



**VIDYA ACADEMY OF SCIENCE &  
TECHNOLOGY - TECHNICAL CAMPUS**

**Malakkal P.O, Kilimanoor, Thiruvananthapuram – 695 602  
(Accredited by NAAC with ‘B++’ Grade)**

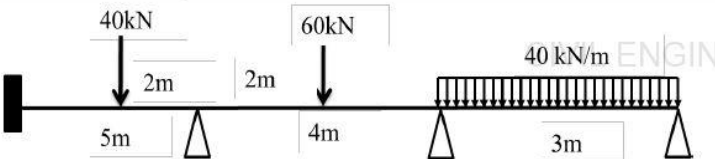
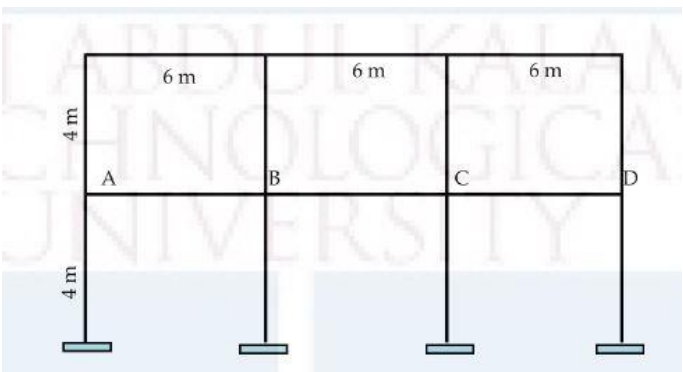
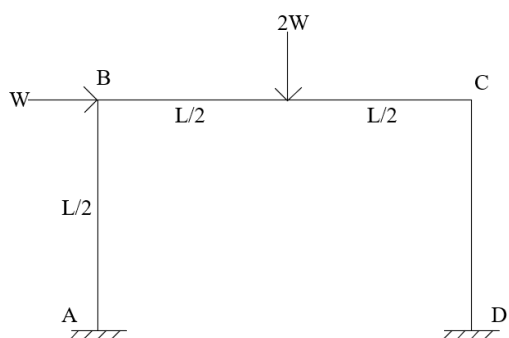
**DEPARTMENT OF CIVIL ENGINEERING**

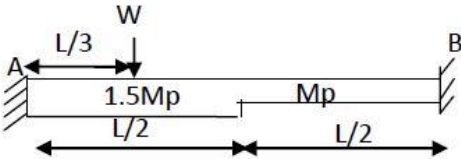
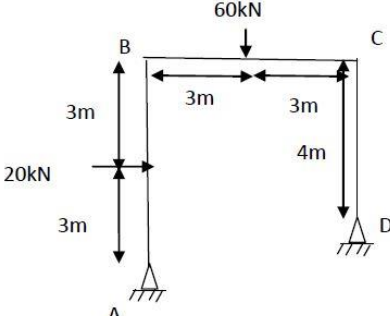
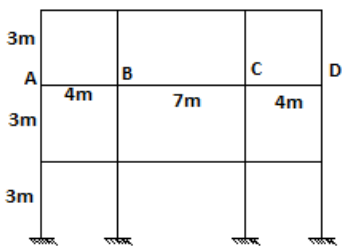
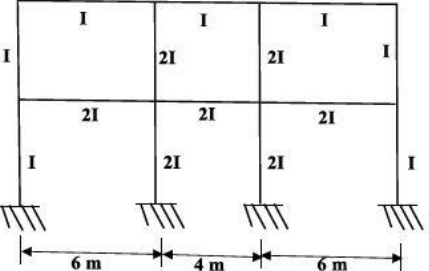
**S6 - Question Bank**

## QUESTION BANK

### STRUCTURAL ANALYSIS II

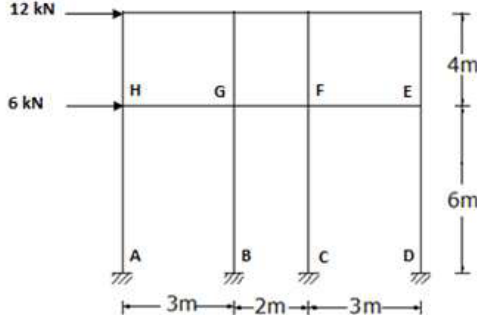
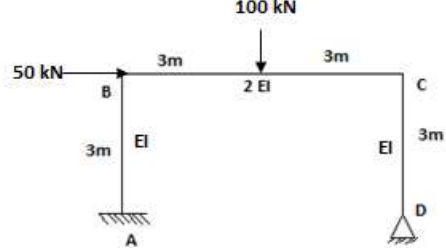
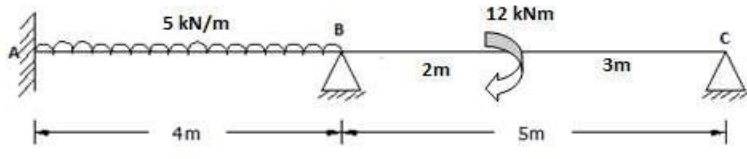
#### MODULE 1

