DADI INSTITUTE OF ENGINEERING &TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi& Affiliated to JNTU, Kakinada)

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NH-5, Anakapalle – 531002, Visakhapatnam, A.P.

Phone: 08924-221111 / 221122/9963981111, e-mail:info@diet.edu.in

DEPARTMENT OF CIVIL ENGINEERING

CONCRETE TECHNOLOGY QUESTION BANK (2017-18 AY)

Faculty Name: Miss.V.A.MANGA **Branch: CIVIL**

Year: II Year **Semester: II SEM**

UNIT-1 INGRDIENTS OF CONCRETE CEMENTS&ADMIXTURES

1. (a) Explain the classification of admixtures.
   (b) Explain the various tests to obtain the physical properties of cement.

2. (a) Explain the alkali-aggregate reaction and the factors influencing the alkali aggregate reaction.
   (b) Explain the importance of grading of aggregates and describe the various types of gradation.

3. (a) Explain the mechanism of hydration of cement.
   (b) With neat examples explain various performance of super Plasticizer in modifying the performance of concrete.

4. (a) Explain the classification of aggregates.
   (b) Describe the various mechanical properties of aggregates.

5. (a) Explain the chemical composition of Portland cement.
   (b) Explain the importance of fineness of cement and describe the various tests to obtain the soundness of cement.

6. Explain the following mineral admixtures
   (a) Fly ash
   (b) Blast furnace slag
   (c) Silica fume

UNIT-2 FRESH CONCRETE

1. (a) Define workability and explain the factors affecting the workability of concrete.
   (b) Distinguish between segregation and bleeding of concrete

2. (a) Explain the various methods of measurement of workability of concrete..
   (b) Explain the various methods of mixing of concrete.

3. (a) Explain the influence of temperature and time on workability of concrete.
   (b) Explain the various methods of vibration of concrete.

4. (a) Explain the Setting times of concrete.
   (b) Explain Ready mixed concrete.

5. (a) List out various field and laboratory tests that are conducted to assess the properties of fresh concrete.

(b) Explain Compaction Factor test describing the test equipment. Compare the Compaction factor values to Slump of the concrete for different workability.

6. Discuss in detail the various stages of manufacture of concrete.

UNIT-3 HARDENED CONCRETE

1. (a) Define curing and explain the various methods of curing of concrete.
   (b) Explain the influence of water-cement ratio on the strength of concrete.

2. (a) Explain the various non-destructive testing methods of concrete.
   (b) Explain the different methods of obtaining the tensile strength of concrete.

3. (a) Explain the method of obtaining the flexural strength of concrete.
   (b) Explain the ultrasonic pulse velocity test for the evaluation of concrete.

4. (a) Explain the influence of gel-space ratio on the strength of concrete.
   (b) Explain the maturity of concrete. Also describe its importance in the concrete construction industry.

5. (a) Explain the factors influencing the compressive strength of concrete.
   (b) Explain the various codal provisions for Non-destructive testing methods of concrete.

6 (a) Explain Abrams water/cement ratio law and compare it with Gel/space ratio law.
(b) Calculate the gel space ratio and the theoretical strength of a sample of concrete made with 500 gm of cement with 0.40 water / cement ratio on full hydration and at 75% hydration.

UNIT-4 ELATICITY CREEP &SHRINKAGE

1. (a) Explain the various elastic moduli of concrete.
   (b) Explain the factors affecting the shrinkage and creep of concrete.

2. (a) Explain the static and dynamic moduli of elasticity of concrete.
   (b) Explain the method of obtaining the dynamic modulus of elasticity of concrete.

3. (a) Draw the stress-strain curve for concrete and explain the method of determination the various elastic moduli of concrete.
(b) Explain creep and shrinkage of concrete and the factors influencing the creep of concrete.

4. (a) Explain the factors affecting the strength of hardened concrete.
   (b) Estimate the strength of concrete at 21 days using maturity concept for M40 Grade cement cured at 120C for 4 hours and 180C for 8 hours and 210C for the rest of the period? Plowman's coefficients are A = 21 and B = 61.

5. (a) Explain the relation between modulus of elasticity and strength of concrete.
   (b) Describe the creep of concrete and explain the variation of creep with time.

6. (a) Explain the factors affecting the creep and shrinkage of concrete.
   (b) Explain Poission's ratio. How do you find the Poission's ratio of concrete?

UNIT-5 MIXDESIGN

1. (a) Explain the various factors influencing the durability of concrete.

(b) Explain the procedure for the mix design of M25 grade of concrete as per the Bureau of Indian standards method.

2. (a) Explain the factors influencing the mix proportions of concrete.
   (b) Explain the quality control of concrete and the acceptance criteria.

3. (a) Explain the statistical quality control of concrete.
   (b) Explain the various methods of proportioning of concrete mixes.

4. Design M 30 grade of concrete using the following data:
   Grade of cement: 53 Grade OPC
   Degree of quality control: Good
   Maximum size of aggregate: 20 mm
   Slump required: 75 mm
   Fineness modulus of coarse aggregate: 6.2
   Fineness modulus of fine aggregate: 3.2
   Density of coarse aggregate: 1500 kg/m3
   Density of fine aggregate: 1450 kg/m3
   Sand: Zone II
   Assume any other data suitably.

5. (a) What is the filed corrections to be carried out for concrete mixes? explain?
   (b) What are different variables in proportioning that influence mix design.

6. (a) Explain what is mix design and its practical necessity.
   (b) Explain the durability considerations in the design of concrete mixes as per IS 456-2000.

Unit-6 SPECIAL CONCRETES

1. Explain the following:
   (a) Self-consolidating concrete
   (b) Cellular concrete

2. Explain the following:
   (a) Explain the properties of polymer concrete.
   (b) High density concrete

3. (a) Explain the various types of fibres used in concrete
   (b) Explain the factors affecting properties of fibre reinforced concrete.

4. Explain the following:
   (i) Light weight aggregate concrete (ii) Types of Polymer concrete

5. Explain the following:
   (i) High performance concrete (ii) No-fines concrete

6. List out the concretes categorized as special concretes. What are the objectives of special concretes?

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DEPARTMENT OF CIVIL ENGINEERING

HYDRAULICS AND HYDRAULIC MACHINERY

QUESTION BANK (2017-18 AY)

Faculty Name: B.USHA RANI **Branch: CIVIL**

Year: II Year **Semester: II SEM**

UNIT-1

1. a) Explain specific energy of a flowing liquid ,minimum specific energy,critical depth,critical vlocity and alternate depth as applied to non-uniform flow. (5M)
   b)Find the dischagre through a trapezoidal channel of width 6m and side slope of 1 horizontal t 3 vertical .the depth of flow of water is 3m and Chezy's constant C=60.Th slop of the bed of the channel is given 1 in 5000.(5M)
2. (a) Derive the condition for depth of flow of a most economical circular channel Section subject to the condition for maximum velocity. (6M)

(b) A rectangular channel carries water at the rate of 500 litres/s when bed slope is 1 n 3000.Find the most economical dimensions of the channel if C=60.(4M)

3. (a) Differentiate between Steady and unsteady flow (5M)
   (b) Derive the condition for the best side slope of the most economical trapezoidal channel(5M)
4. (a)Differace between (i)Critcal,sub-critical and supercritical flow (ii)uniform flow and Non uniform flow(iii)steady and unsteady flow in a open channel. (5M)
   (b)The discharge of water through a ectangular channl of width 6m,is 18m^3/s when depth of flow of water is 2m.Calculate (i)specific energy of the flowing wate(ii)critcal depth and critical velocity and(iii)value of minimum specific energy. (5M)
5. (a) What are the empirical formulae for determining the value of Chezy"s constant? (5M)
   (b) What is the relation between Manning"s constant and Chezy"s constant? (5M)

6. state the conditions under which the rectangular section of an open channel will be most economical. derive these conditions.(10M)

UNIT- 2

1. Derive dynamic equation for GVF (10M)
2. Explain Term of Hydaulic Jump.Derive an expression for the depth of Hydaulic jump in terms of the upstream Froude number.(10M)
3. (a) What is the essential deffierence between gradually varied flow and rapid varied flow?Illistrate with neatly drawn sketches.(5M)
   (b) A Rectangular channel has a width of 2 m and carries a discharge of 4.8 m3/s with a depth of 2 m and carries a discharge of 4.8 m3/s with a depth of 1.6m. At a certain section a small, smooth hump with a flat top and of height 0.1m is proposed to be built. Calculate the likely change in the water surface. Neglect the energy loss.(5M)

