ADAMAS UNIVERSITY
END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B. Tech   Semester: IV
Stream: CE
PAPER TITLE: Structural Analysis-I   PAPER CODE: ECE42102
Maximum Marks: 40   Time duration: 3 Hours
Total No of questions: 08   Total No of Pages: 02

Instruction to the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups
Group A
Answer all the questions of the following $5 \times 1 = 5$

1.   **a)** What is Degree of Freedom?

b) Calculate Degree of Redundancy for Propped cantilever beam.

c) Calculate Degree of Freedom for Fixed beam.

d) Derive the equation of Unit load method for Beam from Principle of Virtual work.

e) Write the equation for slope at the ends of a simply supported beam of span *'l'* under a uniformly distributed load 'w'per unit length.

GROUP –B
(**Short Answer Type Questions**)
Answer *any three* of the following $3 \times 5 = 15$

2.   Determine the horizontal support reaction in a portal frame with two supports hinged at base at the same level. Horizontal beam of the frame of span is loaded with a u.d.l. 'w' kN/m in full length of l. Height of the column is h meter. Assume EI = constant.

3.   Find out the deflection at point *C* under the load by Strain energy method.

(I = 50 X 10^6 mm^4, E = 200 X 10^6 KN/m^2)
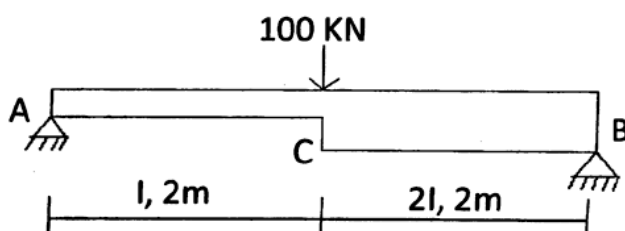
4. Two wheel loads, 80 kN & 200 kN, spaced 2 m apart move on a girder of span 16 m. Find the maximum Bending moment at a section 6 m from the left end. Any wheel load can lead the other.

5. A UDL of 60 kN/m of length 5 m move on a girder of span 16 m. Find the maximum +ve & -ve Shear force at a section 6 m from the left end.
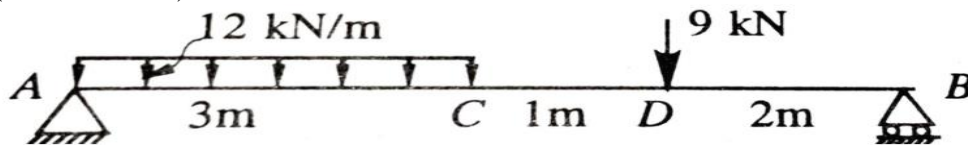
GROUP –C
(Long Answer Type Questions)
Answer *any two* of the following $2 \times 10 = 20$

6. By Moment area method, determine the slopes at A and the deflection at D in the beam shown in Fig. below. Given also EI is constant.
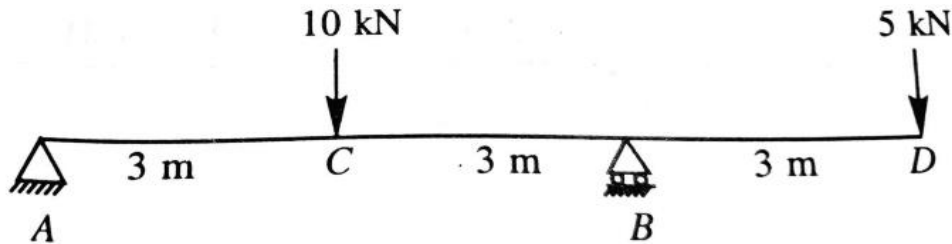
7. Determine the slope at A and deflection at C in the beam by Unit load method shown in Fig. below (EI is constant).

8. Calculate the horizontal thrust & the reactions at the hinges and the maximum bending moment anywhere on the arch shown in Fig. below.
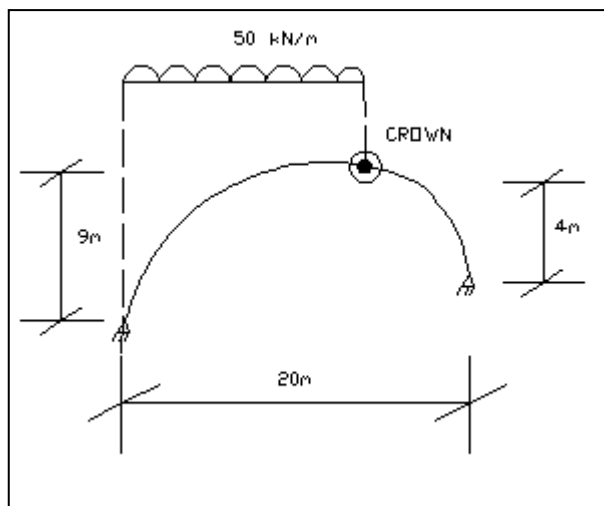
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Name of the Program: B. Tech   Semester: IV
Stream: CE
PAPER TITLE: Civil Engineering Materials   PAPER CODE: ECE42104
Maximum Marks: 40   Time duration: 3 Hours
Total No of questions: 08   Total No of Pages: 02