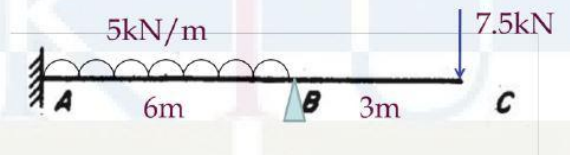
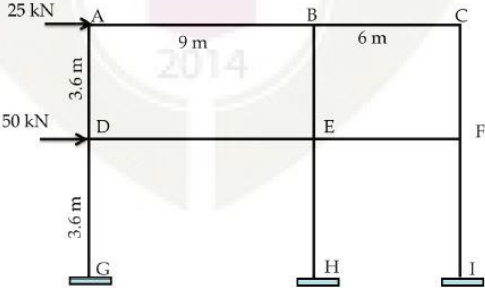
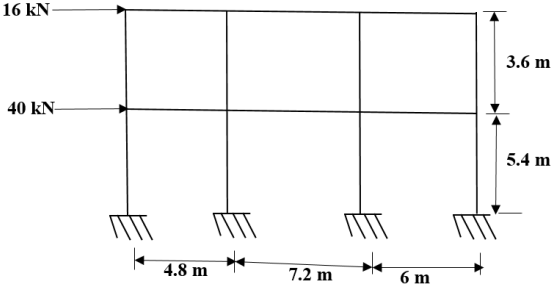
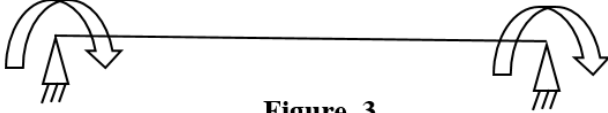

1	<p>Find the plastic moment capacity of the beam shown in figure. Assume uniform section throughout</p> 	KTU Model question paper	14 marks
2	<p>Total dead load is 12 kN/m and total live load is 20 kN/m on ABCD. Analyse the frame for midspan positive moment on BC, using substitute frame method.</p> 	KTU Model question paper	14 marks
3	<p>Determine the shape factor of T- Section with flange width 120 mm. Depth of web is 110 mm. Thickness of flange and web is 10 mm. If the value of yield stress is 250N/mm<sup>2</sup>, find the plastic moment capacity of the section</p>	2019 may	10 marks
4	<p>Determine the value of collapse load for the portal frame shown in fig. All the members have the same plastic moment of resistance</p> 	2019 may	20 marks

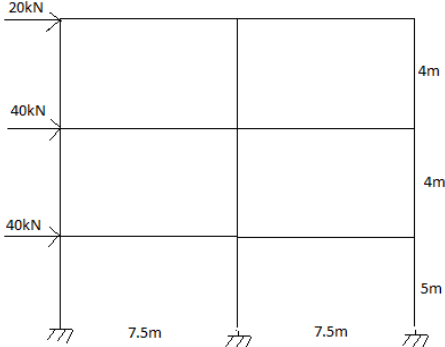
5	<p>a. Explain plastic section modulus  b. State the three theorems of plastic collapse  c. Determine the collapse load (<math>W_c</math>) for the fixed beam by kinematic method</p> 	2019 december	2 marks 5 marks 13 marks
6	<p>Find the value of <math>M_p</math> for the frame of uniform section under the applied factored loads.</p> 	2019 december	15 marks
7	<p>In a multi-storey building frame spaced at 5.5m interval. The DL on the slab is <math>3\text{kN/m}^2</math> and LL is <math>6\text{kN/m}^2</math>. Analyse the second floor beam BC for maximum positive bending moment at the mid span. Self weight of the beam for 4m span is <math>4\text{ kN/m}</math> and that of 7m span is <math>5\text{kN/m}</math>. Use substitute frame method, Assume that <math>I</math> of the columns = <math>36 \times 10^4\text{ cm}^4</math> and <math>I</math> of all girder = <math>50 \times 10^4\text{ cm}^4</math></p> 	2020 december	10 marks
8	<p>Find the maximum hogging moment and shear force at the support due to gravity loading in the frame shown in Figure.2. Frames are spaced at 3.0 m c/c. Dead load = <math>3\text{ kN/m}^2</math>, Live load = <math>2\text{ kN/m}^2</math>, Weight of beam = <math>2\text{ kN/m}</math> and storey and height 3m</p> 	2019 december	10 marks

9	Derive an expression for the shape factor of a rectangular cross section	<b>KTU model question paper</b>	<b>3 marks</b>
10	What are the advantages and disadvantages of approximate methods of structural analysis?	<b>KTU model question paper</b>	<b>3 marks</b>

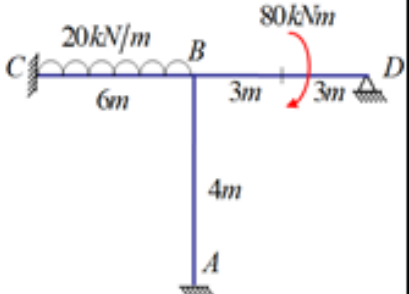
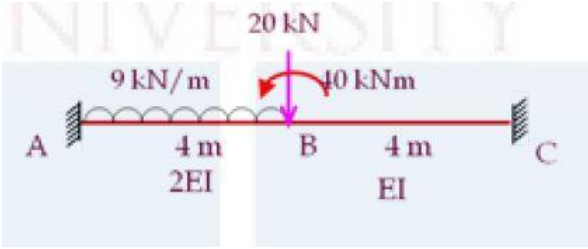

