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B020411(020)

B. Tech (Fourth Semester) Examination, April-May 2021

(Civil Engg. Branch)

STRUCTURAL ANALYSIS-I

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Part (a) carries 4 marks & compulsory from each unit. Rest other parts (b), (c) and (d) carry equal 8 marks. Answer any two from (b), (c) and (d).*

Unit-I

1. (a) Define Static indeterminacy and Kinematic indeterminacy 4

   (b) Compute Degree of static indeterminacy for the rigid frame shown in figure (i) & (ii) 8

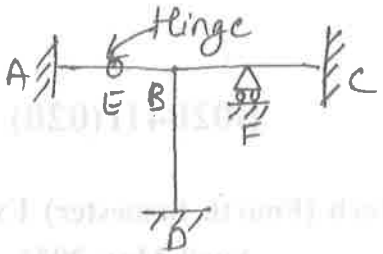


Fig. (i)

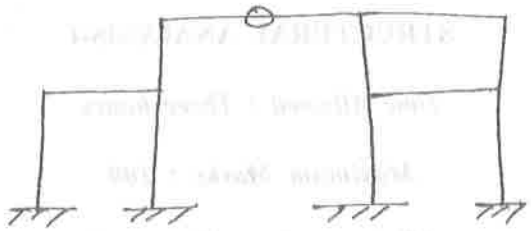
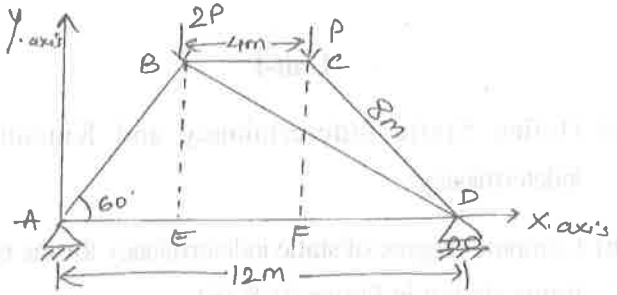


Fig. (ii)

(c) A Truss shown in figure below is loaded with two point loads of 2P and P kN at joints B and C. Determine the forces in all the members 8



(d) The feet of a tripod on a smooth ground are tied by horizontal bars forming a tringle BCD, shown in fig (i) below where E is the mid point of CD and F is the mid point of BE. The Apex A [fig (ii)] of the tripod is 3 m vertical above point (F). Determine the force in all the members due to a load of 100 kN suspendel from Apex A.

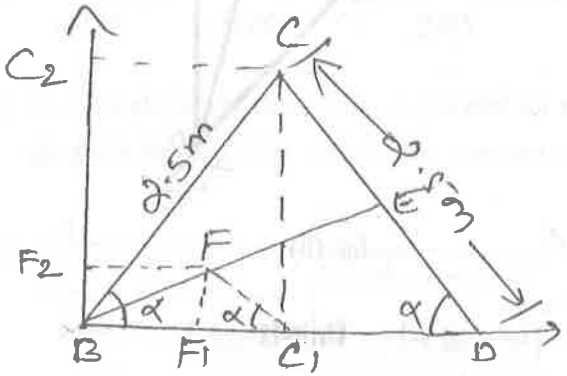


fig (i)

BC = 2.5 m

CD = 2.5 m

BD = 2 m

AF = 3 m

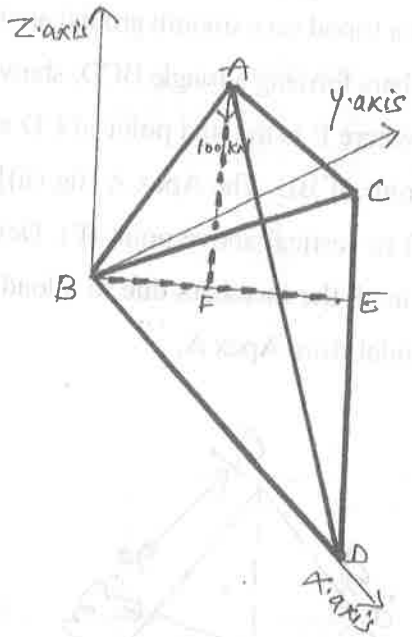


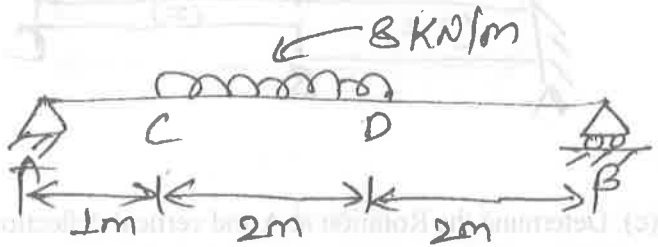
fig. (ii)