Instruction to the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups
Group A
Answer all the questions of the following $5 \times 1 = 5$

1.   **a)** What is the statement of Abram's law.
      b) Mention what are the Bogue's compounds?
      c) What are the characteristics of good timber?
      d) List out the constituents of bituminous mix.
      e) What is the test conducted for design of compacted bituminous mixes.

GROUP –B
(**Short Answer Type Questions**)
Answer *any three* of the following $3 \times 5 = 15$

2.   Discuss about Rebound hammer test and Ultrasonic pulse velocity test on concrete.
3.   What are the arrangement of stretcher bond and header bond in brick, mention with neat sketches.
4.   Compare between flakiness index and elongation index.
5.   List out different type of tests available for bitumen and explain any one test.

GROUP –C
(**Long Answer Type Questions**)
Answer *any two* of the following $2 \times 10 = 20$

6.   a) Discuss about Modified bituminous binder.   (5)

      b) Write notes about: (**any one**)   (5)
      (i) /Rules of brick bonding   (ii) Constituents of brick earth   (iii) Ingredients of oil paint

7.   a) Calculate the gel/space ratio and the theoretical strength of a sample of concrete made with 500
      gm of cement with 0.5 W/C ratio, on full hydration and at 60% hydration.   (5)

      b) Discuss about: (**any one**)   (5)
      (i) Flash and fire point test   (ii) Softening test   (iii) Impact test of aggregate

8.   Perform concrete mix design based on the following :   (10)

Grade designation – M20, type of cement – OPC, admixture – super plasticizer, maximum size of coarse aggregate – 20 mm (angular), fine aggregate – Zone II, specific gravity : cement – 3.15, fine aggregate – 2.6, coarse aggregate - – 2.6, minimum and maximum cement content – as per IS:456-2000 , maximum water-cement ratio - 0.55. Exposure – mild, slump – 100 mm, water absorption : coarse aggregate – 0.5% and fine aggregate – 1%, free surface moisture: coarse aggregate – nil and fine aggregate – 2%, Consider any other necessary data if required.

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Name of the Program: B. Tech
Semester: IV
Stream: CE
PAPER TITLE: Soil Mechanics I
PAPER CODE: ECE42106
Maximum Marks: 40
Time duration: 3 Hours
Total No of questions: 08
Total No of Pages: 02

Instruction to the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups
Group A
Answer all the questions of the following   **1 X 5 = 5**

1.   **a)** Calculate the Coefficient of Percolation of a soil deposit, if the Void ratio and coefficient of permeability is equals to 0.6 and 2×10^{-4} cm/sec. respectively.

b) Liquid limit and Shrinkage limit of a clay deposit was found as 27% and 13%. Find out the Compression index of it.

c) Differentiate the Light and Heavy compaction tests.

d) Write down the Westergaard's equation for vertical stress.

e) 5 number of stream lines passed below a dam and bounded up to an impermeable soil stratum at 15 m below from dam base. Determine the Shape factor of the flow net, if the number of potential drops equals to 18.
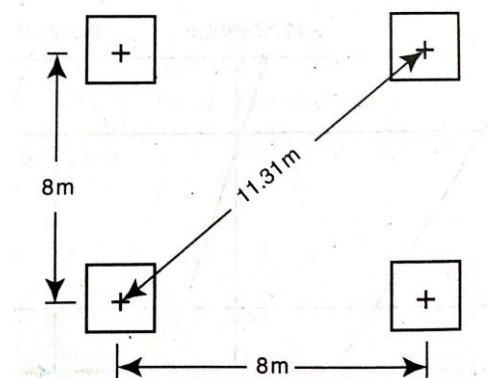
GROUP –B
(**Short Answer Type Questions**)
Answer *any three* of the following $3 \times 5 = 15$

2.   Derive the relation of Coefficient of Compressibility (a_v) with Coefficient of Volume change (m_v).

3.   Derive the average Coefficient of permeability through stratified soil parallel to the bedding plane.

4.   Discuss about the Zero air void ratio and show it graphically.

5.   An overhead water tank is supported over four isolated square footings, embedded at a depth of 3.5 m and placed as shown in Fig.1. If the applied load on each footing is 700 kN, then calculate the vertical stress at the foundation level at the center of the four footings. Use Boussinesq's formula.

