2013-14
(Reg.)

(3 Hours)   [Total Marks : 80]

	Instructions: 1. Question no. 1 is compulsory and solve any three questions out of remaining five questions. 2. Draw neat sketches wherever necessary. 3. Figures to the right indicates full marks.	
1(a)	Explain in brief various methods of curing of concrete.	20
(b)	Explain in brief any four properties of Ordinary Portland Cement.	
(c)	Explain in brief fineness modulus of coarse and fine aggregates.	
(d)	Define high performance and high strength concrete.	
(e)	What are the mineral admixtures? Explain in brief.	
2 (a)	Explain in detail various properties of hardened concrete.	10
(b)	Explain in detail various factors affecting workability of concrete.	10
3 (a)	Explain in detail manufacturing process of concrete in RMC plant.	10
(b)	Explain step by step procedure to design concrete mix for compressive strength as per IS: 10262.	10
4 (a)	Enlist any five types of chemical admixtures commonly used and explain them in detail.	10
(b)	What is NDT of concrete? Explain any one method of NDT with sketch in detail.	10
5(a)	Explain the effect of aggregate properties on concrete quality.	7
(b)	Explain in detail Hot weather and cold weather concreting.	6
(c)	What is durability of concrete? Explain the effect of W/C Ratio on durability of concrete.	7
6	Write short notes on the following (a) Roller compacted concrete. (b) Distress in concrete structures. (c) Ferrocement. (d) Fibre reinforced concrete (e) Explain concept of retrofitting.	20

Con. 13773-14.

[REVISED COURSE]

(4 Hours)   [Total marks: 80]

NOTE:.

 ix) Question No. 1 is compulsory.
 x) Attempt any three out of the remaining five questions.
 xi) Figure to the right indicates full marks
 xii) Assume any suitable data and clearly state the same.

Q.1 It is proposed to construct a RCC Framed structure (G+1) Bungalow for a
  businessman with the following area requirements, same on each floor.
  Drawing Hall = 25 m^2 , Master Bed Room = 25 m^2, Children's' Bed Room =
  20 m^2, Guest Room= 20 m^2, Kitchen and Dining Room = 20 m^2.
  Provide verandah, staircase, passage and sanitary units as per bye laws.
  i) Draw the Ground Floor plan   14
  ii) Draw the Front elevation   06

Q.2 A) Draw the cross section passing through staircase, bath, WC of building 15
  drawn in Q. no.01
  B) Draw the site layout plan for building drawn in Q. no. 01 clearly indicating 05
  various services, open spaces etc.

Q.3 A) Draw the foundation plan with dimensions for the building drawn in Q no. 10
  01. Also draw the section of one footing.
  B) Suggest the type of pitched roof for a factory of size 8.5m x 20m. Draw the 10
  plan and section of the same showing all details.

Q.4 A) Explain the 'principles of planning' used in planning of a residential 10
  building.
  B) Explain the zoning regulation and Building bye laws in detail. 10

Q.5 A) Explain with the help of sketches, Load bearing structure, framed 07
  structure and composite structure
  B) Draw the plan, elevation and section of the half paneled and half glazed 07
  door. Assume the door size as 1.2m x 2.1m.
  C) Explain carpet area, built up area and FSI.   06

Q.6 Write short notes on the followings (any four)
  i). Sun path diagram, ii). Wind rose (circulation) diagram. Iii). Functional 20
  planning of a residential building, iv). Sun shading devices, v). orientation of
  building.

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Con. 13020-14.

(3 Hours) [Total Marks : 80

N. B. : (1) Question No. 1 is **compulsory**.
      (2) Solve any **three** questions from remaining **five**.
      (3) Assume suitable data if necessary and state clearly.

1. Solve any **four** :–   20
    (a) Define mach number. What is the significance in compressible fluid flow.
    (b) Derive Dupit's equation.
    (c) Explain water hammer with control measures.
    (d) Explain prandtl's mixing length theory.
    (e) What is kinetic energy correction factor and momentum correction factor.

2. (a) Three pipes of diameters 300 mm, 200 mm and 400 mm and length 450 m, 255   10
    m and 315 m respectively are connected in series. The difference in water surface
    levels in two tanks is 18 m. Determine the rate of flow of water if co-efficients
    of friction are 0.0075, 0.0078 and 0.0072 respectively considering
        (i) Minor losses also and
        (ii) Neglecting minor losses.

