Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FOURTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: CE202
Course Name: STRUCTURAL ANALYSIS – I (CE)

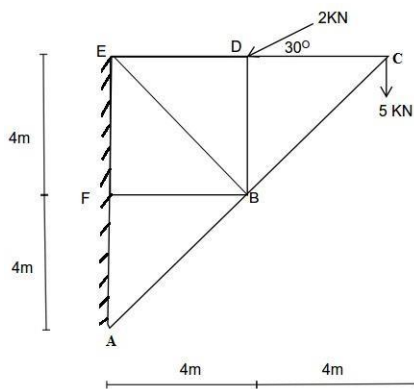Max. Marks: 100   Duration: 3 Hours

PART A
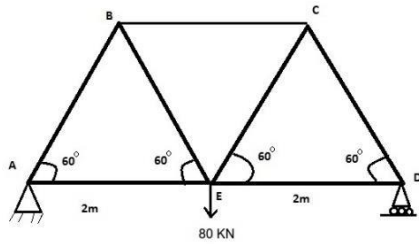### *Answer any two full questions. Each question carries 15 marks.*

			Marks

Answer any two full questions, each carries 15 marks.

1 a) Distinguish between method of joints and method of sections used in the analysis of pin jointed framed structures.   5

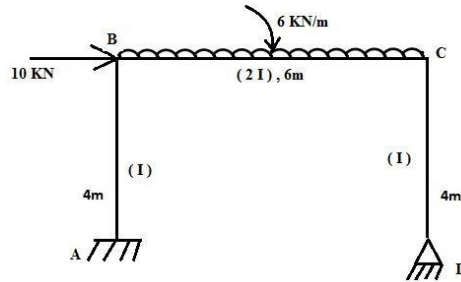   b) Analyse the truss shown in figure by method of sections   10

2 a) Derive an expression for strain energy due to bending of a beam subjected to general loading   4

   b) Explain Castigliano's theorems with the help of sketches   4

   c) State Betti's theorem   4

   d) Explain the Principle of least work   3

3 a) Describe static and kinematic indeterminacies with the help of examples   5

   b) Determine the vertical displacement of joint E of truss shown in figure by unit load method. Given, for all members cross sectional area = 1000mm^2, Young's modulus = 200 kN/mm^2 10

PART B
Answer any two full questions, each carries 15 marks.

4   a)   Describe the steps involved in the analysis of indeterminate beams subjected to   5
          support settlement

     b)   Analyse the frame shown in figure using consistent deformation method. Draw   10
          the bending moment diagram.

5   a)   Analyse the beam shown in figure by strain energy method and draw the bending   9
          moment diagram.
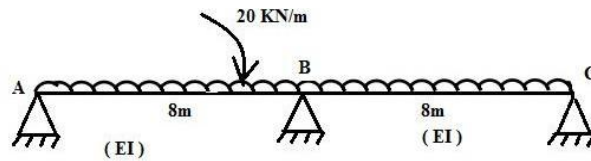
     b)   Draw the influence lines for shear force and bending moment at a point C of the   6
          beam shown in figure
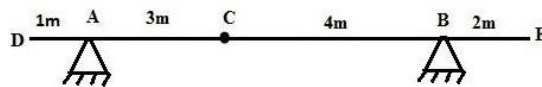
6   a)   What are influence lines? What are its advantages?   3

     b)   A train of concentrated loads moves from left to right on a simply supported   12
          girder of span 15 m, and 4kN load leading as shown in figure. Determine the

maximum shear force and the maximum bending moment at a section 4m from left support.

PART C
Answer any two full questions, each carries 20 marks.