4. A trapezoidal Channel with bottom slope 0.000169.bottom width 10m and side slopes 1:1 carries 20m^3/s when Manning"s constant =0.015.Determine the normal depth.(10M)
5. (a) What are the methods are used for determining the critical depth and explain.(6M)
   (b) A 2.5 m wide rectangular channel has a specific energy of 1.5m when carrying a discharge of 6.48 m3/s. Calculate the alternate depths and corresponding Froud numbers.(4M)

UNIT- 3

1. a) State Buckingham's theorem. Why this theorem is considered superior over the Rayleigh's method for dimensional analysis. (5M)
b) What is meant by geometric, kinematic and dynamic similarities? (5M)

2. a) Explain different types of hydraulic similarities that must exist between a prototype and its model. (5M)
b) Define the term dimensional analysis and model analysis(5M)

3. a) What are the methods of dimensional analysis? Describe the Rayleigh's method for Dimensional analysis. (5M)
b) Explain the terms: distorted models and undistorted models. What the use is of distorted Models? (5M)
4. a) What do you mean by dimensional numbers? Name any four dimensional numbers. Define and explain Reynolds's number, Froude's number and Mach number. Derive expressions for any above two numbers. (5M)
b) What is meant by geometric, kinematic and dynamic similarities? (5M)

5. a) What are the methods of dimensional analysis? Describe the Rayleigh's method for Dimensional analysis. (5M)
b) Explain the terms: distorted models and undistorted models. What the use is of distorted Models? (5M)

UNIT-4

1. (a) Prove that the force exerted by a jet of water on a fixed semi-circular plate in the direction of the jet when the jet strikes at the center of the semi-circular plate is two times the force exerted by the jet on an fixed vertical plate.(6M)

b) Find the force exerted by a jet of water of diameter 100 mm on a stationary flat plate, when the jet strikes the plate normally with a velocity of 30 m/s.(4M)

2. a) A jet of water of diameter 50 mm moving with a velocity of 20 m/s strikes a fixed plate in such a way that the angle between the jet and the plate is 60°. Find the force exerted by the jet on the plate (i) in the direction normal to the plate, and (ii) in the direction of the jet.(6M)
   b) Differentiate between the force exerted by a jet of water on a fixed vertical plate and moving vertical plate.(4M)
3. a) Derive the expression for the force exerted by a water jet on a plate moving in the same direction of the jet with a velocity less than that of the jet.(5M)
b) A blade turns the jet of diameter 3 cm at a velocity of 20 m/s by 60°. Determine the force exerted by the blade on the fluid.(5M)
4. a) A water jet 20 mm in diameter and having a velocity of 90 m/s strikes series of moving blades in a wheel. The direction of the jet makes 20° with the direction of movement of the blade. The blade angle at inlet is 35°. If the jet should enter the blade without striking, what should be the blade velocity? If the outlet angle of the blade is 30°, determine the force on the blade. Assume that there is no friction involved in the flow over the blade.(6M)
b) Differentiate between the force exerted by a jet on a single curved moving plate and a series of curved moving plate.(4M)

UNIT-5

1. a) A Pelton wheel is having a mean bucket diameter of 0.8 m and is running at 1000 r.p.m.The net head on the Pelton wheel is 400 m. If the side clearance angle is 15° and discharge through nozzle is 150 liters/s, find (i) Power available at the nozzle, and (ii) Hydraulic efficiency of the turbine(6M)
b)What do you understand by the characteristics curves of turbine? Name the important characteristics of a turbine. (4M)

2. A Kaplan turbine is to develop 2400 KW when running at 240 rpm under a net head of 49m. In order to predict its performance a model of scale 1:5 istested under a net head of 25m. At what speed should the model run and what power would it develop.(6M)
3. a)Determine the discharge in the model and in full scale turbine if the overall efficiency of the model is 85%(6M)
   b) Explain the different types of the efficiency of a turbine(4M)

4 a) A Francis turbine working under a head of 5 m at a speed of 210 rpm develops 75 KW when the rate of flow of water is 1.8 m3/ sec. If the head is increased to 16 m, determine the speed, discharge and power. (6M)
   b) Explain briefly the principles on which a Kaplan turbine works(4M)

5. Show that the hydraulic efficiency for a reaction turbine having velocity of flow through runner as constant and is given by the relation $\eta h = 1/(1+(1/2\ \tan 2\alpha)/(1-(\tan\alpha/\tan\theta))$

Where α =guide blade angle , θ =runner vane angle at inlet.The turbine is having radial discharge at outlet(b) If the vanes are radial at inlet, then show that $\eta h = 2/(2+\tan 2\alpha)$(10M)

UNIT-6

1. a) A centrifugal pump works against a head of 30 m and discharges 0.25 m3/s while running at 1000 rpm. The velocity of flow at the outlet is 3 m/s and the vane angle at outlet is 300.Determine the diameter and width of impeller at outlet if the hydraulic efficiency is 80 percent. (6M)
   b) Draw and discuss the operating characteristics of a centrifugal pump(4M)

2. a) The diameter and width of a centrifugal pump impeller are 50 cm and 2.5 cm. The pump runs at 1200 rpm. The suction head is 6 m and the delivery head is 40m. The frictional drop in suction is 2 m and in the delivery 8 m. The blade angle at out let is 30°. The manometric efficiency is 80% and the overall efficiency is 75%. Determine the power required to drive the pump. Also calculate the pressures at the suction and delivery side of the pump(4M)
b) Define a centrifugal pump. Explain the working of a single stage centrifugal pump with neat sketches. (6M)

3. a)What do you mean by manometric efficiency, mechanical efficiency and overall efficiency of centrifugal pump. (4M)
b) What is negative slip in a reciprocating pump? Explain with neat sketches the functions of air vessels in a reciprocating pump. (6M)

4 a) What is meant by priming of a centrifugal pump? What are the different priming arrangements employed for small and big pumping units? (6M)
b) Find an expression for the head lost due to friction in suction and delivery pipe(4M)

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QUESTION BANK (Academic Year 2017-18)

STRUCTURAL ANALYSIS - I

J.B.S.BHARATHI, Assistant *Professor*

II Year B-TECH– II Semester Branch: Civil Engineering Regulation: R-16

UNIT-I

1.a) Propped cantilever is statistically determinate or indeterminate?
b) Using consistent deformation method, evaluate the prop reaction in the beam shown in Figure . EI is constant

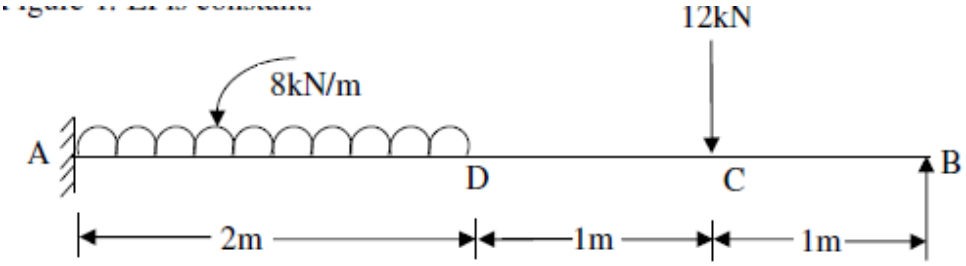
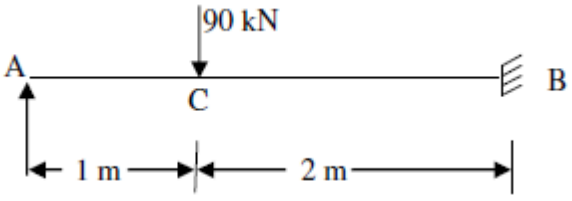
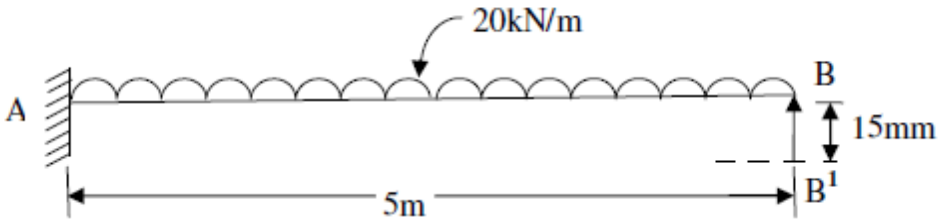


Figure 1

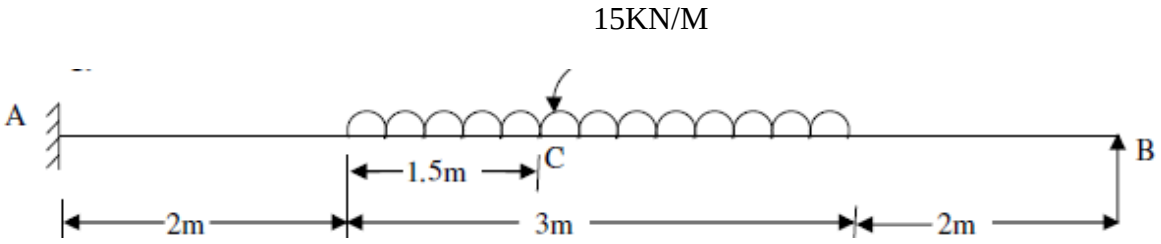
2.a) What is a propped cantilever?
b) Determine the deflection at point ***'C'*** in a propped cantilever shown in Figure.