## MODULE 2

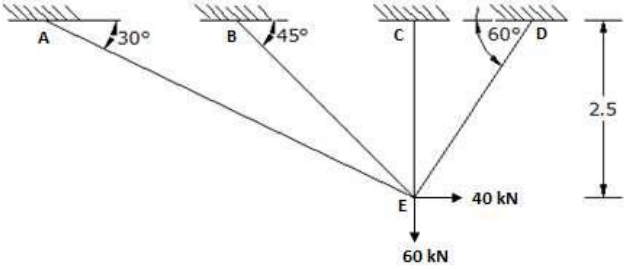

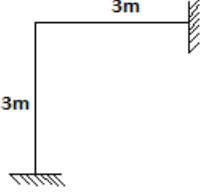
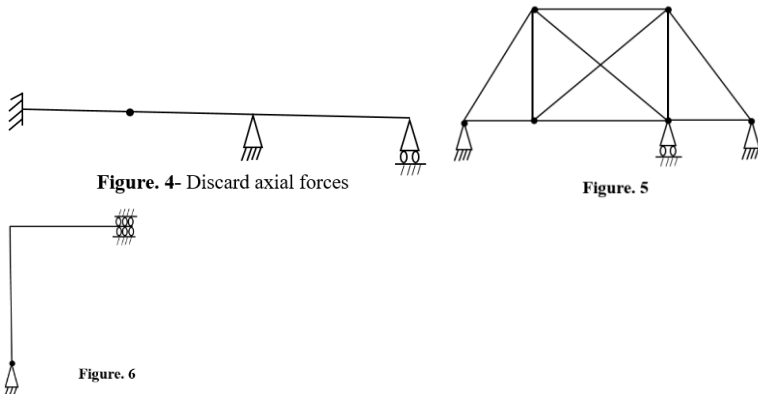
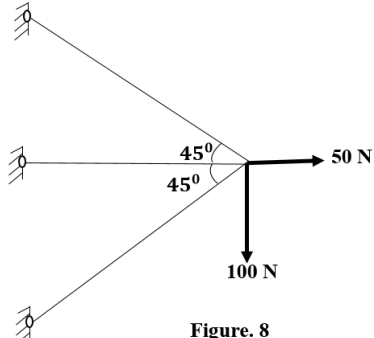
1	<p>a. List the assumptions to analyse a frame by cantilever method</p> <p>b. Analyse using portal method and find the axial force in columns, shear force in beams and columns, bending moments in beams and columns. Draw the BMD of beams and columns</p> 	2020 december	3 marks 12 marks
2	<p>a. Explain how the effect of lack of fit is considered in flexibility matrix method of Analysis.</p> <p>b. Analyse the frame shown in figure by flexibility method</p> 	2020 december	3 marks 12 marks
3	<p>a. Derive the relationship between force transformation matrix and displacement transformation matrix</p> <p>b. Analyse the continuous beam shown in Figure, using flexibility matrix method and find the bending moments</p> 	2020 december	5 marks 10 marks
4	Analyse the beam in figure using flexibility method	<b>KTU Model question paper</b>	<b>14 marks</b>

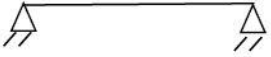


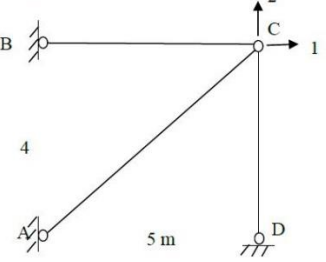
			
5	<p>Analyse the frame in figure using portal method.</p> 	<p><b>KTU Model question paper</b></p>	<p><b>14 marks</b></p>
6	<p>Analyse the frame in Figure.1 using portal method. Beams and columns have same size</p>  <p style="text-align: center;">Figure. 1</p>	<p><b>2019 december</b></p>	<p><b>12 marks</b></p>
7	<p>Derive Flexibility matrix for the following beam element in Figure.3.</p>  <p style="text-align: center;">Figure. 3</p>	<p><b>2019 december</b></p>	<p><b>5 marks</b></p>
8	<p>Derive flexibility matrix for the co-ordinates shown for the beam in figure</p> 	<p><b>KTU Model question paper</b></p>	<p><b>3 marks</b></p>
9	<p>a. What are the assumptions in portal method of analysis?  b. Analyse the frame shown in figure 1 using portal method</p>	<p><b>2019 may</b></p>	<p><b>2 marks</b>  <b>13 marks</b></p>

			
10	<p>a. Explain the load transformation matrix approach in flexibility method</p> <p>b. Explain analysis of plane trusses by flexibility method</p>	2019 may	8 marks 7 marks