Unit-II

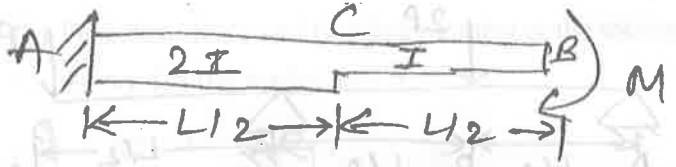
2. (a) State Area Moment Method (Mohr's Method) (Theorem - 1 and Theorem - II) 4

(b) A simply supported beam AB of span 2 m carry a uniformly variable load. The beam is made from 200 mm square cross section. Find the deflection at the centre of the beam. If the loading intensity at support A is zero and support B is 1·5 kNm. E = 2.10×10^5 N/mm^2 using Double Integration Method. 8

(c) A simply supported beam has a flexural rigidity of 24 MN-m^2 and loaded as shown in figure below. Determine deflection at the Mid span. Also find slope at the both ends. Use Macaulay's Method. 8



(d) Find the slope and deflection at free end for a beam shown in figure below using Area moment method. 8



Unit-III

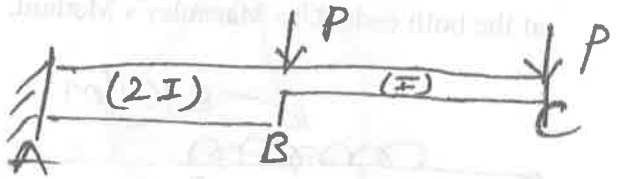
3. (a) Explain : 4

(i) Castiglianos 1st and 2nd theorem

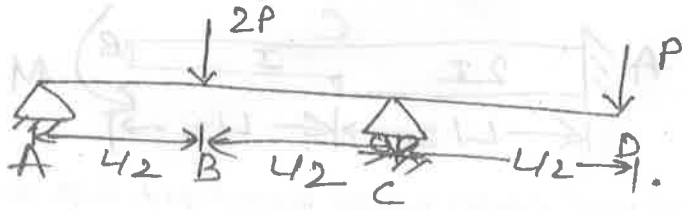
(ii) Relation of strain energy due to axial load and bending.

(b) Determine the deflection and rotation at the free end

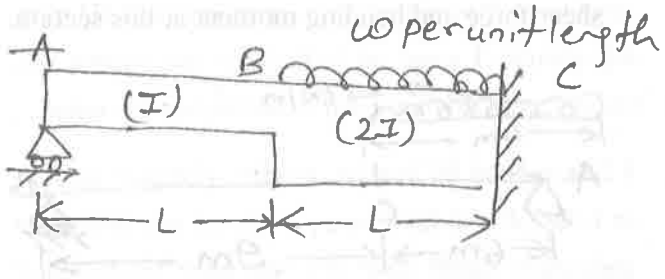
of the cantilever shown in figure. using unit load method. 8



(c) Determine the Rotation at A and vertical deflection at end (d) in the overhanging beam shown in figure below. Using unit load method. 8



(d) A stepped beam ABC, simply supported at A and Fixed at C as shown in the figure below carries a uniformly distribution load of intensity 'W' per unit length over BC. Determine reaction at (A). Using Strain Energy Method. 8



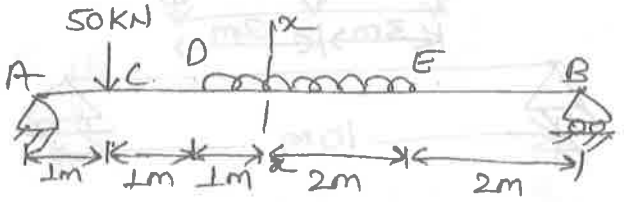
Unit-IV

4. (a) Define : 4

(i) Influence Line Diagram

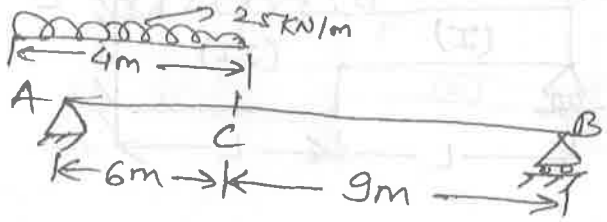
(ii) Muller Breslau's Principle

(b) Find shear force and Bending moment at the section shown for the loaded beam 8