3.a) How is the prop reaction determined? Explain
b) In the beam shown in the Figure 1, the prop has sunk by 15 mm. calculate the prop reaction. Take E= 200 x106 kN/m2 and I=5x10-6 m4.



4. Find the deflection at C in the beam as shown in figure 1. Take EI= 9000 kNm2.



5. A cantilever of length 'L' carries a concentrated load 'W' at its mid-span. If the free end is supported by a prop, find the reaction at the prop and also draw the S.F. and B.M. diagrams.

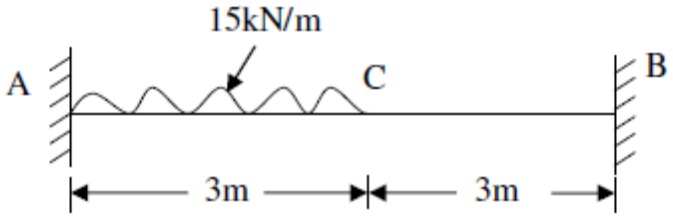
6. A cantilever of length 6 m carries a U.D.L of 2 kN/m over a length of 4 m starting from the fixed end. The cantilever is propped rigidly at the free end. If the value of E=2x105 N/mm2 and I=108 mm4, then determine i) Reaction at the rigid prop, ii) The deflection at the center of the cantilever, and iii) Magnitude and position of maximum deflection.

UNIT-II

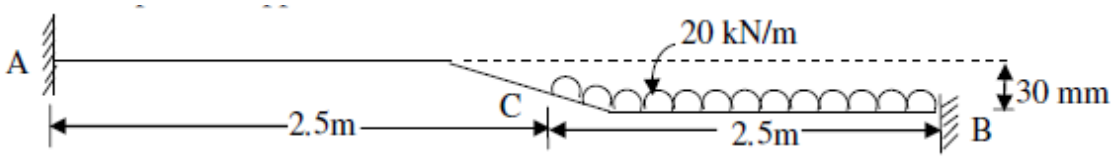
1. A fixed beam of span 6 m is subjected a UDL of 5 kN/m on the left half of the span and a point
load of 15 kN at the middle of the right half of the span. Draw the S.F. and B.M. diagrams.

2. A fixed beam of 6 meters span carries a uniformly distributed load of 12 kN/m run over the whole span. The level of right hand support sinks by 8 mm below that the left hand end. Take E=2.10x108 kN/m2 and I=4.50x10-5 m4. Find: i) Support moments, ii) Support reactions, and iii) Deflection at the centre.

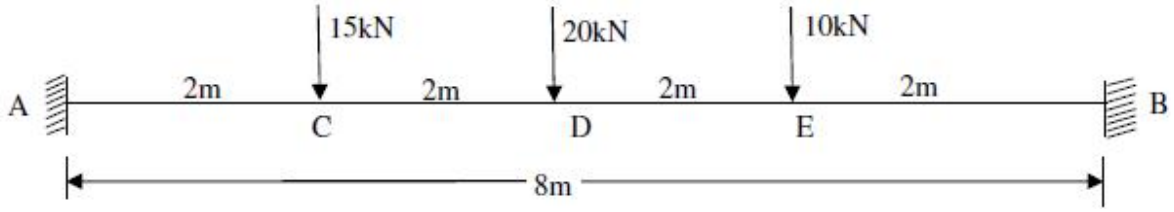
3. Solve the fixed beam shown in Figure 2, Draw BM & SF diagrams.



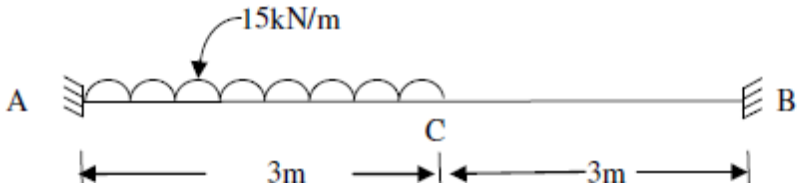
4. Determine the fixed end moments in the beam shown in Figure 2. Support **B** is sinking by 30 mm with respect to support A.



5.a) Derive expressions for fixe-end moments in a fixed beam of span of L carrying UDL of ***w*** kN/m by consistent deformation method.
b) Determine the fixed-end moments in the beam shown in figure

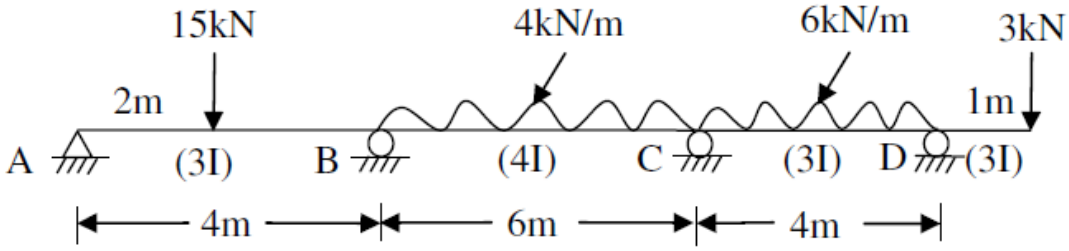


6.a) What is the degree of indeterminacy of a constrained beam?
b) Draw the S.F.D. and B.M.D of the beam shown in Figure



UNIT-III

1. Analyze the continuous beam shown in Figure , using three-moment equation. Draw S.F and B.M diagrams.

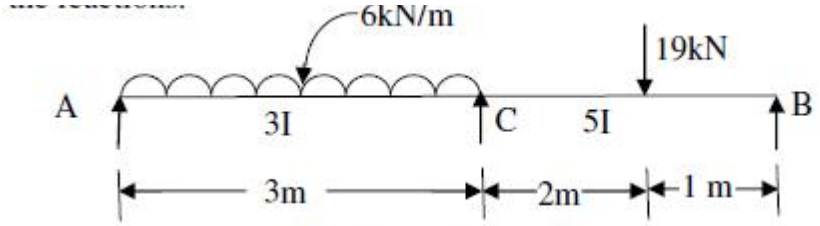


2.A continuous beam ABC consists of two spans AB of length 4m, and BC of length 3m. The span AB carries a point load of 100 KN at its middle points. The span BC carries a point load of 120 KN at 1m from C. The end A is fixed and the end C is simply supported. Find: a) the moments at the supports, b) the reactions at the supports and c) Draw the B.M diagram. Use

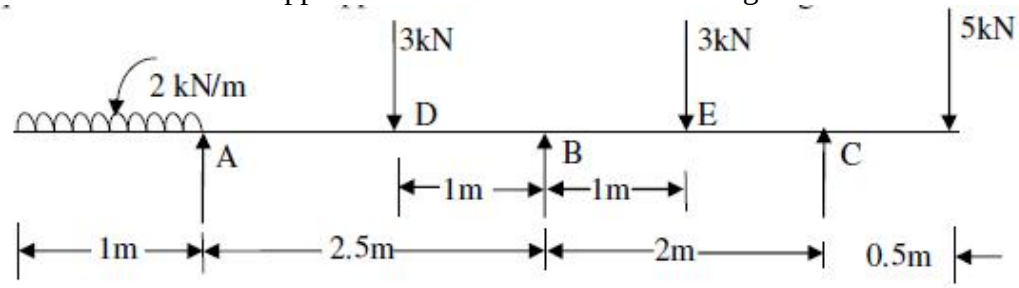
Clapeyron's theorem of three moments.

3. A continuous beam ABC consists of two spans AB of length 4 m, and BC of length 3 m. The span AB carries a point load of 100 kN at its mid point. The span BC carries a point load of 120 kN at 1m from C. The end A&C is fixed. Use Clapeyron's theorem of three moments, Find:
i) moments at the supports, ii) reactions at the supports and
iii) Draw the B.M diagram

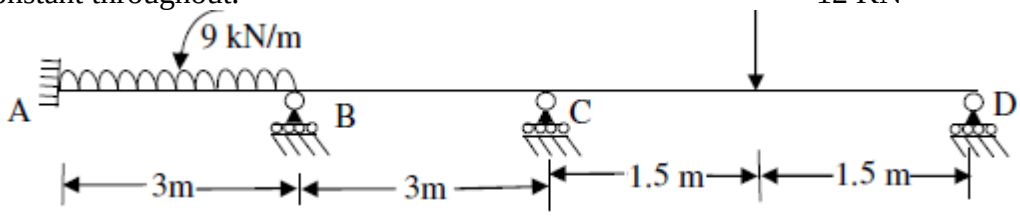
4. The moment of inertia of a continuous beam is different for different span as shown in Figure. Find the reactions.



