QP Code : MV-18389

(3 Hours)   [Total Marks : 100]

N.B. 1) Question No.1 is **compulsory**. Attempt any **four** out of remaining **six** questions.
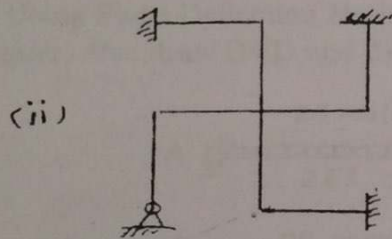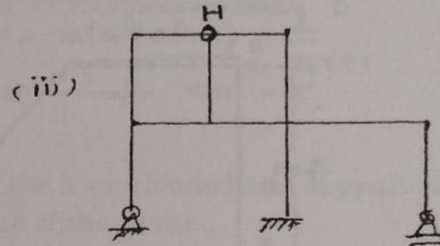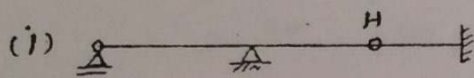
2) **Figures** to the **right** indicate full marks.

3) Assume suitable **data** if necessary but justify the same.

Q.1 (a) For the structures shown in figure, determine-

i) Static Indeterminacy, indicating both external & internal.   (4)

ii) Kinematic Indeterminacy, neglecting axial deformation in flexural members.   (4)

(i)

(iii)

(ii)

(iv)
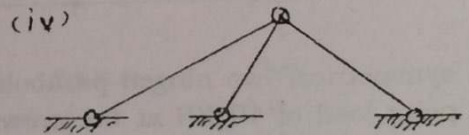
(b) Determine shape factor 'S' about one of the diagonals of square cross section.   (6)

(c) The members of a steel bent frame are subjected to temperature variation as shown in figure. Find the vertical deflection at free end 'C', considering axial deformation. Take depth of each member as 400 mm and $a = 12 \times 10^{-6}$ /°C.   (6)

B   30°   C
         40°

35° 25°

              AB = 5m
              BC = 3m

A
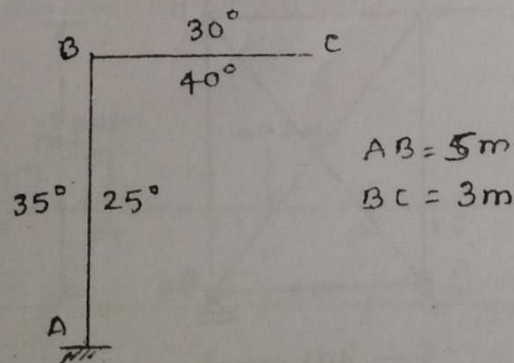
[TURN OVER]

Q.2 A beam ABC is loaded and supported at point 'B' by a linear spring whos stiffness K is $\frac{EI}{10}$. Analyze the beam using stiffness method and draw BMD an deflected shape. (20
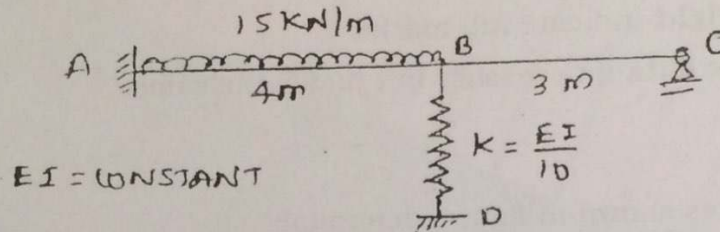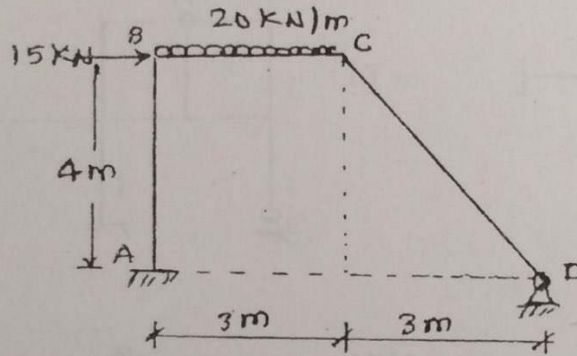
15 KN/m