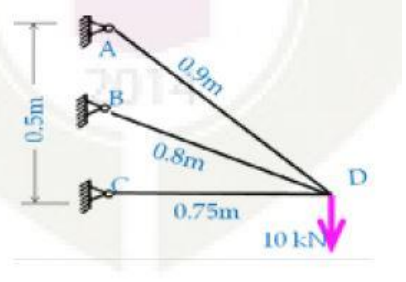
### MODULE 3

1	<p>Determine all the member end moments for the frame shown in figure, using stiffness method.</p> 	KTU Model question paper	14 marks
2	<p>Determine the displacements at B for the beam shown in figure, using stiffness method</p> 	KTU Model question paper	14 marks
3	<p>Derive stiffness matrix for the degrees of freedom shown for the beam in figure</p> 	KTU Model question paper	3 marks
4	<p>Prove that flexibility matrix is the inverse of stiffness matrix for a given set of actions and corresponding displacements.</p>	KTU Model question paper	3 marks

5	<p>Find the forces in the members of the truss loaded as shown in figure using stiffness method</p> 	2020 decembe r	10 marks
6	<p>Derive the stiffness matrix for the given structures.</p> <p>i)  ii) </p>	2020 decembe r	5 marks
7	<p>Find the Kinematic indeterminacy and Static indeterminacy of the continuous beam ( Figure.4) , pin jointed frame (Figure.5) and rigid frame (Figure.6)</p>  <p>Figure. 4- Discard axial forces</p> <p>Figure. 5</p> <p>Figure. 6</p>	2019 decembe r	9 marks
8	<p>Find the member forces in the truss shown in Figure.8 using stiffness method</p>  <p>Figure. 8</p>	2019 decembe r	15 marks

9	<p>Define kinematic indeterminacy. Determine the kinematic indeterminacy of the following structures in fig</p> <p>a.  b. </p> <p>c. </p>	2019 may	5 marks
10	<p>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 <math>F_1 = 50 \text{ kN}</math>; <math>F_2 = 30 \text{ kN}</math>, and a lack of fit due to bar AC being too long by 5 mm. Assume all bars to have same axial rigidity <math>AE = 6000 \text{ kN}</math>. Use stiffness matrix</p> 	2019may	10 marks

#### MODULE 4

1	Write down the steps involved in direct stiffness method.	KTU Model question paper	3 marks
2	<p>Find all the joint displacements for the beam in Figure 5, using direct stiffness method</p> 	KTU Model question paper	14marks
3	<p>Find the joint displacements for the pin-jointed truss shown in figure, using direct stiffness method.</p> 	KTU Model question paper	14 marks
4	a. How global stiffness matrix can be derived from the element stiffness matrix	2020 december	5 marks



	<p>b. Analyse the continuous beam shown in Figure, using direct stiffness method and find the bending moments</p>		<b>15 marks</b>
<b>5</b>	<p>Analyse and draw bending moment diagram for the frame shown in Figure. using direct stiffness method</p> <p style="text-align: center;">Figure. 9</p>	<b>2019 december</b>	<b>17 marks</b>
<b>6</b>	<p>What is direct stiffness method?</p> <p>Analyse a continuous beam ABCD by direct stiffness method. Assume <math>EI</math> 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.</p>	<b>2019 december</b>	<b>3 marks</b>
<b>7</b>	<p>Discuss the procedure of Direct Stiffness Method in the matrix analysis</p>	<b>2020 december</b>	<b>15 marks</b>
<b>8</b>	<p>Analyse the continuous beam shown in figure 5 using Direct Stiffness Method shown in figure and develop the BMD</p>	<b>2019 may</b>	<b>5 marks</b>
<b>9</b>	<p>Explain Direct Stiffness Method in the matrix analysis</p>	<b>2019 may</b>	<b>15 marks</b>
<b>10</b>	<p>Analyse the beam shown in figure 6 using Direct Stiffness Method shown in figure and determine the member forces and moments.</p>	<b>2019 may</b>	<b>5 marks</b>

