qn paper
6	Describe sprayed concrete	6	KTU Model Qn paper

7	List any three advantages and dis advantages of light weight aggregate concrete	3	KTU June 2022
8	Explain short note on mass concreting	3	KTU June 2022
9	Explain any three properties of self compacting concrete .Specify any two field application of sel-compacting concrete	8	KTU June 2022
10	What is fire reinforced concrete (FRC) Describe the factors affecting the properties of FRC	6	KTU June 2022
11	Explain the slip form construction and list out any two application of it	6	KTU June 2022
12	Explain the types of polymer concrete highlighting its properties and applications	8	KTU June 2022
13	Explain in detail about the following special concrete a) Light weight concrete b) heavy weight concrete c) High strength concrete d) Self compacting concrete	15	KTU 2018
14	Explain in detail about the following special concrete (15) a) ready mix concrete b) underwater concrete c) mass concrete d) green concrete	15	KTU 2018

QUESTION BANK

INDUSTRIAL ECONOMICS AND FOREIGN TRADE

(HUT 300)

MODULE 1			
1	What is Industrial Economics ?	3	KTU
2	Why does an economic problem arise ?	3	KTU
3	What are the basic economic problems ?	3	KTU Dec 2021
4	Explain Production possibility curve?	3	Ktu Dec 2021
5	Explain consumer equilibrium ?	3	KTU
6	What should be percentage change in price a product if the sale is to be increased by 50% and its price elasticity of demand is2	3	KTU
7	Demand function of a product is given as D = 50-2p and supply function S + 20 + 3p. What will be the equilibrium price and quantity of the product.	3	KTU
8	Explain consumer surplus?	3	KTU
9	Explain producer surplus?	3	KTU
10	Explain Dead weight loss.	3	KTU
11	Difference between micro and macroeconomics?	3	KTU
12	What are the merits and demerits of Joint stock companies?	7	KTU
13	A consumer purchases 50 units of commodity× when its price is Rs.8/- per unit. In the next month he purchased 60 units at the same price. this was due to an increase in the price of another commodity y from Rs.10to 12. Calculate cross elasticity of demand and interpret the result.	7	KTU
14	Explain the concepts consumer surplus and producer surplus.	7	KTU
15	Suppose the govt. imposes a tax on a commodity where the tax burden is met by the consumers. Draw diagram and explain dead	7	KTU

	weight loss. Mark consumer surplus, producer surplus, tax revenue and dead weight loss in the diagram		
16	Prepare a utility schedule showing units of consumption, total utility and marginal utility. Point out any three limitation of the law.	7	KTU
17	How is elasticity of demand measured according to the percentage method? How is the measurement of elasticity of demand useful for the government.	7	KTU
18	Define the cross elasticity of demand a tea manufacturing company was able to sell 800kg of the price of coffee was Rs 70 per kg. Later they were able to sell 9000 kg when the price of coffee became Rs80 per kg. Calculate the cross elasticity of demand for tea. Are the commodities substitute or complimentary?	7	KTU
19	Define price elasticity of demand. A company producing soft drink is selling its product for Rs.22. It sells 1000 units, and then increases the price to Rs.24. Now sales fall to 900 units. What is the price elasticity of soft drink? Is the demand elastic or inelastic? Why?	7	KTU
20	With the help of diagram explain Deadweight loss	7	KTU
21	Draw total utility and marginal utility curves and derive the three relations between marginal utility and total utility.	7	KTU Dec 2022
22	What is cross elasticity of demand? Suppose cross elasticity of demand between X and Y is 0.5. If there is a 50 percent change in the price of Y, what will be the percentage change in the quantity demanded of X?	7	KTU Dec 2022
23	What is deadweight loss of a tax? Examine the consumer and producer surplus before and after a tax with the help of a diagram.	7	KTU Dec 2022
24	The demand function of a product is given as D = 60 - 2P and the supply function S = 30 + 4P. Estimate equilibrium price and equilibrium quantity. Also find the excess supply when Price equals Rs.6?	7	KTU Dec 2022
MODULE 2			
1	In the production function $\theta = 2L½ K ½If L + 36$ how many units of capital one needed to produce 60 units of output.	3	KTU
2	In the short run AVC <P <AC. Will the firm produce or shut down? Give reason ?	3	KTU

3	Define Isoquants	3	KTU
4	Explain Isocost line	3	KTU
5	Explain Expansion path	3	Dec 2021
6	Explain Cobb-Douglas production function	3	KTU
7	Differentiate explicit cost and implicit cost	3	KTU
8	Explain Sunk cost	3	KTU
9	Explain Profit Volume Ratio. (PV Ratio)	3	KTU
10	Explain shut down point in the short run	3	KTU
11	What is margin of safety? What happens when margin of safety is low ?	7	Dec 2021
12	Explain Profit Volume Ratio. (PV Ratio)	3	KTU
13	Explain shutdown point with the help of diagram	7	KTU
14	What are internal and external economics of scale.	7	KTU
15	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.	7	KTU
16	Explain Law of variable Proportions with a diagram.	7	KTU
17	Explain marginal Revenue and Average Revenue in perfect competition and imperfect competition with graph (7)	7	KTU
18	Define isoquant curve. Explain properties of isoquant curve.	7	KTU
19	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.	7	KTU
20	What are the advantages of large-scale production? Explain producer equilibrium with the help of a diagram.	7	KTU
21	Explain producer equilibrium with the help of isoquants and is cost line. What is expansion path.	7	KTU, KTU Dec 2022
22	Explain Returns to scale OR Long run production function,	7	KTU, KTU