5. A continuous beam has overhangs on both sides as in the Figure 3. Apply three moment equation to determine the support moments. EI is constant throughout.

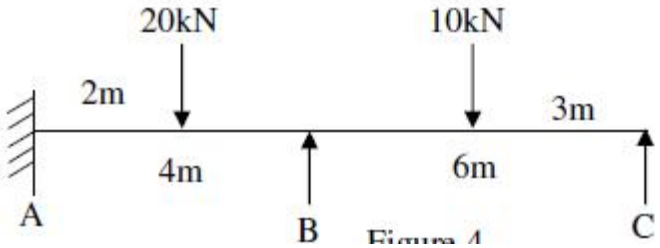


6. Using Clapeyron's theorem, solve the problem of the continuous beam shown in figure 3. EI is constant throughout.

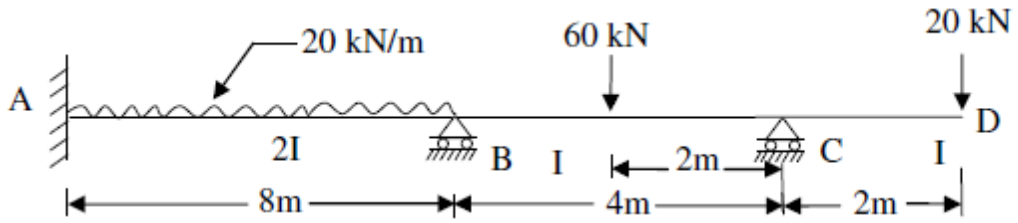


UNIT-IV

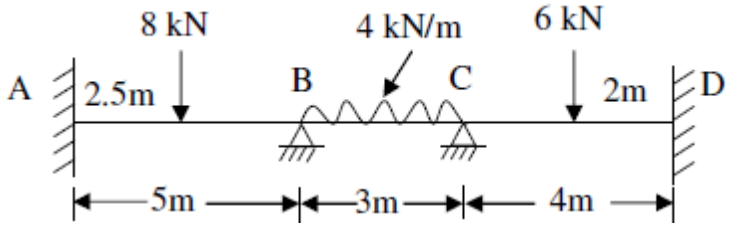
1. A continuous beam is shown in Figure , analyze the beam and draw the SF and BM diagram, Use slope deflection method



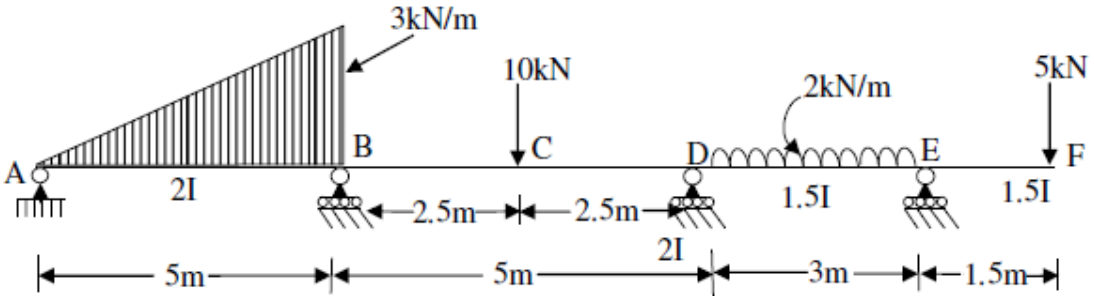
2. Analyze the beam ABCD shown in Figure by Slope-Deflection method and draw bending moment diagram



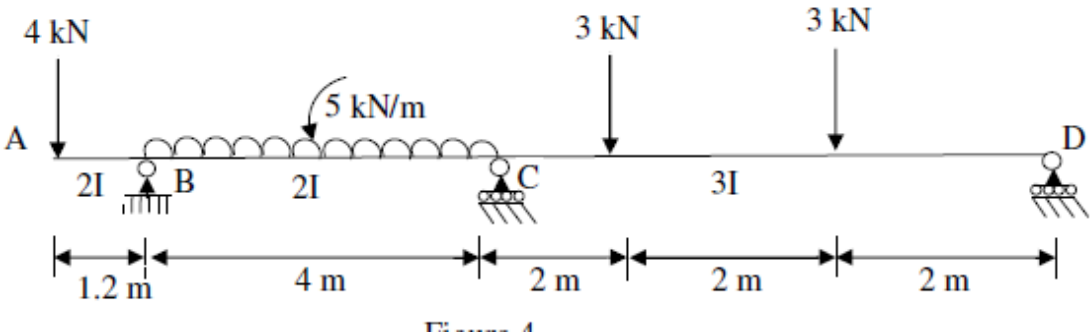
3. A continuous beam ABCD 12 m long is fixed at A and D, and is loaded as shown in Figure 2. Analyze the beam completely if the following moments take place simultaneously i) the end A yields, turning through 1/250 radians in a clock-wise direction ii) end B sinks 30 mm in downward direction, iii) end C sinks 20 mm in downward direction. The beam has constant I=33.20x105 mm4 and E=2x105 N/mm2. Use slope-deflection method.



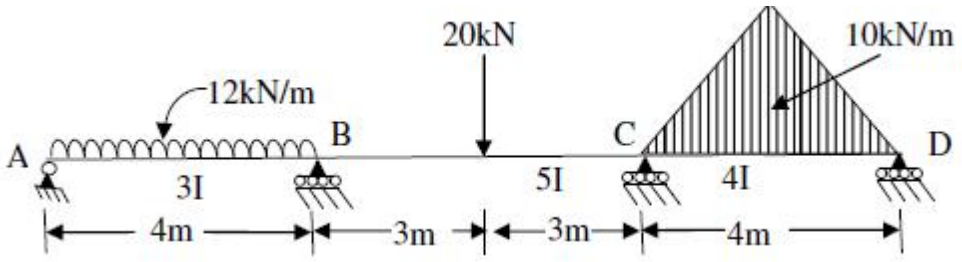
4.Analyse the continuous beam shown in figure , by slope –deflection method.



5. Analyze the continuous beam shown in Figure 4, by slope-deflection method



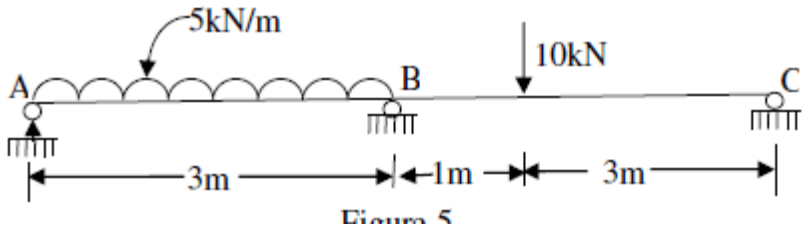
6. A continuous beam hinged at left end carries the load shown in Figure .The supports are all at the same level. Determine the bending moments and reactions at all supports using slope deflection method



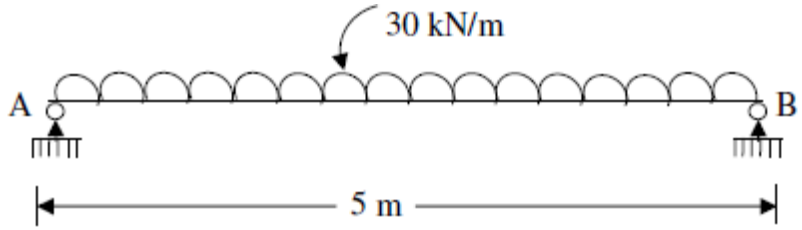
UNIT-V

1.a) Explain the principle of virtual work.
b) State Castigliano's first theorem.

2. Solve the continuous beam shown in Figure , by Castigliano's theorem. Draw the SFD and the BMD.



3. Calculate the strain energy of a simple beam shown in Figure



4. An indeterminate frame is shown in Figure 3. Take AE is constant for all the members. Find the final forces in all members. Use Energy theorem.