A |ooooooooooo B   C
        4m   3 m

EI = CONSTANT   k = $\frac{EI}{10}$

                              D

Q.3 Analyze the rigid jointed plane frame using Flexibility Method. Also draw BMD an deflected shape of the frame. Take EI = Constant for all members. (20)

15KN, B oooooooooo C 20 KN/m

4m

   A

     3 m   3 m   D

Q.4 (a) A symmetrical two hinged parabolic arch of span 20 m and central rise 5 m carries a point load of 40 KN at the crown. Analyze the arch using method of least work. Also draw BMD for the arch, showing location and magnitude of maximum +ve & maximum –ve BM. (10)

(b) Using Force Method, analyze the redundant frame loaded & supported as shown in figure. Take AE = Constant. Also find the axial force in all the members. (10)

                    30 KN

           C   D
40 KN →

                              4m

   A   B

       3m

[TURN OVER]
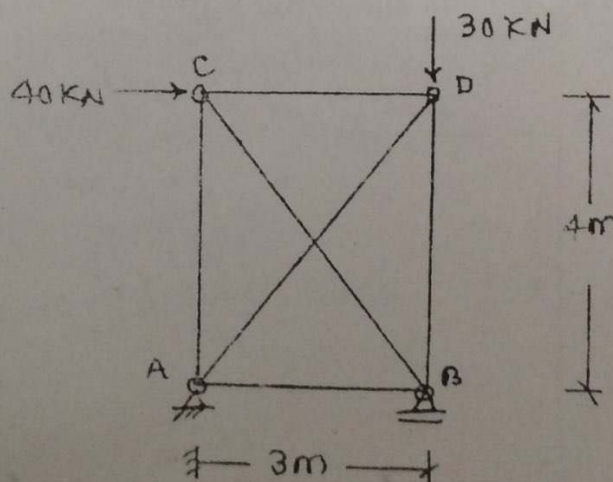
Q.5 (a) Using Clapeyron's theorem, analyze the continuous beam loaded as shown in figure and draw BMD.   (7)
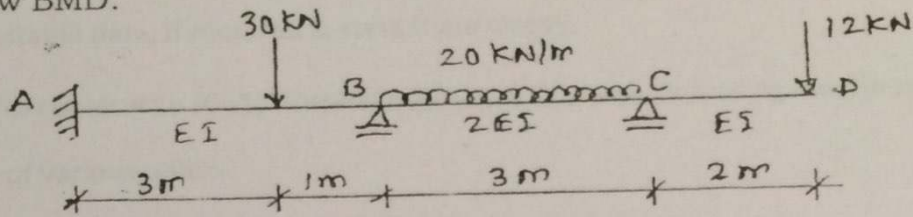
b) Define the terms i) Plastic section modulus ii) Load factor.   (3)