### MODULE 5

<b>1</b>	<p>Derive an expression for the free-vibration response of a damped SDOF system (Underdamped case only).</p>	<b>KTU Model question paper</b>	<b>14 marks</b>
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<b>2</b>	A vibrating system consists of a weight of $W = 100\text{kN}$ and a spring with stiffness $k = 20 \text{ N/m}$ 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	<b>KTU Model question paper</b>	<b>14 marks</b>
<b>3</b>	Discuss the concepts of vibration isolation and its applications.	<b>2020 december</b>	<b>5 marks</b>
<b>4</b>	State and explain D'Alembert's principle.	<b>2020 december</b>	<b>4marks</b>
<b>5</b>	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.	<b>2020 december</b>	<b>8marks</b>
<b>6</b>	A system vibrating with a natural frequency of $6\text{Hz}$ starts with an initial amplitude of $2\text{cm}$ and an initial velocity of $25 \text{ cm/s}$ . Determine the natural period, amplitude, maximum velocity, maximum acceleration and phase angle. Also write the equation of motion of a vibrating system.	<b>2020 december</b>	<b>8marks</b>
<b>7</b>	<ul style="list-style-type: none"> <li>a. What is critical damping</li> <li>b. What is magnification factor?</li> <li>c. person standing on a spring produces a deflection of <math>1.0 \text{ mm}</math> to the spring. Find the natural frequency and Time period</li> </ul>	<b>2019 december</b>	<b>3 marks</b> <b>3 marks</b> <b>4 marks</b>
<b>8</b>	A vibrating system consists of mass of $10 \text{ kg}$ , spring of stiffness $240 \text{ N/m}$ and a damper with a damper coefficient of $10 \text{ N-s/m}$ . Determine <ul style="list-style-type: none"> <li>i) Damping factor</li> <li>ii) Natural frequency of damped vibration</li> <li>iii) Logarithmic decrement</li> <li>iv) Ratio of successive amplitudes</li> <li>v) Number of cycles after which initial amplitude reduced to <math>25\%</math></li> </ul>	<b>2019 december</b>	<b>10 marks</b>
<b>9</b>	Write the equation of motions corresponding to the damped and undamped free and forced vibration	<b>2019 may</b>	<b>5 marks</b>
<b>10</b>	<ul style="list-style-type: none"> <li>a. Explain logarithmic decrement. Derive the equation for logarithmic decrement.</li> <li>b. Derive the response of the free vibration system with damped case and calculate the free vibration response of a SDOF system at time <math>t=0.20 \text{ sec}</math>. for the following data Natural frequency <math>\omega = 12 \text{ rad/sec}</math> Damping coefficient <math>\xi = 0.15</math> Initial velocity <math>= 10 \text{ cm/sec}</math> Initial displacement <math>= 5 \text{ cm}</math></li> </ul>	<b>2018 december</b>	<b>15 marks</b>



<b><u>MODULE 2</u></b>			
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 to treat 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 $1.007 \times 10^{-6}$ m <sup>2</sup> /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 $9 \times 10^6$ 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	

<b><u>MODULE 3</u></b>			
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 rapid sand 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

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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 networks with 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													

#### **MODULE 4**

1	a)What are the factors considered during site selection of waste water treatment plant. 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 a sewage 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/l BOD 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	

### **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	

<b>SUB CODE</b>	<b>CET322</b>	<b>SUBJECT NAME</b>	<b>GEOTECHNICAL INVESTIGATION</b>
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<b>MODULE 1</b>		<b>Marks</b>	<b>Year</b>	<b>Instructional Objectives</b>
<b>1</b>	Explain in detail a site investigation programme.	10	KTU 2022	
<b>2</b>	What is the criteria for fixing the number and spacing of boreholes?	4	KTU 2022	
<b>3</b>	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 m <sup>2</sup>	4	KTU 2019	
<b>4</b>	Differentiate between preliminary and detailed soil investigation. What are the details to be collected in these two stages of investigation?	5	KTU 2018	
<b>5</b>	List different methods of soil exploration	2	KTU 2018	
<b>6</b>	Explain Site reconnaissance in soil investigation program	3	KTU 2023	
<b>7</b>	Define Significant Depth	3	KTU 2023	
<b>8a)</b>	Discuss on the guidelines laid down in IS code for fixing the number of boreholes and depth of exploration	7	KTU 2023	
<b>8b)</b>	Explain in detail Auger Boring with a neat sketch	7	KTU 2023	
<b>9a)</b>	What are the stages in Sub-surface Exploration and explain	8	KTU 2023	
<b>9b)</b>	Differentiate between Pits & Trenches	6	KTU 2023	
<b>10</b>	What are the procedures to be carried out for preliminary and detailed ground investigation?	10	KTU 2020	
<b>MODULE 2</b>				
<b>1</b>	Explain the various corrections to be applied for SPT test	10	KTU 2022	
<b>2</b>	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/m <sup>2</sup> . Find the corrected SPT number.	4	KTU 2022	
<b>3</b>	List any three advantages of static cone penetration test.	3	KTU 2022	
<b>4</b>	Explain the Overburden correction to be applied to the N value	3	KTU 2023	
<b>5</b>	List any three advantages of Static Cone Penetration test	3	KTU 2023	
<b>6a)</b>	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/m <sup>3</sup> . Calculate the corrected N value	9	KTU 2023	
<b>6b)</b>	Describe Sounding methods in soil exploration, with examples	5	KTU 2023	
<b>7a)</b>	What are the factors influencing SPT results and explain the precautions to obtain reliable results	9	KTU 2023	
<b>7b)</b>	What are the drawbacks of Dynamic cone penetration test	5	KTU 2023	
<b>8</b>	How does overburden pressure and dilatancy affect the measured Standard penetration number or N value?	5	KTU 2020	
<b>9</b>	Explain dynamic cone penetration test with a neat diagram.	7	KTU 2020	
<b>10</b>	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	
<b>MODULE 3</b>				
<b>1</b>	With a neat diagram, explain the process of seismic refraction method.	10	KTU 2022	
<b>2</b>	Differentiate between electrical profiling and electrical sounding method	4	KTU 2022	
<b>3</b>	A seismic refraction study of an area has given the following data	7	KTU 2018	