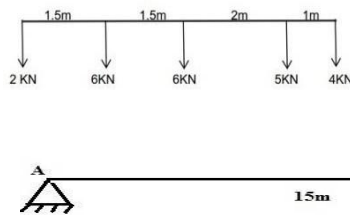7   a) With the help of a sketch, explain the various steps involved in the analysis of a loaded cable   8

    b) A light cable is supported at two points 20m apart which are at the same level.   12
       The cable supports three concentrated loads of magnitudes 20 kN, 30 kN and 25
       kN at points 1,2 and 3 respectively. The points 1,2 and 3 are at distances 5m,
       10m,15 m respectively from the left support. The deflection at first point is
       found to be 0.8m. Determine the tension in the different segments and total
       length of the cable.

8   a) Explain with the help of sketches, the different types of arches.   8

    b) A flexible suspension cable of weight 0.75 N/m hangs between two vertical walls

                                                                                            1

       2 60m apart, the left hand end being attached to the wall at point 10m below the
       right hand end. A concentrated load of 100 N is attached to the cable in such a
       manner that the point of attachment of the load is 20m horizontally from the left
       hand wall and 5m below the left hand support. Show that the maximum resultant
       cable tension is at the right hand end and find its value. The cable weight may be
       taken as uniformly distributed horizontally.

9   a) State Eddy's theorem   5

    b) A parabolic three hinged arch carries a udl of 30 kN/m on the left half of the

                                                                                            1

       5 span. It has a span of 16 m and a central rise of 3 m. Determine the resultant
       reactions at the supports. Find the bending moment, normal thrust and radial
       shear at a section 2m from left support.

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C   S2065   **Pages: 2**

Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FOURTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018
Course Code: CE204
Course Name: CONSTRUCTION TECHNOLOGY (CE)

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions. Each question carries 15 marks.

1   a)   What are the different market forms of timber used in construction industry?   6

    b)   What is an admixture? Explain the properties and uses of admixtures in concrete.   9

2   a)   What is mortar? Explain the different types of mortars used in civil constructions. 9

    b)   What is meant by curing of concrete? Discuss the different methods of curing of   6
         concrete.

3   a)   Explain the different market forms of steel with neat sketches. Where they are   6
         used?

    b)   Write the steps involved in BIS method of concrete mix design.   9

PART B
Answer any two full questions. Each question carries 15 marks.

4   a)   Enumerate in detail the preliminary considerations in the selection of foundations. 5

    b)   What is an arch? What are the different types of arches?   5

    c)   Write a note on the different types of roofs   used in buildings.   5

5   a)   Explain different types of stone masonry with neat sketches   9

    b)   What is DPC? Explain the different methods of providing DPC to a residential   6
         building.

6   a)   Explain, with neat sketches a) Filler slab b) Rat Trap bond masonry   8

    b)   List the various types of flooring materials and the criteria for their choice.   7
         Explain the construction of Timber Floor.

PART C
Answer any two full questions. Each question carries 20 marks

7   a)   What are the advantages and disadvantages of tall buildings?   6

b) What are the different modes for vertical transportation? Explain the components   9
of an escalator with neat sketch.

	c)	What are different types of failures of a building? List out the general reasons for	5 a building c
8	a)	Distinguish between RCC framed buildings and steel framed buildings	6
	b)	List out the different types of stairs used in buildings, with neat sketches.	6
	c)	What are the causes of failure in RCC structures? Explain with neat sketches	8
9	a)	Explain the advantages of precast concrete construction.	6
	b)	What are the methods of Retrofitting of RCC beams?	8
	c)	What are the causes of foundation failures?	6

Reg. No._____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CE206

Course Name: FLUID MECHANICS -II.

Max. Marks: 100   Duration: 3 Hours

Answer any two Questions from each part.