(c) A continuous beam shown in figure is subjected to loading at collapse. Find the plastic moment capacity 'M$_p$' of the beam.   (10)
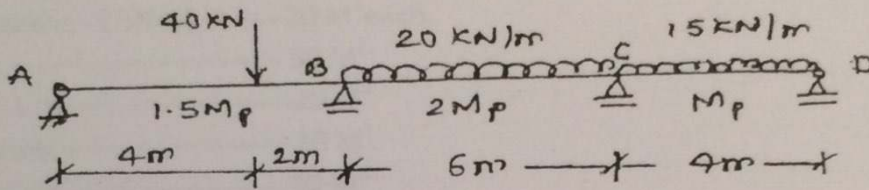
Q.6 Using Slope-Deflection Method, analyze the frame loaded and supported as shown in figure. Also draw BMD and deflected shape of the frame.   (20)
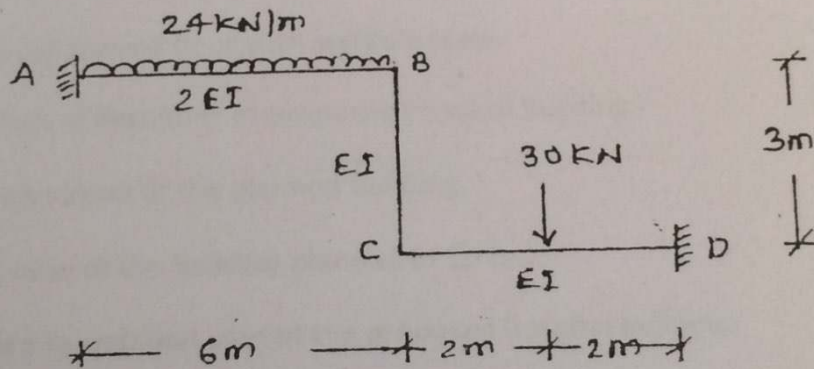
Q.7 Analyze the continuous beam loaded and supported as shown in figure using Moment Distribution Method. Also draw SFD, BMD and deflected shape. Note that the supports at 'B' settle by 10 mm. Take EI = 20000 KNm².   (20)
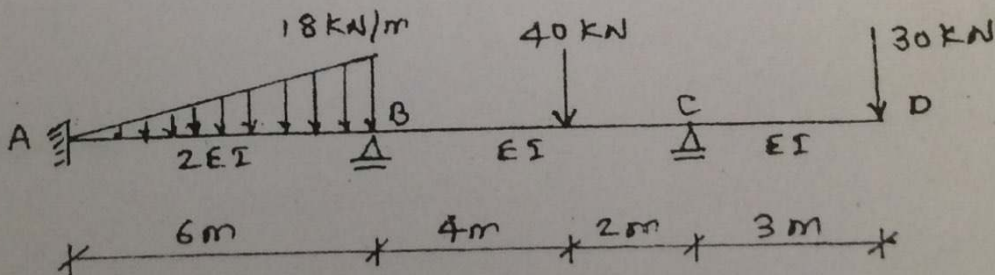
Con. 10178-14.

(4 Hours)   **[Total Marks : 100**

N.B :- (1) Question No. 1 is Compulsory.

(2) Answer any **four** questions out of remainining questions.

(3) Assume suitable data, if required & state them clearly.

Q 1) It is proposed to construct a (G+1) Hospital building in City area. Following are the area

Requirements of various units:-

1) Consulting Rooms :- (3Nos) --- 20M^2 each.
2) Male ward -------------------------100 M^2
3) Female Ward ----------------------100 M^2
4) Operation Theatre --------------- 30 M^2
5) Special Rooms:- (5Nos) -------20 M^{2}each.
6) I.C.U --------------------------------- 50 M^2
7) Pathology Lab ---------------------20 M^2
8) Medical Store ----------------------20 M^2
9) Administrative Unit --------------30 M^2
10) Nurse Room ------------------------20 M^2

Provide entrance Lobby, Reception Counter, Waiting Area, Common Toilets, and Staircase etc. of suitable sizes. It is R.C.C Framed building having floor to floor height 3.4m.

Draw developed plan of ground floor with suitable scale.   -------------- 20 Marks.

Q 2) (a) Draw Line Plan of first floor of proposed hospital building.   ------------- 08 Marks.

(b) Draw front elevation of the planned building.   --------------- 12Marks.

Q 3) Draw sectional view of the building planned in Q.No.1.   ------------- 20Marks.

Q 4) (a) Draw detailed foundation plan of the proposed hospital building.   ------------ 12Marks.

(b) Draw Site Plan of the same building.   -------------- 08 Marks.

Q 5) a) Define,' Town Planning" Also explain the principles of town planning.   ----------- 10 Marks.

b) Explain Built Environment & its approaches in detail.   -------------- 10 Marks.

[TURN OVER

Con. 13248-14.

20

Differentiate the following :-
(i)   Public limited and private limited Company
(ii)   Income Statement and Balance sheet
(iii)   Entrepreneurship and Intrapreneurship
(iv)   Small scale Industries & large Scale Industries

20

Explain the following .
(i)   Double entry system
(ii)   Ledger
(iii)   Safety rules and Regulation for Civil Industries
(iv)   Checklists for a Project Report

Explain the following :-
Concepts of Management   07
Functions of Management   08
Principles of Organaisations   05

Con. 12595-14.

(3 Hours)   [Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.
     (2) Attempt any **four** questions from the remaining **six** questions.
     (3) Assume suitable **data** if **necessary**.
     (4) **Fig.** to **right** indicate **full** marks.