<b>SUB CODE</b>	<b>CET322</b>	<b>SUBJECT NAME</b>	<b>GEOTECHNICAL INVESTIGATION</b>			
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	<table border="1"> <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> <p>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.</p>	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			
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											
<b>4</b>	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													
<b>5</b>	<p>Data set from a seismic refraction test is given below.</p> <table border="1"> <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> <p>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.</p>	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	8	KTU 2022	
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											
<b>6</b>	How the thickness of subsurface layers is computed using seismic refraction method?	5	KTU 2020													
<b>7</b>	What are geophysical methods and their limitations?	3	KTU 2023													
<b>8</b>	Define Stabilization of Bore hole with casing	3	KTU 2023													
<b>9a)</b>	Explain the procedure for conducting Electrical Profiling method	8	KTU 2023													
<b>9b)</b>	Explain the limitations of Electrical Resistivity Method	6	KTU 2023													
<b>10a)</b>	Explain the estimation of ground water level	7	KTU 2023													
<b>10b)</b>	Explain Seismic refraction method with a neat sketch	7	KTU 2023													
<b>MODULE 4</b>																
<b>1</b>	Sketch a piston sampler and explain its working.	10	KTU 2019													
<b>2</b>	Briefly explain the method of collecting sand samples from beneath the water table.	5	KTU 2019													
<b>3</b>	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													
<b>4</b>	Explain the factors affecting sample disturbance and ways to reduce them.	10	KTU 2019													
<b>5</b>	Differentiate between Disturbed & Un-disturbed Samples	3	KTU 2023													
<b>6</b>	What are the factors affecting Sample disturbance during sampling operation	3	KTU 2023													
<b>7a)</b>	What are the measures that you are going to adopt while handling and transporting the soil sample?	8	KTU 2023													
<b>7b)</b>	Explain chunk & tube samples	6	KTU 2023													
<b>8a)</b>	What are the methods adopted to minimize the disturbance of the sample?	7	KTU 2023													



<b>SUB CODE</b>	<b>CET322</b>	<b>SUBJECT NAME</b>	<b>GEOTECHNICAL INVESTIGATION</b>
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<b>8b)</b>	Explain the Shelby Tube Sampler with a sketch	7	KTU 2023		
<b>9</b>	What are representative soil samples? How are they obtained?	7	KTU 2022		
<b>10</b>	What are the precautions to be followed while handling and transporting soil samples? Why is it necessary?	7	KTU 2022		
<b>MODULE 5</b>					
<b>1</b>	With a figure, explain the test procedure for plate load test.	8	KTU 2019		
<b>2</b>	The results of two plate load tests are given in the following table			5	KTU 2019
	Plate diameter, B (m)	Total load, Q (kN)	Settlement (mm)		
	0.305	32.2	20		
	0.610	71.8	20		
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.					
<b>3</b>	What are the limitations of plate load test?	5	KTU 2019		
<b>4</b>	What is the significance of pressure meter modulus and limit pressure? Explain the test procedure to obtain the same	8	KTU 2019		
<b>5</b>	Calculate core recovery and rock quality designation from the following borehole core logging data. Core run length=150 cm.			5	KTU 2019
	Core recovery (cm)				
	25				
	5				
	5				
	7.5				
	10				
	12.5				
	7.5				
	10				
	15				
	10				
5					
12.5					
<b>6</b>	Explain Flat Dilatometer test	3	KTU 2023		
<b>7</b>	Define Rock quality designation	3	KTU 2023		
<b>8a)</b>	Explain the procedure for Pressure meter test	8	KTU 2023		
<b>8b)</b>	Discuss the limitations of Plate load test	6	KTU 2023		
<b>9a)</b>	Explain the preparation of a geotechnical investigation report and sketch a bore log chart	10	KTU 2023		
<b>9b)</b>	Define modulus of subgrade reaction	4	KTU 2023		
<b>10</b>	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	7	KTU 2018		

depth of 3.5 m below the ground surface										
Pressure kN/m <sup>2</sup>	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.										

## **CET 352- ADVANCED CONCRETE TECHNOLOGY**

### **MODULE -1**

1

- a) Explain the products of hydration. (5)
- b) List any 3 characteristics of concrete aggregate and discuss their influence on properties of concrete.

c) Write short notes on i) air entraining admixtures ii) plasticisers Write short notes on  
i) air entraining admixtures ii) plasticisers (6)

2 What are light weight aggregates? Discuss any two uses of them with examples (3)

3. Explain segregation and bleeding in concrete. (6)

4.a) List the different types of cement. (6)

b) Mention the classification of aggregate in accordance with size and source (9)

5) Distinguish between plasticizers and super plasticizers (7)

6)

a) Write a short note on artificial aggregates. (5)

b) What are the properties of Bogue's compounds? (4)

7)

Describe the various tests for determining the quality of aggregate to be used

for concreting work. (8)