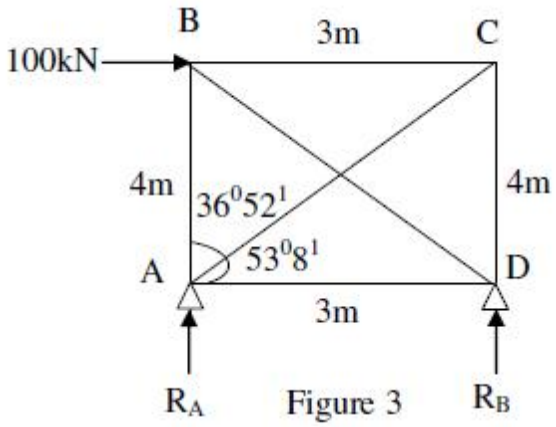
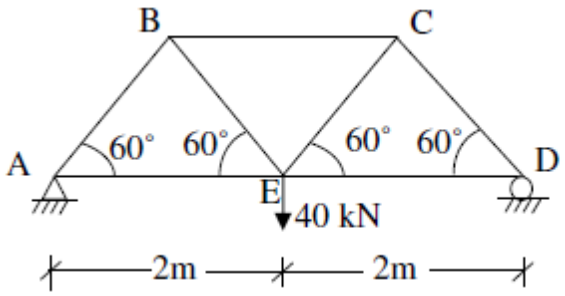


Figure 3

5. Determine the vertical deflection of Joint 'E' for the truss shown in Figure 2. Take A=500x10-6
m2, E=200x10 6 kN/m 2 are constant for all members. Use Strain Energy method.



6. Determine the Reaction at A and the moment at B as shown in Figure 3. Use Strain Energy method.

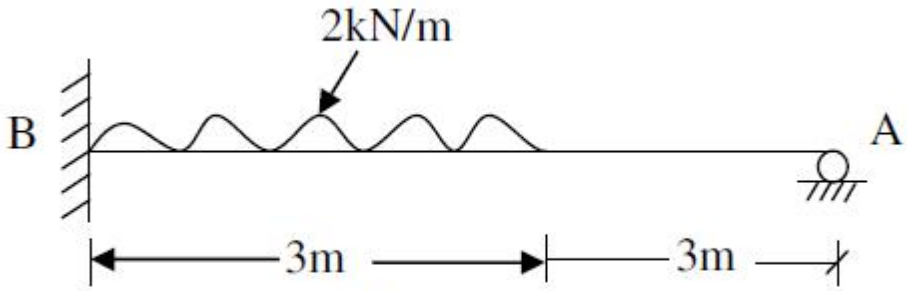


Figure 3

UNIT-VI

1. A simply supported girder has a span of 25m. Draw the influence line for shearing force at a section 10m from one end, and using the diagram determine the maximum shearing force due to the passage of a knife-edge load of 5kN, followed immediately by a uniformly distributed load of 2.4 kN per meter extending over a length of 5m. The loads may cross in either direction.

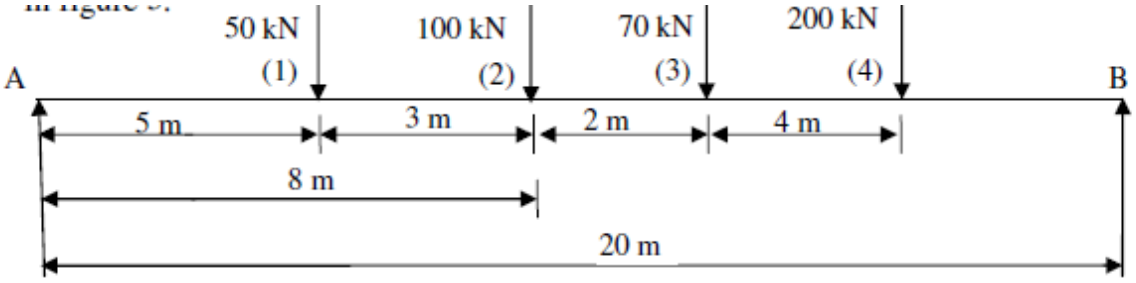
2. Two point loads of 8 kN and 4 kN spaced 3 m apart cross a girder of 15 m span, the smaller load leading from left to right. Construct the maximum S.F. and B.M. diagrams, stating the positive and amount of absolute maximum bending moment.

3. Four wheel loads of 6, 4, 8 and 5 kN cross a girder of 20 m span, from left to right followed by U.D.L. of 4 kN/m and 4m long with the 6 kN load leading. The spacing between the loads in the same order is 3m, 2m and 2m. The head of the U.D.L. is at 2m from the last 5 kN load. Using influence lines, calculate the S.F. and B.M. at a section 8m from the left support when the 4 kN load is at centre of the span.

4. A uniformly distributed load of 1 kN per meter run, 6m long crosses a girder of 16m span. Construct the maximum S.F. and B.M. diagram and calculate the values at section 3m, 5m and 8m from the left hand support.

5. Draw the Influence line diagram for reactions of a simply supported beam of 12 m span. Also draw the influence line diagrams for Shear force and bending moments at quarter span and mid-span sections

6. a) Explain the indirect model analysis for influence lines of indeterminate structures.
b) Determine the maximum shear at a point 8 m from the left support for a 20m span of a simple supported beam with the moving load (1-2-3-4), moving from right to left as shown in figure



DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

N.H- 5, ANAKAPALLE - 531 002, VISHAKAPATANAM DISTRICT., A.P

DEPARTMENT OF CIVIL ENGINEERING

STRENGTH OF MATERIALS -II

QUESTION BANK

Faculty: P.UMA **YEAR:II B.TECH / II SEM**

UNIT-I

1. Write about Principal stress theory. Discuss briefly the maximum principal stress theory.
2. What are the different Theories of Failures and Explain about Mohr's circle?
3. Explain about Normal and tangential stresses on an inclined plane, Show that the greatest shear strain is equal to greatest difference of principal strains
4. Derive an expression for the major and minor principal stresses on an oblique plane, when the body is subjected to direct stresses in two mutually perpendicular directions accompanied by a shear stress
5. Direct stresses of 120 N/mm^2 (tensile) and 90 N/mm2 (compressive) exist on two perpendicular planes at a certain point in a body. They are also accompanied by shear stress on the planes. The greatest principal stress at the point due to these is 150 N/mm$^{2.}$
   (i) What must be the magnitude of the shearing stresses on the two planes?
   (ii) What will be the maximum shearing stress at the point?
6. a)Derive an expression for the normal stress and shear stress on an oblique section of a rectangular body when it is subjected to direct stress in one plane only.

   b) A rectangular element is a strained body is subjected to tensile stresses of 250 N/mm^2 and 180 N/mm2 on mutually perpendicular planes together with a shear stress of 80N/mm^2. Determine: i) Principal stresses ii) Principal planes iii) Maximum shear stress and iv) Plane of maximum shear stress

7. A circular shaft 100 mm diameter is subjected to combined bending and twisting of moments the B.M being 3 times the twisting moment. If the direct tensile yield point of the material is 350 N/mm^{2,} and the factor of safety is 4, calculate the allowable twisting moment according to the following theories of failures.
   (i). maximum principle stress theory, (ii) shear strain energy theory, if the simple shear is not to exceed 60 N/mm^2.
8. An element is subjected to tensile stresses of 60 N/mm^2 and 20 N/mm^2 acting on two

perpendicular planes and is also accompanied by shear stress of 20 N/mm^2 on these planes.

Draw the Mohr's circle of stresses and determine the magnitudes and directions of principal

stresses and also the greatest shear stress.

9. Write a note on Mohr's circle of stresses. What is the importance of this circle?

b) A rectangular block of 1200 mm^2 cross-sectional area is subjected to a longitudinal compressive load of 1200kN. Determine the normal stress across the cross section of the block. If the block is cut by an oblique plane making an angle of 40^0 with normal section of the block. Determine:

(i) Normal stress on the oblique plane

(ii) Tangential stress along the oblique plane, and

(iii) Resultant stress on the oblique plane.