    (b) A 300 mm diameter horizontal pipe is suddenly enlarged to 600 mm. The rate   10
    of flow of water through pipe is 0.5 m^3/s. If the intensity of pressure in smaller
    pipe is 120 KN/m^2 determine.
        (i) Loss if head due to sudden enlargement
        (ii) Intensity of pressure in larger pipe
        (iii) Power lost due to enlargement.

3. (a) Calculate discharge in each pipe of network as shown in fig. The pipe network   10
    consists of 5 pipes. The head loss 'hf', in pipe is given by hf = rQ^2. The ralues
    of 'r' for various pipes and also inflow or outflows at nodes are shown in figures.
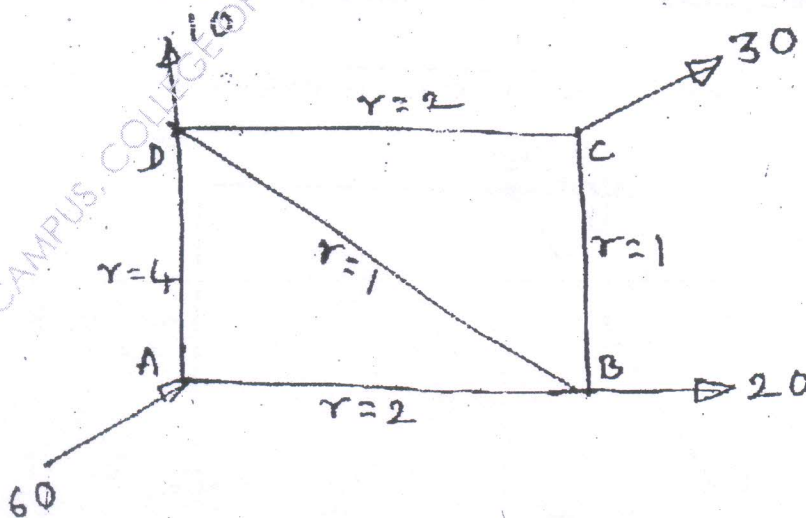
(b) A nozzle fitted to a pipe 100 mm diameter, and 250 m long with coefficient of   10
friction as 0.01. If head available at nozzle is 120. Find maximum power
transmitted by jet of water freely out of a nozzle and diameter of the nozzle.

4. (a) Prove relationship for one dimensioal compressible flow.   10

$$\frac{dA}{A} = \frac{dP}{PV^2}[1 - M^2]$$

(b) A supersonic aircraft flies at an altitude of 3 km where temperature is 4°C.   10
Determine the speed of aircraft if its sound is heared 5 seconds after its passage
over the head of an observer.

Take $R = 287 \ J/kg^0 k$ and $k = 1.4$

5. (a) Derive an expression for the coefficient of viscosity in case of dashpot   10
arrangement.

(b) A lubricating oil of viscosity 1 poise and specific gravity 0.9 is pumped through   10
a 30 mm diameter pipe. If the pressure drop per meter length of pipe is
20 KN/m² determine.
      (i) Mass flow rate in kg/min
      (ii) The shear stress at the pipe wall
      (iii) Reynolds number of flow and check the flow
      (iv) The power required per 50 m length of the pipe to maintain the flow.

6. (a) Describe in detail hydrodynamically smooth and rough boundaries. What is   8
karman–Prandtl equation for hydrodynamical rough boundaries.

(b) Explain Moody's diagram.   5

(c) A pipe of diameter 100 mm, carrying water, the velocities at the pipe centre and   7
35 mm from pipe centre are found tube 2.7 m/s and 2.4 m/s respectively. Find
the wall shearing stress.

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(3 Hours)   (Total Marks: 80)

1) Question No.1 is compulsory.

2) Attempt any **three** questions out of remaining four questions.

3) Assume suitable data wherever required and state it clearly.

4) Illustrate your answers with neat component sketches wherever required.

5) Answers should be written in the legible handwriting, stepwise and in the systematic manner.

1. Attempt any FOUR of the following:

   (a) Explain the principle of superposition with examples.   05

   (b) For a three hinged parabolic arch of span L and rise h carries udl of intensity   05
       w per unit run over whole span. Show that horizontal thrust at each support of
       arch is $wl^2/8$ and bending moment at any section of arch is zero.