### **MODULE -2**

- 1) Briefly explain about various factors considered during the design the design of concrete mix (15)
- 2) Explain about different statistical quality control of concrete (15)
- 3) Distinguish between nominal mix and design mix (15)
- 4) Write down the procedure for concrete mix design by BIS method. (15)
- 5) What are the objectives of concrete mix design? (15)
- 6) Discuss the step-by-step procedure of ACI method of concrete mix design. (15)

### **MODULE -3**

- 1) Explain the term workability and enumerate the various factors affecting workability? (6)
- 2) Explain the term shrinkage in concrete. What are the different forms of shrinkage in concrete. (7)
- 3) Explain the term shrinkage in concrete. What are the different forms of shrinkage in concrete. (8)
- 4) Briefly discuss about the elastic properties of concrete. (3)
- 5) Compare compressive strength results of cube with cylinder test on concrete (4)
- 6) Explain the various factors affecting modulus of elasticity of concrete. (5)
- 7) Explain the procedure for determining the flexural strength of concrete under four point bending test. (6)
- 8) Explain plastic shrinkage and drying shrinkage. (6)

#### **MODULE -4**

- 1) What is non-destructive testing of concrete? Discuss any four methods (8)
- 2) Explain the factors affecting the measurement of ultrasonic pulse velocity. (7)
- 3) What is sulphate attack in concrete? How is it controlled? (8)
- 4) Explain Schmidt's rebound hammer test to assess the strength of concrete. (8)
- 5) Explain any two non-destructive tests in concrete. (8)
- 6) Discuss in brief the mechanism of chloride induced corrosion of steel and its control.

#### **MODULE -5**

- 1) 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)
- 2) Briefly explain about fibre reinforced concrete ? (10)
- 3) Briefly discuss fibre reinforced concrete & polymer concrete? (10)
- 4) What do you mean by sprayed concrete? (5)
- 5) Explain in detail about the following special concrete (15)
  - a) ready mix concrete
  - b) underwater concrete
  - c) mass concrete
  - d) green concrete
- 6) Briefly explain about slipform construction (5)

## 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)

#### MODULE 2

- 1.Explain 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 explain 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)

### **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.

#### **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 =  $23.5 \text{ kN/m}^3$ . Top width of dam = 8m, Bottom width = 24m

Allowable stress in concrete =  $2500 \text{ kN/m}^2$  (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)

## 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 dissipators(Ktu model qn)(3marks)

# INDUSTRIAL ECONOMICS AND FOREIGN TRADE

## (HUT 300)

MODULE 1			
1	Why does an economic problem arise? What are the basic economic problems?	7	KTU,KTU Dec 2021
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, 7	KtuDec2021 KTU June 2023
3	Explain consumer equilibrium? Explain consumer surplus? Explain producer surplus?	3	KTU
4	<p>a. What should be percentage change in price a product if the sale is to be increased by 50% and its price elasticity of demand is 2</p> <p>b. A consumer purchases 50 units of commodity X 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.10 to 12. Calculate cross elasticity of demand and interpret the result.</p> <p>c. 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?</p> <p>d. 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?</p> <p>e. 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?</p>	7	KTU KTU DEC 2022

5	<p>a. Demand function of a product is given as <math>D = 50 - 2p</math> and supply function <math>S = 20 + 3p</math>. What will be the equilibrium price and quantity of the product.</p> <p>b. The demand function of a product is given as <math>D = 60 - 2P</math> and the supply function <math>S = 30 + 4P</math>. Estimate equilibrium price and equilibrium quantity. Also find the excess supply when Price equals Rs.6?</p>	3	KTU, KTU Dec 2022																		
6	<p>a. Explain Dead weight loss.</p> <p>b. Suppose the govt. imposes a tax on a commodity where the tax burden is met by the consumers. Draw diagram and explain dead weight loss. Mark consumer surplus, producer surplus, tax revenue and dead weight loss in the diagram</p> <p>c. What is deadweight loss of a tax? Examine the consumer and producer surplus before and after a tax with the help of a diagram.</p>	7	KTU, KTU Dec 2022 KTU June 2023																		
7	What are the merits and demerits of Joint stock companies?	7	KTU, KTU June 2023																		
8	<p>a. Prepare a utility schedule showing units of consumption, total utility and marginal utility. Point out any three limitation of the law.</p> <p>b. Draw total utility and marginal utility curves and derive the three relations between marginal utility and total utility.</p>	7	KTU, 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	KTU																		
10	<p>Calculate the marginal utility from the following data</p> <table border="1" style="margin-left: 20px;"> <tr> <td>X</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>TU</td> <td>11</td> <td>19</td> <td>26</td> <td>31</td> <td>34</td> <td>36</td> <td>36</td> <td>30</td> </tr> </table>	X	1	2	3	4	5	6	7	8	TU	11	19	26	31	34	36	36	30	4	KTU June 2023
X	1	2	3	4	5	6	7	8													
TU	11	19	26	31	34	36	36	30													
<b>MODULE 2</b>																					
1	<p>a. In the production function <math>\theta = 2L^{1/2} K^{1/2} + 36</math> how many units of capital one needed to produce 60 units of output.</p> <p>b. A firm's total cost function is given by the equation, <math>TC = 4500 + 10Q + 25Q^2</math>. Write the expression for the following cost concepts. (a) AFC (b) AVC (c) AC (d) MC</p>	3 4	KTU KTU June 2023																		
2	<p>a. In the short run <math>AVC &lt; P &lt; AC</math>. Will the firm produce or shut down? Give reason ?</p> <p>b. Explain shut down point in the short run with the help of diagram</p>	3 4	KTU KTU June 2023																		