UNIT-II

1. a) Write the assumptions made in the theory of torsion and a) (i)Derive the torsion equation from fundamentals T/J =q/r = N_/L with usual notation.(ii) Explain the Theory of pure torsion?

   b) A solid steel shaft has to transmit 75 kW at 200 r.p.m., taking allowable shear stress as 70N/mm^2. Find the diameter for the shaft, if maximum torque transmitted at each revolution exceeds the mean by 30%.
2. Write about Polar section modulus with one example and Write the different Types of springs Write about close and open coiled helical springs
3. A solid shaft is required to transmit 120 kW power at 200 r.p.m. Find the suitable diameter of the shaft if maximum torque transmitted in each revelation exceeds the mean by 20%.Take allowable shear stress as 70 N/mm^2.
4. A 450 kW of power has to transmit at 100 r.p.m. Find the suitable diameter of hollow circular section, the inside diameter being 3/4 of the external diameter. Take allowable shear stress as 70 N/mm^2.
5. a) Derive the maximum shear stress induced, in the wire of a closed-coiled helical spring which carries an axial load W. Assume mean radius of spring coil is R and diameter of spring wire is d.

   b) A leaf spring carries a central load of 3000 N. The leaf spring has to be made of 10 steel plates 5 cm wide and 6 mm thick, if the bending stress is limited to 150 N/mm^2. Determine: (i)length of the spring and (ii) deflection at the centre of the spring. Take E = $2x10^5$ N/mm^2
6. A leaf spring carries a central load of 3000 N. The leaf spring has to be made of 10 steel plates 5cm wide and 6 mm thick. If the bending stress is limited to 150 N/mm2 determine: (i) length of the spring and (ii) deflection at the centre of the spring. Take E = $2x10^5$ N/mm^2.
7. Define helical spring? Name the two important types of helical springs.

   b) A hollow shaft of diameter ratio 3/5 is required to transmit 400KW at 140 r.p.m with uniform twisting moment. The shear stress in the shaft must not exceed 60 MPa a the twist in a length 2.5 m must not exceed 10. Calculate the minimum external diameter of the shaft. Take C=$8X10^4$ MPa
8. Closely coiled helical spring is made out of 10mm dia. steel rod, the coil having 12 complete turns. The mean dia. of spring is 10mm. Calculate the shear stress induced

in the section of the rod due to an axial load of 250N. Find also the deflection under the load, energy stored in the spring and the stiffness of spring. Take N = 8 x104 N/mm^2.

9. Find the maximum torque that can be safely applied to a shaft of 200 mm diameter, if the permissible shear stress is 45 $N/mm^{2.}$

UNIT-III

1. What the different types of columns? What is the difference between short and long column?
2. Starting from secant formula, derive Perry's formula for long columns.
3. a)Derive the Rankine's formula for crippling load.

b) A column of circular section has 160mm diameter and 4m length. Both ends of the column are fixed. The column carries a load of 150kN at an eccentricity of 15mm from the geometrical axis of the column. Find the maximum compressive stress on the column section.

4. Write and explain about the limitations of Euler's Formula Calculate Euler's critical stress for the column having slenderness ratio 100,150 with both ends hinged. Take E = $2x10^5$ N/mm^2.
5. A hollow rectangular column of external depth 1 m and external width 1 m is 10 cm thick. Calculate the maximum and minimum stress in the section of the column, if vertical load of 200 kN is acting with an eccentricity of 20 cm.
6. Deduce a formula for the critical load of a column having both ends hinged.

b) A solid circular bar 6m long and 5 cm in diameter was found to extend 4.5 mm under a tensile load of 50KN. The bar is used as a strut with both ends hinged. Determine the buckling load for the bar and the safe load, consider factor of safety as 3.0.

7. a)Define slenderness ratio of a column. What is its importance?

b) A column of circular section has 160mm diameter and 4m length. Both ends of the column are fixed. The column carries a load of 150kN at an eccentricity of 15mm from the geometrical axis of the column. Find the maximum compressive stress on the column section.

8. In an experimental determination of the buckling load for a rod 12 mm mild steel pin ended struts of various lengths, two of the values obtained were: (a) When the length is 50 cm load is 10 kN and

(b) When the length is 20 cm load is 30 kN. Make necessary calculations and state whether either of the values of the loads, confirm with Euler's formula for the critical load. Take E= 2x105 N/mm^2.

9. An I-section joist ISWB400 and 8 m long is used as a strut with both ends fixed, determine

Euler's crippling load. Give for the section Ixx = 23426.7 cm^4, Iyy= 1388.0 cm^4 and E =$2x10^5$ N/mm^2.

10. a) Derive Euler's buckling load formula of a long column pinned at both ends.

b) A solid round bar 3 m long and 5 cm in diameter is used as a strut with one end is fixed and

other is hinged. Determine the crippling load. Take E = $2x10^5$ N/mm^2.

11. A 1.5 m long column has a circular cross section of 5 cm diameter, one of the ends of the column is fixed in direction and position, and the other end is free. Taking factory of safety as 3, calculate the safe load using: (i) Rankin's formula, take yield stress is 560 N/mm^2 and a= 1/1600 for pinned ends, (ii) Euler's formula, Young's Modulus for the material is $1.2x10^5$ N/mm^2.

UNIT-IV

1. Find core diameter of a solid section, if diameter is 'd'. Find core diameter of a hollow section, if external and internal diameter are 'D' and 'd'.
2. A beam carries a UDL of 50 kN/m over a span of 2 m long, with an axial compressive load of 50 kN. The beam section is rectangular, having depth equal to 240 mm and width equal to 120mm. Compute (i) maximum fibre stress, (ii) fibre stress at a point 0.5 m from the left end of thebeam and 80 mm below the N.A.
3. A hollow rectangular column of external depth 1 m and external width 1 m is 10 cm thick. Calculate the maximum and minimum stress in the section of the column if vertical load of 200 kN is acting with an eccentricity of 20 cm.
4. Explain about the term kernel and determine the size of kernel for a rectangular 200 mm x300. Find maximum eccentricity of the rectangular section (width b and depth d) for no tension in the section.
5. A short column of external diameter 40 cm and internal diameter 20 cm carries an eccentric load of 80kN. Find the greatest eccentricity which the load can have without producing tension on the cross –section.
6. A square chimney, 30 m high, has a flue opening of size 1.5 m x 1.5 m. Find the minimum width required at the base for no tension if the masonry weights 20 kN/m^3 and the wind pressure is 1.5 kN/m^2. The permissible stress in the masonry is $1kN/m^2$.
7. Determine of stresses in the case of dams and explain the conditions for stability? Write the stresses in retaining walls?
8. Determine of stresses in the case of chimneys, retaining walls
9. Distinguish between direct stress and bending stress by means of a diagram.

UNIT-V

1. What is moment of inertia? Explain briefly about unsymmetrical bending? State the assumptions made in analyzing a beam for unsymmetrical bending.
2. Explain briefly how stresses in beams due to un symmetric bending is considered b) Explain briefly the method of locating shear centre.
3. What are the conditions that should be satisfied for a beam to bend without twisting? Explain about centroid in rectangular section.
4. A beam of rectangular section 100mm wide and 180mm deep is subjected to a bending moment of 12kN.m The trace of the plane of loading is inclined at 45^0 to the y-y axis of the section. Locate the natural axis of the section and calculate the maximum bending stress induced is the section.
5. A beam of rectangular section 80mm wide and 120mm deep is subjected to a bending moment of 12kN.m The trace of the plane of loading is inclined at 45^0 to the y-y axis of the section. Locate the neutral axis of the section and calculate the maximum bending stress induced is the section.
6. Determine the principal moments of Inertia for an angle section 225x175x15 mm.

7. A rectangular section of dimensions 120 x 200 mm is used as a beam on a 3 m span, If the beam is loaded by a concentrated load (P) at the centre at 30° to the vertical (Y-Y axis). Find the maximum value of the load 'P' in kN, if the maximum bending stress is not to exceed 12MPa.
8. A T-Section of dimensions 150 wide x 200 mm deep, with 10 mm thickness of flange and web, is used as simply supported a beam on a span of 6 m. Find the maximum value of 'w' in kN/m, the permissible stress in the material is 120 MPa. The plane of loading is inclined at an angle of 40o to the vertical plane.

UNIT-VI

1. Explain the concept of determinate trusses and indeterminate trusses
2. Explain the procedure for tension coefficient method in statically determinate frame.
3. Explain the procedure for method of sections in statically determinate frame.
4. cantilever truss is loaded as shown in Figure 1. Analyze the truss by method of joints.
5. cantilever truss is loaded as shown in Figure 1. Analyze the truss by method of sections.

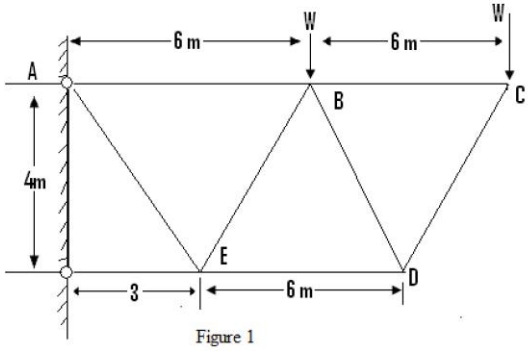


Figure 1

6. Write a note on method of joint? Determine the forces in the members of equilateral triangle truss of span 'L' loaded with apoint load 'W'.