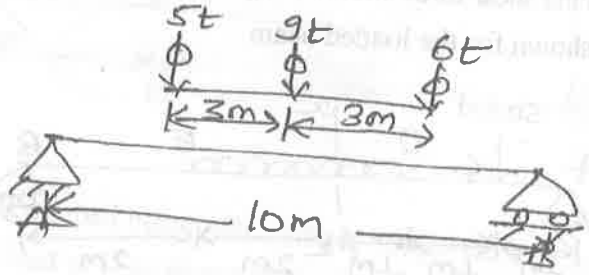


(c) A SSB has a span of 15 m. A uniformly distribution load of 25 kN/m and 4 m long crosses the girder from left to right. Draw the influence line diagram for shear force and bending moment at a section 6

m from the left support. Also calculate maximum shear force and bending moment at this section. 8



(d) The series of three wheel loads 5*t*, 9*t* and 6*t* spaced 3 m from centre to centre cross over simply supported girder of span 10 m. If loads moves from left to right and 6t load leading then the find position and maximum bending moment which may occur anywhere on the girder. 8



Unit-V

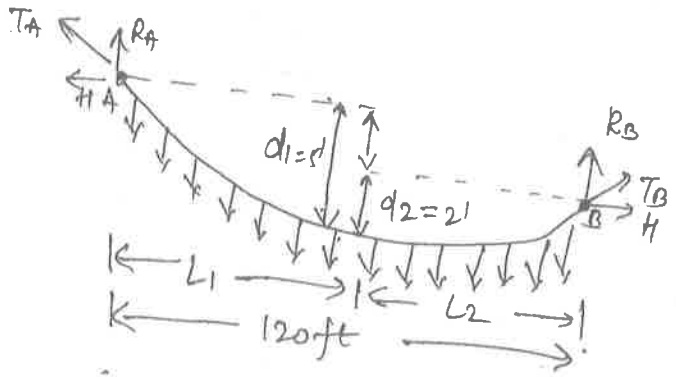
5. (a) (i) Comparison between Arch and cables. 4

(ii) Write advantages and disadvantage of Arch over beams.

(b) A parabolic arch hinged at springings and crown of span (*l*) and central rise (*h*) carries 4dl of (*w*) per unit length over left half of the span. Calculate the position and magnitude of maximum bending moment. 8

(c) A three hinged parabolic arch of 20 m span and 4 m central rise carries a point load of 4 kN at 4 m horizontally from the left hand hinge. Calculate Normal thrust and shear force at the section under the load. Also calculate the maximum B. M positive and negative. 8

(d) A wire of uniform material weighing 0.32 lb per cu in hangs between two points (120 ft) apart horizontally with one end 3ft above the other. The sag of the wire measured from the highest point is 5ft. Calculate the maximum stress in the wire (U.L) 8



Consider $P = \omega x$ of cable, per lit length.

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B. Tech. (Fourth Semester) Examination, April-May 2021

(AICTE Scheme)

(Civil Engineering Branch)

HYDRAULIC ENGINEERING

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Part (a) is compulsory from each question. Attempt any* ***two*** *parts from (b), (c) and (d). Part (a) carries 4 marks and (b), (c) and (d) carries 8 marks each.*

Unit-I

1. (a) Write short note on Colebrook-White equation. 4

(b) Show that velocity distribution for turbulent flow through rough pipe is given by

$$\frac{u}{u_*} = 5 \cdot 75 \log_{10}(y/K) + 8 \cdot 5$$

u_* = Shear velocity, y = distance from pipe wall

K = roughness factor 8

(c) Determine the wall shearing stress in a pipe of diameter 100 mm which carries water. The velocities at the pipe centre and 30 mm from the pipe centre are 2 m/s & 1·5 m/s respectively. The flow in pipe is given as turbulent. 8

(d) An old water supply distribution pipe of 275 mm diameter of a city is to be replaced by two parallel pipe of smaller diameter having equal lengths & identical friction factor values. Find out the new diameter required. 8