3	Define Isoquants and properties, Explain Isocost line, Explain Expansion path, Explain Cobb-Douglas production function	7	KTU
4	Differentiate explicit cost and implicit cost, Explain Sunk cost	3	KTU
5	<p>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 <math>TC=100+50Q-0.2Q^2+0.3Q^3</math>. Find marginal cost when output equals 5 units.</p> <p>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.</p> <p>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</p> <p>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.</p>	7 10	KTU, KTU Dec 2022 KTU June 2023
6	Explain Law of variable Proportions with a diagram.	7 10	KTU KTU June 2023
7	What are the advantages of large-scale production? Explain producer equilibrium with the help of a diagram.	7	KTU
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 $TC=500+5Q-4Q^2+Q^3$ . Estimate TVC, TFC and MC when output equals 10 units.	7	KTU, KTU Dec 2022
<b>MODULE 3</b>			

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	KTU Dec 2021
2	What is Predatory pricing? Describe on product pricing and explain the different methods used for pricing.	7 10	KTU 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	KTU, 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.	3	KTU Dec 2022
7	Why a firm under perfect competition is called a price taker?	3	KTU Dec 2022
8	Explain Price rigidity under oligopoly with the help of kinked demand curve. Why price is rigid under oligopoly?	7	KTU, 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	KTU, KTU Dec 2022
10	Explain Kinked Demand Curve	7 4	KTU KTU June 2023
<b>MODULE 4</b>			
1	Explain in detail the circular flow of income in a four sector model with a neat diagram.	3 10	KTU 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 KTU June 2023
4	Distinguish between a bond and a share?	3	KTU

		4	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 2022																				
8	<p>a. GDP of a country = 1500 crores, Depreciation =150 Crores NFIA= 50 crores. Estimate GNP,NDP and NNP</p> <p>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</p> <p>c. 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</p> <p>d. From the data given below estimate the NDP using Item Rs</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Consumption Expenditure</td> <td style="text-align: right;">3000</td> </tr> <tr> <td>Investment Expenditure</td> <td style="text-align: right;">2000</td> </tr> <tr> <td>Govt. Expenditure</td> <td style="text-align: right;">700</td> </tr> <tr> <td>Exports</td> <td style="text-align: right;">600</td> </tr> <tr> <td>Imports</td> <td style="text-align: right;">300</td> </tr> <tr> <td>Intermediate consumption</td> <td style="text-align: right;">2000</td> </tr> <tr> <td>Wages and Salaries</td> <td style="text-align: right;">2000</td> </tr> <tr> <td>Rent</td> <td style="text-align: right;">500</td> </tr> <tr> <td>Interest</td> <td style="text-align: right;">500</td> </tr> <tr> <td>Profit</td> <td style="text-align: right;">1000</td> </tr> </table> <p>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.</p> <p>f. Suppose the national income of a country is Rs1000 and depreciation equals Rs300. If NFIA equals Rs (-400) and</p>	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, KTU Dec2021, KTU Dec 2022, KTU June 2023
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	<p>Indirect Taxes equals Rs300, estimate NNP, NDP, GDP and GNP (all figures in Rs. Crores).</p> <p>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.</p>		
9	Distinguish between money market and capital market ?	7	KTU Dec 2021
10	What is monetary policy? What are the monetary policy measures?	7	KTU Dec 2022
<b>MODULE 5</b>			
1	<p>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?</p> <p>What are the arguments in favour of free trade?</p> <p>What are the tariff barriers? Explain its impact on the economy.</p>	7	KTU Dec 2021
2	Effects of International Trade	4	KTU June 2023
3	How is National income estimated under Product method and expenditure method, income method	7	KTU
4	What are the monetary and fiscal policy measures to control inflation?	3	KTU Dec 2021
5	<p>What is international trade? List out the advantages of foreign trade ?</p> <p>What are the disadvantages of foreign trade? Examine the effects of quotas on international trade.</p>	7	KTU, KTU Dec 2022
6	What do you mean by labour augmenting technical progress?	3	KTU Dec 2022
7	<p>What is a Trading account?</p> <p>Point out any three items coming under unilateral transfers account.</p> <p>What is balance of payments?</p>	3	KTU Dec 2022 KTU June 2023
8	<p>Examine the comparative cost theory. Point out any two criticisms against this theory.</p> <p>Explain absolute advantages theory with the help of an example</p>	7	KTU Dec 2022 KTU June 2023
9	What is protection? State any five arguments in favour of	7	KTU Dec 2022



	protection.		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 2022 KTU June 2023