PART A

1. a) Derive an expression for maximum hydraulic efficiency of a Pelton wheel. (5)
    b) A jet of water having a velocity of 45m/s impinges without shock a series of vanes moving at 15m/s, the direction of motion of the vanes being inclined at 20^0 to that of the jet. The relative velocity at outlet is 0.9 of that at inlet, and the absolute velocity of the water at exit is to be normal to the motion of the vanes. Find: (a) vane angles at entrance and exit (b) work done on vanes per unit weight of water supplied by the jet; and (c) the hydraulic efficiency.   (10)

2. a)Explain with figure the function of a surge tank in a hydroelectric plant.   (5)
    b)Determine the overall efficiency of a Kaplan turbine developing 3000kW under a net head of 5m.It is provided with a draft tube with its inlet diameter 3m set 1.6m above the tail race level. A vacuum gauge connected to the draft tube indicates a reading of 5m of water. Assume draft tube efficiency as 78%.Neglect losses in the draft tube.   (10)

3. a) Define the terms (i) Specific speed of a centrifugal pump and (ii) Net Positive Suction Head.   (5)
    b)The diameter of an impeller of a centrifugal pump at the inlet and outlet are 36cm and 72cm respectively. The velocity of flow at outlet is 2.4m/s and the vanes are set back at angle of 45^0 at outlet. Determine the minimum starting speed if the manometric efficiency is 70%.   (10)

PART B

4. a) Differentiate between (i) Gradually varied flow and rapidly varied flow, (ii)subcritical and supercritical flow.   (6)
    b) A trapezoidal channel with side slopes of 2 horizontal : 1 vertical has to be designed to carry 15 m^3/s at a slope of 1/5000. Determine the dimensions of the efficient section.Manning's coefficient is 0.014.   (9)

5. a) A rectangular channel 3.5m wide is laid on a slope of 0.0005. Calculate the normal depth of flow for a discharge of 5m^3/s in this channel. The Manning's coefficient can be taken as 0.02.   (7)

b)On what slope should one construct a 3m wide rectangular channel (Manning's coefficient is 0.014) so that critical flow will occur at a normal depth of 1.2m? (8)

6. a) Differentiate between alternate depths and conjugate depths. (5)

b) In a hydraulic jump on a horizontal rectangular channel the depth and Froude number before the jump are 0.2 m and 9 respectively. Estimate the energy loss and specific energy head at the end of the jump. (10)

PART C

7. a) Sketch the water surface profiles that can occur in a steep slope channel. (7)

b) In a rectangular channel 12 m wide and 3.6 m deep water is flowing with a velocity of 1.2 m/s. The bed slope of the channel is 1 in 4000. If flow of water through the channel is regulated in such a way that energy line is having a slope of 0.00004, find the rate of change of depth of water in the channel. (8)

c) Differentiate between backwater curve and drawdown curve. (5)

8. a) The resisting force F of a plane during flight can be considered as dependent upon the length of aircraft L, velocity V, air viscosity μ, air density ρ and bulk modulus of air K. Express the functional relationship between these variables and the resisting force using dimensional analysis. (8)

b) The normal depth of flow of water, in a rectangular channel 1.5 m wide, is one metre. The bed slope of the channel is 0.0006 and Manning's roughness co-efficient is 0.012. Find the critical depth. At a certain section of the same channel the depth is 0.92 m while at a second section the depth is 0.86 m. Find the distance between the two sections. (12)

9. a) Explain the different types of similarities to be ensured between the model and prototype. (5)

b) Explain the Froude model law and Reynolds model law. (5)

c) A model of rectangular pier 1.5m wide and 4.5m long in a river is built to a scale of 1: 25.The average depth of water in the river is 3m. The model was tested in a laboratory, where the velocity of flow was maintained constant at 1.65m/s.It was observed that the force acting on the model was 3.92 N and the height of the standing wave was 3.5cm. Determine for the prototype a) the corresponding speed, b) the force acting, c) the height of the standing wave at nose. (10)

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Reg No.:＿＿＿＿＿＿＿＿ Name:＿＿＿＿＿＿＿＿＿＿＿＿

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FOURTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CE208
Course Name: GEOTECHNICAL ENGINEERING I (CE)

Max. Marks: 100 Duration: 3 Hours
Graph sheets can be used.

PART A
Answer any two full questions. Each question carries 15 marks.