7. Determine the member forces of the truss shown in Figure 1, using method of joints.

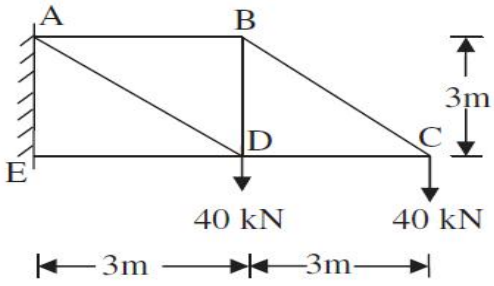
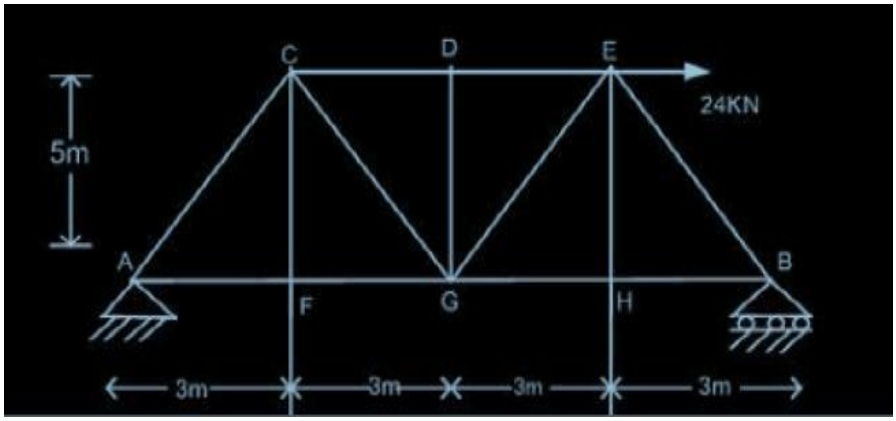


Figure 1

8. Determine the forces in all the members of the frame by method of joints.



9. Find the forces in the members of truss by method of joints as shown in Figure 1.

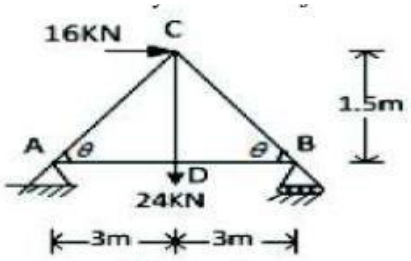


Figure 1

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NAME: B.RAMYA DEPARTMENT: CIVIL

DISSIGNATION: ASSISTANT PROFESSOR YEAR/SEM:II/II

NAME OF THE SUBJECT : **TRANSPORTATION ENGINEERING - I**

REGULATION **:** **R16**

COURSE **:** **B.TECH**

BRANCH **:** **CIVIL**

YEAR / SEMESTER **:** **II YEAR – II SEM**

FACULTY **:** **B.RAMYA**

FACULTY **H.O.D,CIVIL**

PRINCIPAL

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NAME: B.RAMYA DEPARTMENT: CIVIL

DISSIGNATION: ASSISTANT PROFESSOR YEAR/SEM:II/II

UNIT-I

1. Briefly outline the highway development in India.
2. Explain the necessity and objectives of highway planning?
3. What are the factors affecting the highway alignment.
4. What are the different Road Development Plans in India? Discuss them in detail
5. Explain the engineering surveys needed for a highway project and data to be collected.
6. What is the importance of Nagpur road plan in highway planning of our country? Explain the plan formulae and the salient features of the plan
7. Explain obligatory points? What are the uses of map study in engineering surveys?
8. What are the different road network patterns? Explain them in detail with neat sketches.

UNIT – II

1.Explain the summit and valley curves and the various cases when these are formed while two different gradients meet.
2.Explain in detail about highway cross section elements?
3.Discuss about transition curves and extra widening?
4.Define can't?Design superelevation for flexible pavements?
5.The design speed of a highway is 90 Kmph. There is a horizontal curve of radius 190 m on a certain locality. Calculate the super-elevation needed to maintain this speed. If the maximum super-elevation of 0.07 is not to be exceeded, calculate the maximum allowable speed on this horizontal curve as it is not possible to increase the radius. Safe limit of transverse coefficient of friction is 0.15.
6. Explain the ruling, maximum and exceptional gradients.
7. The speed of overtaking and overtaken vehicles are 90 Kmph and 45 Kmph respectively on a two way traffic road. If the time taken by the overtaking vehicle is equal to 7.5 seconds and reaction time of the driver is equal to 2 seconds, calculate the safe overtaking sight distance.
8. What are the objects of highway geometric design? List the various geometric elements to be considered in highway design.
9. Derive an expression for finding the extra widening required on horizontal curve.
10.Discuss about vertical curves with neat sketches and formulaes?

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NAME: B.RAMYA DEPARTMENT: CIVIL

DISSIGNATION: ASSISTANT PROFESSOR YEAR/SEM:II/II

UNIT – III

1. What are the objectives and uses of volume study.
2. What are the various types of traffic accidents and explain the various measures to prevent accidents.
3. Explain briefly the various aspects investigated during parking studies. What are the uses of these studies?
4. What a detailed note on road accidents and its preventive measures
5. Write in details about the traffic counting.
6. Write the various IRC equivalent factors of vehicles for Rural roads.
7. What are the objectives and uses of volume study.
8. How are the traffic signal times decided based on Webster's Method.
9. Explain the design steps involved in Rotary intersection.
10. Explain at grade intersections, the advantages and limitations.
11. Write a short note on speed studies? And discuss about spot speed and speed &delay studies?

UNIT – IV

1. What are the tests for aggregate used in highway. Explain them in brief?
2. What are the various tests conducted on bitumen.Explain them in brief?
3. Explain the plate bearing test procedure and how corrections for 'K' value may be made for a different plate size and for accounting for worst moisture conditions
4. Discuss the desirable properties of the bitumen. Compare tar and bitumen.
5. The properties of a subgrade soil are given below
   Liquid limit = 75 %
   Plastic limit = 55 %
   Passing No. 200 sieve = 70 %
   (i) Determine the group index and classify the soil by HRB soil classification system.
   (ii) Determine the suitability of the soil as a subgrade material.
6. What are the desirable properties of the bitumen mixes? What are the steps on

bituminous mix design? Discuss briefly?

7. Explain the CBR and the test procedure for the laboratory and field tests. How are the results of the test obtained and interpreted?

UNIT – V

1.The CBR value of soil is 5 %. Calculate the total thickness of flexible pavement using design charts developed by IRC.

2.Estimate the thickness of concrete using the method suggested by Indian road congress.
Modulus of elasticity of concrete = 3.0×10^5 kg/cm^2
Modulus of rupture of concrete = 40 kg/cm^2
Poisson's ratio of concrete = 0.15
Modulus of subgrade reaction = 6 kg/cm^2
Wheel load = 5100 kg
Radius of contact pressure = 15 cm

3. Explain the critical wheel load locations considered in Westergaard's theory? Write the significance of each location in the analysis of load stresses?

4.Explain in detail about the CBR and IRC methods for flexible pavements.

5.Explain and discuss about the various streeses in rigid pavements.

6. What are roller compacted roads ?Explain about joints in rigid pavements

7.Write BURMISTER method for flexible pavements.

UNIT – VI

1. Compare the alternate bay and continuous bay methods construction of cement concrete roads

2.Discuss about mainteinence for flexible and rigid pavements?

2. What are the advantages and drawbacks of flexible roads? Explain about the construction procedure?

4. List out the different methods of road construction. Discuss their advantages and limitations.

5. Specify the materials required for construction of WBM roads. What are the uses and limitations of this type of road?

6. Compare the fallowing methods of bituminous road construction
(i) Central plant mix and road mix methods
(ii) Hot mix and cold mix.

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Phone: 08924-221111 / 221122/9963981111, www.diet.edu.in, E-mail: info@diet.edu.in

Branch: Civil-B-tech II year/II Sem **Subject**: BPD

Year: 2017-2018 **Faculty:G.NARAHARI**

UNIT-I- BUILDING BYE LAWS & REGULATIONS

1.Write short notes on building bye-laws for lighting, ventilation and wall thickness.
2.What is the difference between Floor carpet area? Explain in detail
3.What are the Building Bye-laws? Explain in detail along with the objectives of Bye-laws.
4.Write short notes on floor area. How is it related to height of the building?
5.Define floor space index. What is the difference between Law and Bye-laws?
6.Explain the building bye-laws with reference to open space requirements& lighting and ventilation requirements.
7.What are the various principles underlying building bye-laws? When do you apply the building bye-laws?
8.Explain in detail the classification of buildings. Also state the built-up area limitations

UNIT-II – RESIDENTIAL BUILDINGS

1.Describe the characteristics of various types of residential buildings.
2.Discuss briefly the purpose, functions and requirements of Kitchen, study room and Dining room.
3.Explain in detail the purpose, functions and requirements of Dining room, study & pooja room.
4.What are the factors to be considered by a planner prior to plan a residential building? Explain each component on detail.
5.Write short notes on Bye-laws for open in building and for size of rooms and ventilation.
6.What are the factors that are to be considered by planner prior to planning of a residential building? Explain any two of them in detail.
7.Define CPM and PERT. Explain the difference between both
8.Give the standard dimensions for Bed room, verandah, Kitchen and dining room of a residential building
9.