1. Write short notes on any **four** :—   20
    (a) Dimensional homogeneity
    (b) Draft tube theory
    (c) Cavitation in pumps
    (d) Unit quantity of turbine
    (e) Difference between hydraulic reaction turbine and impulse turbine.
    (f) Hydraulic accumulator.

2. (a) The 2cm dia jets of lawn sprinkler face opposite directions. A flow of 3 lit/sec.   10
enters the rotating arm is a normal direction. The jets are equistant from the
centre. The centre to centre distance between the jets and the torque required to
hold the sprinter stationary.

2. (b) The drag force experienced by a flat plate of length 'l' immersed in a liquid of   10
velocity V and viscosity μ and mass density ρ also depends on acceleration due
to gravity 'g'. Derive expression for the drag force D.

3. (a) A square plate of 30 cm side and weight 150N. is suspended from a hinge and a   10
jet of water 2 cm in diameter strikes it horizontally at its centre with a velocity of
17 m/s. Find the force required to be applied at its lower edge to keep it vertical.
If allowed to swing freely. Fing the angle it makes with vertical.

3. (b) A ship 200 m long makes in sea-water whose density in 1030 kg/m³. A 1:100   10
model of the ship is to be tested in a wind tunnel. The velocity of air in the wind
turned around the model is 30 m/s and the resistance of the model is 60N.
Determine velocity of the ship in sea-water. The density of air is driven as 1.24
kg/m³. Take the kinematic viscosity of sea-water and air is 0.012 stroke and
0.018 strokes respectively.

4. (a) A jet of water having a velocity of 30 m/s strikes a series of radial curved plate   10
mounted on wheel which is rotating at 200 r.p.m. The jet makes an angle of 20°
with the tangent to the wheel at out let. Water is flowing from outward in a radial
direction. The outer and inner radii of wheel are 0.5 m and 0.25 m respectively.
Determine (1) Vane angle at inlet and outlet. (2) Work done per unit weight of
water (3) Efficiency of the wheel.

(b) A pelton wheel is having a mean bucket diameter of 0.8 m and running at 1000   10
r.p.m. the net head on the pelton wheel its 400m. If the clearance angle is 15° and
discharge through nozzle is 150 liters/s.

Find :
(i) Power available at the nozzle
(ii) Hydraulic efficiency of the turbine.

Con. 11232-14.

5. (a) A Fransis turbine has net head H = 60m speed N = 800 r.p.m. shaft power =   10
294.30 kw η_0 84%, η_h = 93%. Flow ratio = 0.20, breadth ratio n = 0.1, outer
diameter of the runner = 2 × inner diameter of runner.
The thickness of vane occupy 5% of the circumferential area of the runner velocity
of flare is constant at inlet and outlet and discharge is radial at outlet.

Determine :
(1) Guide blade angle
(2) Runner Vane angle at inlet and outlet
(3) Diameters of runner at inlet and outlet
(4) Width of wheel at inlet.

(b) The diameter of an impeller of a centrifugal pump at inlet and outlet are 30cm   10
and 60 cm respectively. The velocity of how at outlet is 2.0 m/s and the vanes are
set back at angle of 45° at the outlet. Determine the minimum starting speed of
the pump if the manometric efficiency is 70%.

6. (a) The hub diameter of a kaplan turbine working under a head of 15 m is 0.35 times   10
the diameter of runner. The turbine is running at 100 r.p.m. If the vane angle of
entreme edge of the runner at outlet is 15° find flow ratio is 0.6 find.
(i) Diameter of runner
(ii) Diameter of the boss
(iii) Discharge through the runner.
Velocity of whirl at outlet is given as zero.

(b) Describe the spectoic speed of a centrifugal pump (Ns)   5
(c) Write a short note on Model testing of centrifugal pumps.   5

7. (a) A 90° bend in a 15cm diameter pipe carries oil of sceptic gravity 0.8 at   10
120 lit. /sec. Under a pressure of 0.8m of oil at the entrance. Find the force on the
bend.
Given : Angle of bend = Angle through which water gets deflected = 90°
(b) Explain with a neat sketch the construction and operation of Hydraulic ram.   10

Con. 11232-14.