1 a) Define void ratio, porosity, water content and degree of saturation 5
 b) Derive an equation to express the bulk density of a soil mass in terms of its void 5
 ratio, water content, specific gravity, degree of saturation and density of water
 c) The bulk density and dry density of a partly saturated soil sample are 1.98 g/cc 5
 and 1.56 g/cc respectively. Determine the porosity, water content and degree of
 saturation of the soil. Given, G = 2.72

2 a) State Stoke's law. What are the limitations of Stoke's law. 5
 b) The results of sieve analysis performed in a soil are given below. 10
The mass of dry sample taken for the test was 300g.Draw the particle size distribution
curve and determine the uniformity coefficient and coefficient of curvature and comment
on the result.

Sieve size	4.75mm	2.4mm	1.2mm	600µ	425 µ	300 µ	150 µ	75 µ
Mass of soil retained (g)	19.4	24.96mm	29.37	36.88	45.74	47.99	37.74	57.92

3 a) The bulk density and moisture content of a partly saturated soil sample are 1.79 7
g/cc and 18% respectively. The specific gravity of solids is 2.7.Determine the void ratio,
degree of saturation and dry density
 b) Draw the plasticity chart as per Indian Standards and classify the soil having the 8
following values of Atterberg limitsLL = 41%, PL = 29%, SL = 17%

PART B
Answer any two full questions. Each question carries 15 marks.

4 a) State Darcy's law. Define coefficient of permeability of a soil from this law. 5

 b) The subsoil at a site consists of 2m thick layer of clay, which is underlain by a 10
deep sand layer. The ground water table is at 3m below GL. Unit weight of clay is 18kN/m^3,
while that of sand above and below water table are 15.5 and 18.2 kN/m^3 respectively. Find
out the total, neutral and effective stress at a depth of 5m below ground level. The unit
weight of water may be taken as 10kN/m^3.

5 a) What is pole of a Mohr's circle? Explain with a sketch how it can be used to 7
 determine the stresses on any plane in a soil element subjected to external stresses.
 b) If the major and minor principal stresses through a mass of soil at the instant of 8

failure are 6kPa and 2kPa respectively. Calculate the normal and shear stress on a plane making an angle of 30° with the direction of minor principal stress.

	a)	Derive an expression for the effective stress at a depth 'Z' in a soil mass when the direction of flow of water through the soil is (i) downward (ii) upward	7
6			
	b)	In a falling head permeability test, the water level in the stand pipe dropped from 40 to 20cm in 1 hour. The diameter of the sample and stand pipe were 8cm and 0.5cm respectively, while the height of the sample was 9.5cm.Determine the coefficient of permeability of soil in m/day	8

PART C
Answer any two full questions. Each question carries 20 marks

7	a)	Define compression index. How can it be determined from a consolidation test?	5
	b)	Distinguish between normally consolidated soil, under consolidated soil and an over consolidated soil.	5
	c)	A 2m clay stratum is overlain by a 3.5m thick sand stratum and underlain by a rock. The saturated densities of sand and clay are 1850 and 1980 kg/m^3 respectively.The ground water table is at the ground level. It has been estimated that the vertical stress intensity at the middle of the clay layer is likely	10

to increase by 50% due to the construction of a structure. Estimate the compression of the clay stratum.
Given coefficient of volume change = 0.023 cm^2/kg.

8	a)	Explain the friction circle method of determination of the factor of safety of a given slope with respect to a given slip circle.	10
	b)	The optimum moisture content and maximum dry density of a soil obtained from the standard Proctor's tests are 18% and 1.67g/cc. If the sp. Gravity of soil solids is 2.7, determine the degree of saturation of the soil at OMC and the dry density corresponding to a zero air voids condition at OMC	10

9	a)	Explain the procedure for determination of coefficient of consolidation by square root of time fitting method.	10
	b)	Derive an expression for factor of safety against sliding in a cohesionless soil.	5
	c)	What do you understand by light compaction and heavy compaction? Under what circumstances are light and heavy compaction tests are carried out in the laboratory?	5