Figure 1

6. A rolled fill having finished volume of 4800 m³, is filled by the soil, collected from an undisturbed borrow pit of $w = 16.8\%$, $e = 0.62$ and $G_S = 2.7$. The soil is excavated, then transported and dumped the soil on the fill using trucks. The dumped soil is spread, broken and compacted after adding water, until the water content become 18.2% and the wet density of 1.85 gm/cc. How many truck loads are needed if each of them carried 15 m.³ of load?

7. From this given Figure 2, determine the following:

(a) The quantity of flow
(b) The seepage pressure in the middle of field 'B'
(c) The uplift pressure, at point 'B'
Consider, the coefficient of permeability is 4 X 10⁻² mm/sec.
$4 + 3 + 4$
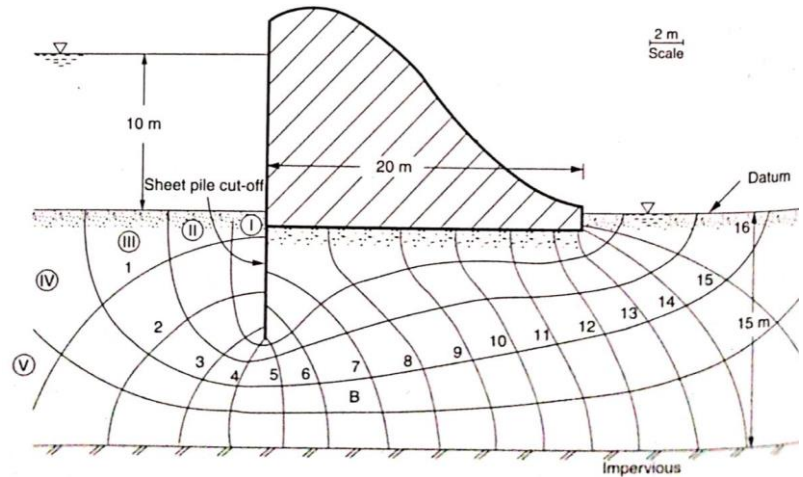
Figure 2

8. Write the properties of the Flow net.

Write the steps of the process of drawing Phreatic line through the Earth dam and show it in diagram.
$2 + 8$

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ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B. Tech   Semester: IV
Stream: CE
PAPER TITLE: Surveying II   PAPER CODE: ECE 42108
Maximum Marks: 40   Time duration: 3 hours
Total No of questions: 8   Total No of Pages: 02

Instruction for the Candidate:
  1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
  2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
  3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups
Group A
Answer all the questions of the following $5 \times 1 = 5$

1. **a)** Give examples of at least 2 space borne platforms with its height from earth surface**.**
    b) What are the disadvantages of Photogrammetry?
    c) What is the difference between low oblique and high oblique photographs?
    d) What do you mean by a zero circle?
    e) What are the advantages of using Planimeter?

GROUP –B
(**Short Answer Type Questions**)
Answer *any three* of the following $3 \times 5 = 15$

2. Define GIS. What are the differences between Raster Data Format and Vector Data Format?

3. Briefly discuss the steps involved in Remote Sensing Process.

4. Find the area of a three-level section with the following data:
    • Formation width = 9.2 m
    • Side Slopes = 2:1
    • Natural ground slope = 15:1 in the higher half
    • Natural ground slope = 8:1 in the lower half
    • Height at mid-section = 2.15 m

5. The following offsets are taken from a survey line to a irregular shaped boundary line. Find the area between the survey line, the boundary line and the first and the last offset by Co-ordinate Method.

Chainage (m)	0	5	10	15	20	30	40	60	80
Offset (m)	2.50	3.80	4.60	5.20	6.10	4.70	5.80	3.90	2.30

6. Derive an expression for finding area of a two-levelled section with the following known parameters:
   - Width of embankment = b
   - Side slope = 1 in s
   - Existing Ground Slope = 1 in n
   - Central height of the embankment = h

7. A 36 m length of earthwork volume for a proposed road has a constant cross section of cut and fill, in which the cut area equals the fill area. The level formation is 12 m wide. The transverse ground slope is 27° and the side slope in cut is 0.8 horizontal to 1 vertical. Side slope in fill is given as 0.9 horizontal to 1 vertical. Calculate the volume of the excavation in 36 m length.

8. (a) Calculate the area of the zero circle with the following data. Assume M = 100 for both the cases.

IR	FR	Anchor Point Position	Remarks
7.875	4.895	Outside the figure	The zero crosses the index mark once clockwise
2.725	8.455	Inside the figure	The zero crosses the index mark twice anticlockwise

(b) Differentiate between Spatial Resolution and Spectral Resolution.