QP Code : MV-18594

(3 Hours) [Total Marks : 100

N.B. : (1) Question **No.1** is **compulsory.**
    (2) Attempt any **four** out of remaining **six** questions.
    (3) **Figures** to the **right** indicate **full marks.**
    (4) Assume any suitable data if not given and justify the same.

1. (a) What is the quick sand condition? Derive equation for critical hydraulic gradient.   5
   (b) Differentiate between soil and rock.   5
   (c) Explain in brief field identification of soil   5
   (d) Define Activity and Sensitivity.   5

2. (a) A clay of sample taken from a natural stratum was found to be partially saturated and   10
when tested in the laboratory gave the following results. Compute the degree of
saturation. Specific gravity of soil particles = 2.6; wet mass of sample = 250 gm;
dry mass of sample = 210 gm; volume of sample = 150 cm³. Show all the relevant
quantities in the phase diagram .
   (b) Name the method of determining permeability of sandy soil. Derive the expression to   10
find out coefficient of permeability for the same case. Also mention effect of
temperature on coefficient of permeability.

3. (a) A 1000 cc core cutter weighing 946.8 g was used to find out the in situ unit weight of   10
an embankment. The weight of core cutter filled with soil was noted to be 2770.
6 g. Laboratory test on the sample indicated a water content of 10.45% and specific
gravity of solids of 2.65. Determine the bulk unit weight, void ratio and degree of
saturation of the sample.
   (b) If k_1, k_2, k_3 are the permeabilities of layers h_1, h_2, h_3 thick, what is its equivalent   10
permeability in the horizontal and vertical directions? Derive the formulae used.

4. (a) Two clays A and B have the following properties :—   10

	Clay A	Clay B
Liquid limit W_L %	44	55
Plastic limit W_P %	20	35
Natural water content W_N %	30	50

Which of the clays, A or B, would experience larger settlement under identical loads?
Which of the soil is more plastic? Which of them is softer in consistency?
   (b) Draw typical bore hole and explain various suitable field tests that are conducted   10
during soil exploration at a site having sandy strata.

Con. 13754-14.

TE SEM - V (Rev) May - June - 14

Civil   Sub. - TE - I

Date: 27/5/1

Q P Code : MV-18473

(3 Hours)   [Total Marks : 100

B. : (1) Q. No. 1 is **compulsory.**
   (2) Answer **any four** questions from the **remaining.**
   (3) **All** questions carry **equal marks.**

(a) A 9° branch curve diverges out from a 8° main curve in the opposite direction of **10**
    M.G. Yard layout. If the speed restriction is 30 kmph on the mainline and cant
    deficiency permissible is 5.2 cm, what would be the speed limit on the branch
    line?

(b) Draw and explain about wind Rose Diagrams of Type-I and Type-II with neat **10**
    sketches.

Write short notes on the following with neat sketches.
   (a) Instrument Landing System   5
   (b) TRANSIT SHEDS   5
   (c) BREAK WATER   5
   (d) HOLDING APRON   5

(a) Explain the following:—   5
       (i) DOLPHINS   5
       (ii) DRY DOCK   10
(b) Design the TURNOUT with the following data :—
       FLANGE = 1.675m.
       No. of Crossing = 12
       Heel Divergence = 11.70m.
       Angle of switch = 1° 35'
         x = 1.2 m.

                                                                                    10
(a) Explain TAXIWAY. How its layout is decided?
(b) Write short notes on :—   5
       (i) Basic Runway Length   5
       (ii) Longitudinal Gradient (GRADIENT) of Runway

5. Write short notes on the following :—   5
       (a) Negative Super Elevation   5
       (b) MARSHALLING YARD   5
       (c) AIRPORT DRAINAGE   5
       (d) Approach lights for RUNWAYS

con. 11735-14.

6. (a) Describe Left Hand TURNOUT with a neat sketch. 10
   (b) Explain different theories CREEP of RAIL with neat sketches. 10

7. (a) What are the different types of Ballast material used in Railway Tracks? Discuss 10
   their properties.
   (b) Explain about various factors to be considered for SITE SELECTION of AIRPORT. 10

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