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Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD/FOURTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: HS200
Course Name: BUSINESS ECONOMICS

Max. Marks: 100   Duration: 3 Hours

PART A

Answer any three questions, each carries10 marks.   Marks

1 a) With the help of a figure demonstrate the relationship between total and marginal utility.   (5)
   b) Marginal analysis is the basis for several theories in Business Economics. Do you support this view?   (5)
2 a) Mention the relevance of the concept of scarcity in business economics.   (5)
   b) Mark the point on a graph of the PPC, showing underutilization of resources. Using the PPC, explain the concept of trade off.   (5)
3 a) If the production function of a firm is $Q = 10 L^{1/2}K^{1/2}$, find out the maximum output that can be produced, if 144 units of labour is combined with 169 units of capital. Also calculate the average and marginal product of labour from the function   (5)
   b) In July, Parle sold 40,000 bottles of their mango juicewhen the price of Tropicana was Rs.35 per bottle. In August, they sold 45,000 bottles when the price of Tropicana was Rs.40. Calculate the cross elasticity of demand of mango juice for Parle.   (5)
4 a) State and explain the law of variable proportions   (4)
   b) The following schedule shows the number of laptops purchased by offices and homes at different market prices.

Price(Rs)	purchased by offices(units)	Purchased by homes(units)
50000	3400	2500
55000	3300	2100
60000	3200	1600
65000	3100	1200

(6)

As the price of laptops increases from 55000 to 60000, what is the price elasticity of demand for (i) offices and (ii) homes?

PART B

Answer any three questions, each carries 10 marks.

5 a) Define average and marginal revenue. With the help of a figure demonstrate the relationship between average and marginal revenue.   (6)
   b) Distinguish between Perfect Competition and Monopoly.   (4)
6 a) Draw a diagram showing AFC, AVC and TC curves.   (4)
   b) A small-scale company, engaged in the production of manufacturing biodegradable carry bags has total sales of Rs. 20000. Its fixed cost is Rs. 6000, while its variable cost is at Rs.12000. Calculate (i) the P/V ratio (ii) breakeven point (iii) Margin of safety at this level of sales (iv) If it sells each bag for Rs.5, how many bags should the company sell to break even? (v)Find out the sales required to earn a profit of Rs. 4000.   (6)
7 a) Examine the various phases of a trade cycle. Draw a neat diagram to substantiate   (5)

your view.
b) Define GNP, NNP, NI, PI and DPI. (5)
8 a) Examine the various functions of the Reserve Bank of India. (5)
b) A mobile manufacturing company makes Rs.100000 every day by selling them. (5)
During this time, the machinery of the company depreciates by 10000. The
company pays GST of Rs.6000, gives the owner Rs. 40000 and retains Rs. 44000
for its expansion activities. The owner pays Rs. 45000 as income tax from his
income. Compute the firm's contribution to the following measures of national
income. (i) GDP (ii) NDP (iii) NI (iv) Personal income (v) Disposable Personal
income.

PART C
Answer any four questions, each carries10 marks.

9 a) What is Capital budgeting? (4)
b) The following table gives the annual sales and cost for two machines, which a (6)
company is planning to purchase. Machine A costs 2,60,000 while machine B
costs Rs. 90,000.

	Machine A	Machine B
Sales	1,70,000	1,70,000
Raw Materials	60,000	60,000
Labour	15,000	60,000
Electricity	30,000	20,000

Use the payback method to determine which machine the company should buy?
10 a) Define payback period and average rate of return. (4)
b) Examine the various sources of capital for a business firm. (6)
11 a) What is cost benefit analysis? Mention the difficulties encountered while (4)
carrying out this analysis.
b) A project has been started by a company with an initial investment of Rs.10, (6)
00,000. The company gets a cash inflow of Rs. 2,00,000 in year 1, Rs. 2,00,000
in year 2, Rs.3,00,000 in year 3, Rs.2,00,000 in year 4, and Rs. 3,50,000 in year
5. The cost of capital for the firm is 10 percent. Use the NPV method to
determine whether the company should go ahead with the project.
12 a) What is the balance sheet? Distinguish between assets and liabilities. (5)
b) What is the money market? What are the various instruments in the money (5)
market?
13 a) Mention the canons of taxation. (4)
b) . The following table gives the demand of a company for five years. Use the (6)
trend method to project the demand for the years of 2018, 2019 and 2020.