UNIT-III – PUBLIC BUILDINGS

1.What are the requirements for the dining room, drawing room, kitchen and bedroom in planning of residential building?

2.Explain the components involved in the design of Bank Building.

3.Enumerate the basic requirements of an educational institution and explain in detail

4.Differentiate between the following: (i) Hotel and motel, (ii) Dispensary and clinic.
5.What are the components of an Industrial building? Explain the principles involved inthe design.
6.Explain in detail the characteristics of various types of residential buildings
7. Define the terms EST, LST, Float, EFT, LFT.

MID 2

1. **A. Draw the conventional signs for the following represented in a sectional elevation : a) Stone masonry b)Concrete c) Sand d)Wood e)Brick f)Earth g)Cinders**

   B. Draw the plan of one and a half brick wall in english bond & Flemish Bond for a wall?

   C. Draw the plan of two brick wall in english bond & Flemish Bond for a wall?

   D.Draw to a suitable scale the plan of the fully panelled door ?

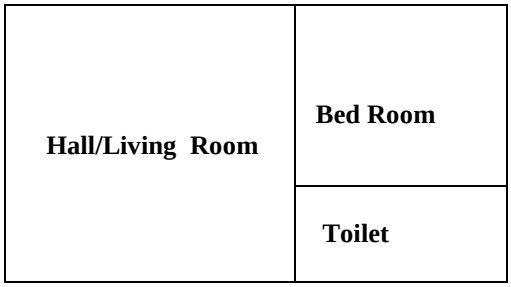
   E.Draw to a suitable scale the plan of the fully panelled window?

   F.Draw the line diagram of a king-post truss showing the various components ?

   G.Draw the line diagram of a queen-post truss showing the various components?

2. **A. Draw the marking plan of a single-room building of size 5.0m×3.5m having wall thickness 230mm and width of foundation 1000mm**

   B.The line diagram shows one bed room residential building . Draw the plan , elevation , section to a suitable specifications.



C.Draw the line diagram of a residential building with the given line sketch to a scale of 1:100

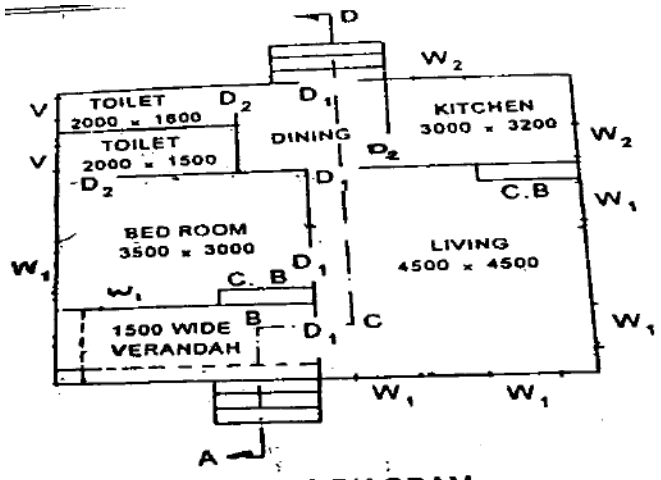


FIG. LINE DIAGRAM

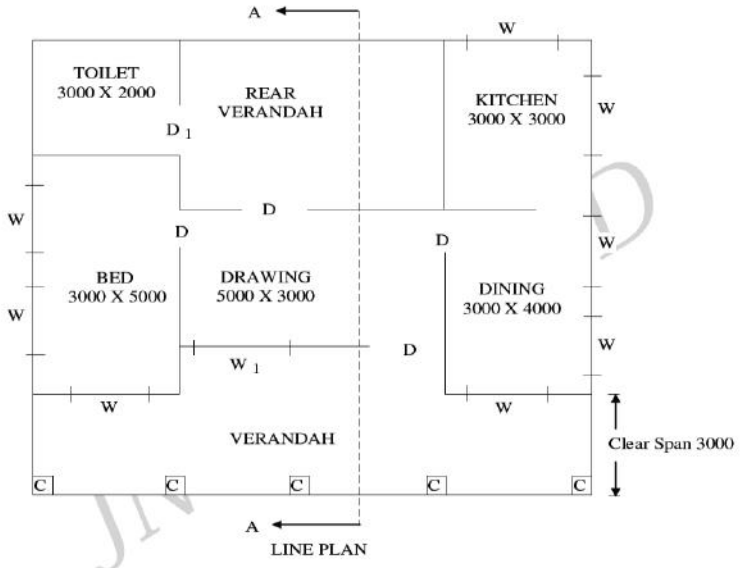
D. Draw the plan section and elevation of a " PRIMARY HEALTH CENTRE " .Assume the dimensions

E. Draw the plan for " HOSTEL " assume the dimensions

F.Draw the plan for "EDUCATIONAL INSTITUTE" assume the dimensions

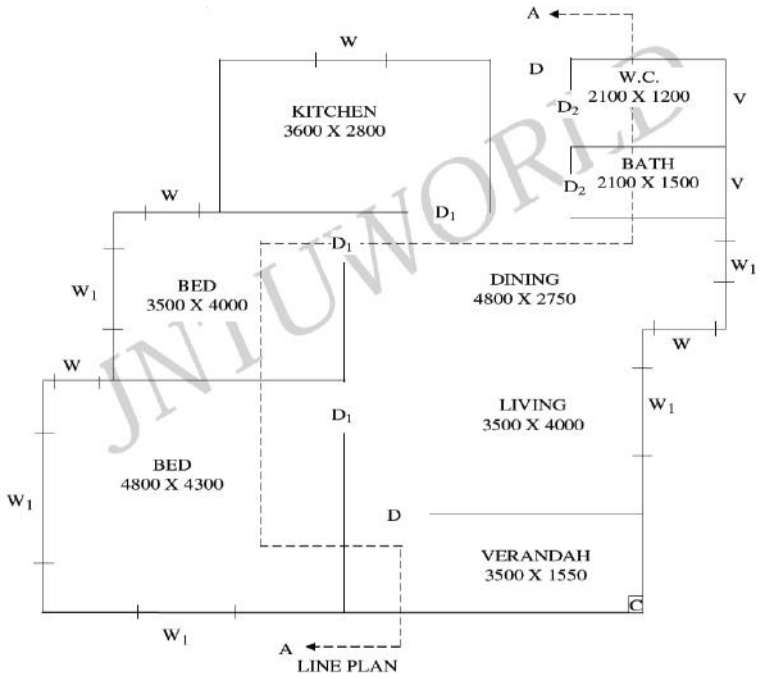
G. Draw the plan, Elevation & Section for the following line diagram

Assume D1 – 800 x 2000, D – 1000 x 2000, W – window Glazed – 1500 x 1000, W1 –Window Glazed – 2000 x 1000, V – Ventilator Glazed – 800 x 500, wall thickness –300mm

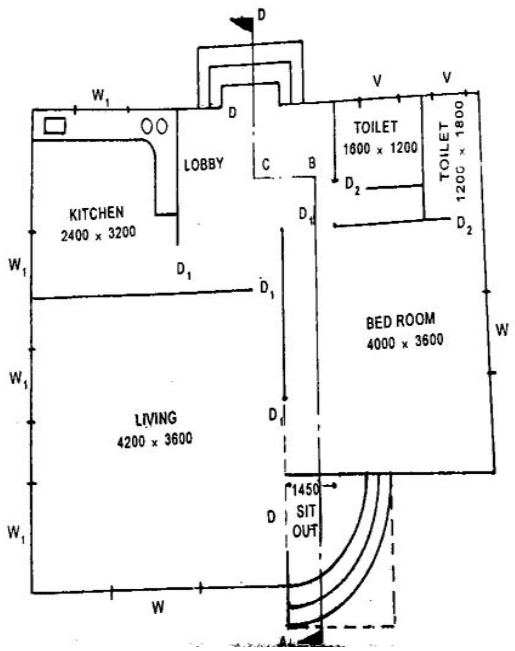


H. Draw the plan for Elevation & Section for the following line diagram

Assume D1 – 800 x 2000, D – 1000 x 2000, D2 – 700 x 2000, W – window Glazed – 1500 x 1000, W1 – Window Glazed – 2000 x 1000, V – Ventilator Glazed – 800 x 500, wall thickness – 300mm



I. Draw the plan for Elevation & Section for the following line diagram


D
W1
D
V
V
TOILET
1600 x 1200
TOILET
1200 x 1800
LOBBY
C
B
D2
KITCHEN
2400 x 3200
D1
D2
W1
D1
D1
BED ROOM
4000 x 3600
W
W1
LIVING
4200 x 3600
1450
D
SIT
OUT
W1
W