Unit-II

2. (a) What do you mean by boundary layer separation? 4

(b) Find the ratio of displacement thickness to momentum thickness and momentum thickness to energy thickness for the velocity distribution in the boundary layer given by : 8

$$\frac{u}{U} = 2(y/\delta) - (y/\delta)^2$$

(c) Oil with a free-stream velocity 2·5 m/s flows over a thin plate 2·5 m wide and 2·5 m long. Calculate the boundary layer thickness and the shear stress at the trailing end point and determine the total surface resistance of the plate. Take specific gravity as 0·9 and kinematic viscosity as 10^{-5} m^2/s. 8

(d) Prove that the momentum thickness for the boundary layer flows are given by 8

$$\theta = \int_0^{\delta} \frac{u}{U}\left[1 - \frac{u}{U}\right] dy$$

Unit-III

3. (a) Explain the terms : 4

Minimum specific energy, Critical depth, Critical velocity

(b) A sluice gate discharges water into a horizontal channel with a velocity of 12 m/s and depth of flow 1·2 m. Determine the depth of flow after the jump and consequent loss in total head. 8

(c) Derive the differential equation for steady gradually varied flow in open channels. 8

$$\frac{dh}{dx} = \frac{(i_b - i_e)}{\left(1 - F_e^2\right)}$$

(d) The discharge of water through a rectangular channel of width 10 m, is 12 m^3/sec when depth of flow of water is 1·0 m. Calculate :

(i) Specific energy of the flowing water.

(ii) Critical depth & critical velocity 8

Unit-IV

4. (a) What is meant by geometric, kinematic & dynamic similarities? 4

(b) The variable controlling the motion of a floating vessel through water are the drag force F, the speed V, the length L, the density ϱ and dynamic viscosity μ of water and acceleration due to gravity g. Derive an expression for F by dimensional analysis. 8

(c) In the model test of a spillway the discharge and velocity of flow over the model were 3 m^3/s and 2 m/s respectively. Calculate the velocity and discharge over the prototype which is 30 times the model size. 8

(d) The water is flowing with a velocity of 2·5 m/sec in a pipe of length 2500 m and of diameter 480 mm. At the end of the pipe, a valve is provided. Find the rise in pressure if the valve is closed in 20 seconds. Take the value of C = 1500 m/s. 8

Unit-V

5. (a) Differentiate between the turbines and pumps. 4

(b) Define the specific speed of a turbine. Derive an expression for the specific speed. 8

(c) What do you understand by the characteristics curves of a pump? What is the significance of the characteristics curves? 8

(d) A centrifugal pump is to discharge 0·18 m^3/sec at a speed of 1400 r.p.m. against a head of 20 m. The impeller diameter P_S 200 mm, its width at outlet is 60 mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller. 8

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B020413(020)

B. Tech. (Fourth Semester) Examination, April-May 2021

AICTE

(~~New~~ Scheme)

(Civil Engg. Branch)

SURVEYING and GEOMATICS

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Attempt all questions. Part (a) from each question is compulsory. Attempt any* ***two*** *parts from part (b), (c) and (d) of each question.*

Unit-I

1. (a) Define trilateration and triangulation. 4

(b) Write short notes on : 8

(i) Classification of triangulation system

(ii) Station marks and signals

(c) What is meant by a satellite station and reduction to centre? Derive expression for reducing the angles measured at the satellite station to centre. 8

(d) Describe the concept of base line measurement and its extension used in triangulation surveying. 8

Unit-II

2. (a) Explain clearly the difference between conditional and normal equations. 4

(b) Explain the laws of weights that are established by the method of least square. 8

(c) Explain the following terms : 8

(i) Residual errors

(ii) Correlates

(iii) Spherical excess

(d) Describe in detail the adjustment of a geodetic triangle by the method of correlates. 8

Unit-III

3. (a) What is Range finder? 4

(b) Derive the formula for horizontal distance and vertical distance in a tacheometric surveying with staff held vertical. 8

(c) Write short notes on : 8

(i) Total Station

(ii) Subtense bar

(d) State the procedure of determining the constant of tacheometer. 8

Unit-IV

4. (a) What are the major application areas of GIS? 4

(b) Derive the expression for scale of a tilt photograph and tilt distortion. 8

(c) Define vertical photograph, Oblique photograph, Tilt, principle point, Nadir point, Exposure station, Isocentre. 8