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ADAMAS UNIVERSITY
END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: BCA/ BTECH   Semester: IV
Stream: CSE/ECE/EE/ME/CE
PAPER TITLE: HSS IV (Economics for Engineers)
PAPER CODE: HEC42180
Maximum Marks: 40   Time duration: 3 Hours
Total No of questions: 12   Total No of Pages: 02

Instruction to the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Section A

*(Answer any **FIVE** of the following questions)*   **Marks: 5*2=10**

1. State the Law of Demand.

2. What do you mean by Perfectly Elastic demand?

3. What do you mean by Opportunity Cost?

4. What do you mean by Income effect?

5. Explain two features of Perfectly Competitive market.

6. Why does an investor want to hold a portfolio?

Section B

*(Answer any **TWO** of the following questions)*   **Marks: 2*5=10**

7. State and explain the features of Monopolistic Competition.

8. Distinguish between Cardinal and Ordinal utility theory. Mention any two exceptions to the law of

    demand.   (2+3)

9. Suppose due to adequate rainfall, there has been a good harvest for mangoes. How will the equilibrium price and quantity demanded change under the new situation? Explain diagrammatically.

Section C

*(Answer any **TWO** of the following questions)*   **Marks: 2*10=20**

10. Discuss the common characteristics of infrastructure assets.

11. What do you mean by Own Price, Cross Price and Income Elasticity of demand? Explain with examples.

12. Distinguish between Increase in demand and Extension of demand. What do you mean by Giffen goods?   (8+2)

ADAMAS UNIVERSITY
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END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: **B. Tech**   Semester: **IV**
Stream: **CE**
PAPER TITLE: **Numerical Techniques**   PAPER CODE: **SMA42106**
Maximum Marks: **40**   Time duration: **3 hours**
Total No of questions: **08**   Total No of Pages: **02**

Instruction for the Candidate:
   1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
   2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
   3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups

Group A
Answer **all** the questions of the following   **5 × 1 = 5**

1.   **a)** Round-off 123.45678 correct to five significant figures

     b) Evaluate $\int_0^2 2x\,dx$ by Composite Trapezoidal Rule taking 2 sub-intervals.

     c) Write the condition for which the equation $f(x) = 0$ has atleast one real root within the interval [a b].

     d) Write an example of a system of non-homogeneous linear equations consisting of two equations and two variables.

     e) Check whether the following system has a unique solution

$$2x + 2y + 2z = 0; \quad x + y + z = 0; \quad 6x + 6y + 6z = 0$$

GROUP –B
Answer ***any three*** of the following   **3 × 5 = 15**

2.   **(a)** Define forward difference operator Δ   **1**

     (b) Write down the approximate representation of 2/3 correct up to four significant figures and then find the (i) absolute error correct up to six decimal places (ii) relative error correct up to five decimal places, and (iii) percentage error.   **4**

3.   Compute $f(2.8)$ from the following table   **5**

x	0	1	2	3
$f(x)$	1	2	11	34

4.   Obtain the forward and backward difference table for the function $f(x)$ as given below

x	1	2	3	4	5
$f(x)$	4	13	34	73	136

Find the values of $\Delta^2 f(3)$ and $\nabla^2 f(3)$ **5**

5. **(a)** Evaluate the integral $\int_0^2 (3x^2 + 2x)dx$ analytically **1**

(b) Solve the above integral correct up to two decimal places, taking five sub-intervals by (i) composite Trapezoidal Rule and (ii) composite Simpson's One-third Rule **4**

Answer ***any two*** of the following **2 × 10 = 20**

6. Compute $y(0.9)$ correct up to four decimal places from the differential equation $\frac{dy}{dx} = xy$, $y(0) = 2$, taking spacing $h = 0.3$ using (i) 4th order R-K Method and (ii) 2nd order R-K Method. Then find the absolute difference between the values obtained by above two methods. **6+3+1**

7. **(a)** Solve the following system of linear equations by Gauss-Seidal iteration method, correct up to two decimal places:

$$8x_1 - 3x_2 + 2x_3 = 20;\ \ 4x_1 + 11x_2 - x_3 = 33\ ;\ \ x_1 + x_2 + 4x_3 = 9$$ **5**

(b) Solve the following system of linear equations by L-U factorization method

$$3x_1 + 2x_2 - 4x_3 = 12;\ \ -x_1 + 5x_2 + 2x_3 = 1;\ \ 2x_1 - 3x_2 + 4x_3 = -3$$ **5**

8. **(a)** Consider the equation $x^2 - 1.5x - 2.5 = 0$. Show that the equation has a root within the interval [0 8]. Then solve the equation using Bisection method considering the initial interval [0 8]. **5**

(b) Find $f'(1)$ and $f'(6)$ for the function $f(x)$ as given in the table **5**

x	1	2	3	4	5	6
$f(x)$	2.7183	3.3210	4.0552	4.9530	6.0496	7.3891

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