	Represent it using a figure.		Dec 2022
23	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	KTU, KTU Dec 2022
24	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?	3	KTU Dec 2021
2	What is non-price competition under Oligopoly ?	3	KTU
3	What is collusive oligopoly?	3	KTU, KTU Dec 2022
4	What is non-price competition under Oligopoly ?	3	KTU
5	What is Predatory pricing?	3	KTU
6	What is Price skimming?	3	KTU
7	Give examples of non-price competition under oligopoly?	3	KTU
8	Explain the equilibrium of a firm earning supernormal profit under monopolistic competition.	3	KTU
9	Make comparison between monopoly and perfect competition.	3	KTU
10	What is inelastic demand?	3	KTU Dec 2022
11	Suppose AC>Price>AVC. Will a producer produce or shutdown in the short run? Give reason.	3	KTU Dec 2022
12	Why a firm under perfect competition is called a price taker?	3	KTU Dec 2022
13	Explain Price rigidity under oligopoly with the help of kinked demand curve. Why price is rigid under oligopoly?	7	KTU, KTU Dec 2022
14	With the help of a diagram explain equilibrium under monopolistic competition.	7	KTU
15	Distinguish between monopoly and Oligopoly/ Monopoly and perfect competition	7	KTU

16	Explain linked demand curve model.	7	KTU
17	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	KTU, KTU Dec 2022
18	Explain the equilibrium of a firm earning super normal profit under monopolistic competition.	7	KTU, KTU Dec 2022
19	Make a comparison between monopoly and monopolistic competition. Draw figures showing the determination of equilibrium under both.	7	KTU Dec 2022
20	Explain cost plus and going rate pricing.	7	KTU Dec 2022
21	Give examples of non-price competition under oligopoly?	7	KTU Dec 2020
MODULE 4			
1	What are important economic activities under primary	3	KTU
2	Explain the GNP Deflator.	3	KTU
3	Explain demand pull inflation	3	KTU
4	Explain cost push inflation.	3	KTU
5	Distinguish between a bond and a share?	3	KTU
6	Distinguish between NSE and BSE	3	KTU
7	Distinguish between NIFTY and SENSEX	3	KTU
8	Distinguish between Demat Account and Trading Account	3	KTU
9	Distinguish between final goods and intermediate goods.	3	KTU Dec 2022
10	GDP of a country = 1500 crores, Depreciation =150 Crores NFIA= 50 crores. Estimate GNP,NDP and NNP	7	KTU
11	Distinguish between money market and capital market ?	7	KTU Dec 2021
12	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	7	KTU

	Net internal tax - 300		
13	From the given below estimate Gross National Product, Net National Product and National Income. GDP - 5000 (in 100 billion) NFIA - 50 Indnet - 70 Subsidies- 20 Depreciation- 30	7	KTU
14	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	7	KTU Dec 2021
15	What is monetary policy? What are the monetary policy measures?	7	KTU Dec 2022
16	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.	7	KTU Dec 2022
17	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).	7	KTU Dec 2022
MODULE 5			
1	What is free trade?	3	KTU Dec 2021
2	What is Devaluation?	3	KTU Dec 2021
3	Explain the J-curve effect?	3	KTU
4	Suppose the sum of elasticity of export and import is less than one. What will be the effect of devaluation?	3	KTU

5	What are the merits of quota restrictions?		KTU
6	Explain Marshall- Learner condition.	3	KTU
7	How is National income estimated under Product method and expenditure method	3	KTU
8	What are the monetary and fiscal policy measures to control inflation?	3	KTU Dec 2021
9	What is international trade? List out the advantages of foreign trade ?	3	KTU
10	What do you mean by labour augmenting technical progress?	3	KTU Dec 2022
11	What is a Trading account?	3	KTU Dec 2022
12	Point out any three items coming under unilateral transfers account.	3	KTU Dec 2022
13	What is balance of payments?	3	KTU Dec 2022
14	What is SENSEX and NIFTY? (8)	7	KTU
15	Examine the comparative cost theory. Point out any two criticisms against this theory.	7	KTU Dec 2022
16	What is protection? State any five arguments in favour of protection.	7	KTU Dec 2022
17	What are the disadvantages of foreign trade? Examine the effects of quotas on international trade.	7	KTU Dec 2022
18	Income method and expenditure method.	7	KTU
19	What are the arguments in favour of free trade?	7	KTU
20	What are the tariff barriers? Explain its impact on the economy.	7	KTU
21	Explain absolute advantages theory with the help of an example	7	KTU
22	What are the advantages of foreign trade?	7	KTU
23	Evaluate the success or failure of devaluation when the demand for import is more elastic or less elastic.	7	KTU Dec 2022