Year	Demand
2013	200
2014	220
2015	210
2016	230
2017	210

14 a) What are the major techniques used in forecasting?   (6)

   b) What is FII? Mention its disadvantages.   (4)

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Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: HS210

Course Name: LIFE SKILLS

Max. Marks: 50   Duration: 2 Hours

PART A
Answer all questions, each carries 6 marks.   Marks

1	Your college recently organised a seminar on 'Say No to Tobacco'. The speakers included well known educationists and doctors. Write a report on the same for your college magazine in not more than 100 words.	(6)
2	a) You were asked to give a speech on global warming for the Environment Day celebration in your college. Prepare the data needed by the method of mind mapping.	(3)
	b) Give 3 differences between critical thinking and creative thinking.	(3)
3	What are the different steps taken in group problem solving?	(6)
4	a) Explain the meaning and need of work ethics.	(3)
	b) What is environmental ethics and comment on environmental ethics and engineers?	(3)
5	Give a short note on leadership styles.	(6)

PART B
Read carefully the following case and answer the questions given below, it carries 20 marks.

6   **(Case study)**

The Exxon Valdez oil spill occurred in Prince William Sound, Alaska, March 24, 1989, when Exxon Valdez, an oil tanker owned by Exxon Shipping Company, bound for Long Beach, California, struck Prince William Sound's Bligh Reef, 1.5 miles west of Tatitlek, Alaska at 12:04 am local time and spilled 10.8 million US gallons (or a mass of 35,000 metric tonnes) of crude oil over the next few days. It is considered to be one of the most devastating human-caused environmental disasters. Prince William Sound's remote location, accessible only by helicopter, plane, or boat, made government and industry response efforts difficult and severely taxed existing response plans. The region is a habitat for salmon, sea otters, seals and seabirds. The oil, originally extracted at the Prudhoe Bay oil field, eventually covered 1,300 miles (2,100 km) of coastline, and 11,000 square

miles (28,000 km2) of ocean.

According to official reports, the ship was carrying 53,094,510 gallons (1,264,155 barrels) of oil, of which about 10.8 million US gallons were spilled into the Prince William Sound. During the first few days of the spill, heavy sheens of oil covered large areas of the surface of Prince William Sound.

Multiple factors have been identified as contributing to the incident: Beginning three days after the vessel grounded, a storm pushed large quantities of fresh oil on to the rocky shores of many of the beaches in the Knight Island chain. Exxon Shipping Company failed to supervise the master and provide a rested and sufficient crew for Exxon Valdez. The third mate failed to properly maneuver the vessel, possibly due to fatigue or excessive workload.

Exxon Shipping Company failed to properly maintain the Raytheon Collision Avoidance System (RAYCAS) radar, which, if functional, would have indicated to the third mate an impending collision with the Bligh Reef. Captain Joseph Hazelwood, who was widely reported to have been drinking heavily that night, was not at the controls when the ship struck the reef.

Other factors, included: Ships were not informed that the previous practice of the Coast Guard tracking ships out to Bligh Reef had ceased. The oil industry promised, but never installed, state-of-the-art iceberg monitoring equipment. Exxon Valdez was sailing outside the normal sea lane to avoid small icebergs thought to be in the area. (Source: Wikipedia).

    a) Identify the key players in the case (4)

    b) What are the professional responsibilities neglected by each of the key players in the case? (4)

    c) What are the ethical issues attached to the case? (4)

    d) How do you think that the disaster management team of the Exxon reacted to the accident? (4)