(d) A line AB 2000 m long, lying at an elevation of 500 m measures 8·65 cm on a vertical photograph for which focal length is 20 cm. Determine the scale of photograph in an area the average elevation of which is about 800 m. 8

Unit-V

5. (a) Name the various types of equipments required for taking sounding. 4

(b) Derive the three point problem in hydrographic survey by analytical solution. 8

(c) What do you mean by shore line survey? Explain in brief. 8

(d) What are uses of hydrographic surveying? Give some examples of its applications. 8

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B.Tech. (Fourth Semester) Examination
April-May 2021

CAICTE ~~(New~~ Scheme)

(Civil Engg. Branch)

BUILDING CONSTRUCTION

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Attempt all questionss. Part (a) is compulsory. Attempt any* ***two*** *parts from (b), (c) and (d) of each question.*

Unit-I

1. (a) Define foundation. Why foundation is required in structure justify it. 4

(b) What is strap foundation? Explain with the help of neat sketch. 8

(c) Write short notes on expansive and non expansive soil. 8

(d) What are the caues of failure of foundation and its remedial measures? 8

Unit-II

2. (a) Define the term masonry. Name various types of masonry used. 4

(b) Write short note on brick masonry. Give reasons why brick masonry is preferred over stone masonry. 8

(c) Give a brief description on slenderness ratio and basic compressive stress. 8

(d) Write short notes on location of doors and windows. 8

Unit-III

3. (a) What is purpose of providing floors? What are its various components? 4

(b) What are the factors that affect the choice of the flooring materials? Exlain in details. 8

(c) Discuss about piched, flat and curved roof. Name the technical terms used in sloping roof. 8

(d) What do you understand by the term formwork? What are the requirements of a good form work. 8

Unit-IV

4. (a) Name the causes and effect of dampness. 4

(b) Discuss about the materials used in damp proofing. Also explain the important function of materials. 8

(c) Explain various defects occurs in plastering work. 8

(d) What are the construction joints? Give a detail note on expansion and contraction joints. 8

Unit-V

5. (a) Define Acoustics. 4

(b) Explain in brief general acoustic defects and suggests remedial measures. 8

(c) Discuss about the materials used for sound proof construction. 8

(d) Give a detailed note on fire safety requirements for buildings. 8

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B020415(020)

B. Tech. (Fourth Semester) Examination, April-May 2021

AICTE

(~~New~~ Scheme)

(Civil Engg. Branch)

ENGINEERING GEOLOGY

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Attempt all questions. Part (a) from each question is compulsory. Attempt any* ***two*** *parts from part (b), (c) and (d) of each question.*

Unit-I

1. (a) Mention the scope of geology to civil engineering. 4

(b) Give a detailed account of the interior of the earth. 8

(c) Describe the radioactive method of determination of age of the earth. 8

(d) Describe the most justified theory of origin of the earth, from your point of view. 8

Unit-II

2. (a) Differentiate rock, mineral and ore. 4

(b) Describe various physical properties of minerals used in the megascopic identification of minerals. 8

(c) Describe various engineering properties of rocks. 8

(d) Describe megascopic properties of any **four** of the following : 4×2=8

(i) Felspar

(ii) Muscovite

(iii) Hematite

(iv) Calcite

(v) Gypsum

Unit-III

3. (a) Differentiate between primary rocks and secondary rocks. 4

(b) Classify igneous rocks and describe major structures and textures of igneous rocks. 8

(c) Write petrographical notes : 4×2=8

(i) Pegmatite

(ii) Basalt

(iii) Dolerite

(iv) Gabbro

(d) Write notes on : 4×2=8

(i) Ripple marks

(ii) Graded bedding

(iii) Conglomerate and Breccia

(iv) Laterite

Unit-IV

4. (a) Define unconformity and mention its types. 4

(b) Describe various types of folds in the rocks. 8

(c) Describe various types of faults in the rocks. 8

(d) What are joints? Describe various types of joints in the rocks. 8

Unit-V

5. (a) Describe land subsidence with examples. 4

(b) Give a brief account of detailed geological investigations carried out in major engineering projects. 8

(c) Describe causes, effects and preventive measures of landslides. 8

(d) Illustrate the geological considerations in design of constructed facilities and infrastructures. 8