   (c) Using influence lines find out the shear force at any section for the loaded   05
   girder as shown in fig.
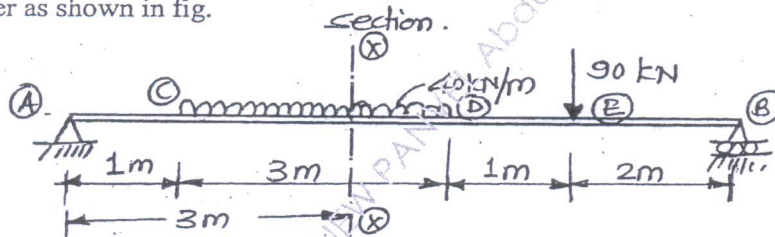
   (d) A rod, 2 m long and rectangular in cross section 88 mm × 44 mm is subjected   05
       horizontally through pin joints. It carries a vertical load of 3.3 kN/m length
       and axial thrust of 110 kN. If E = 208 kN/mm², calculate the maximum stress
       induced.

   (e) What is strain energy? Write the expression for the strain energy stored due to   05
       shear force, bending moment.

2. (a) Draw SFD, BMD and AFD for the frame as shown below.   13

[TURN OVER
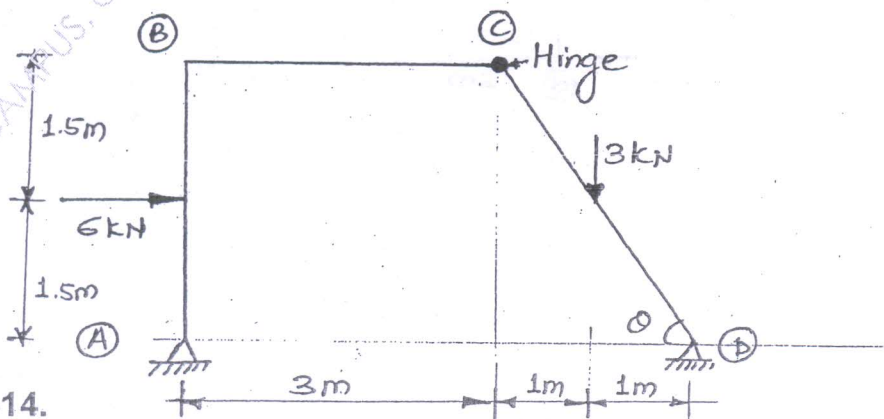
(b) Find out the vertical and horizontal deflection of point A of the lamp post 07 shown in fig. Use strain energy concept.
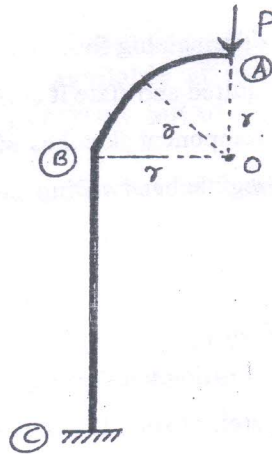

3. (a) A beam ABC is fixed at A and has roller support at end C. It is also provide 10 with an internal hinge at B. Determine the slope and deflection at hinge B, when loaded with point load W. Use conjugate beam method.
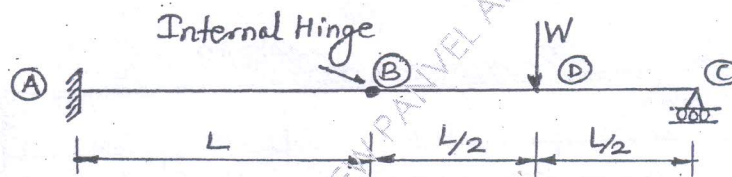
(b) Determine the horizontal and vertical deflection at joint C of a cantilever truss 10 as shown in fig. For all members have equal area of 2000 mm^2 and E = 200 Gpa.
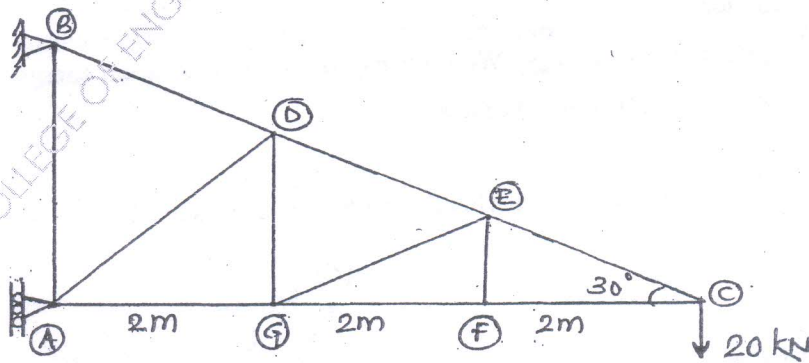
4. (a) Draw influence line diagram for member 4, 5 and 6 of truss shown in fig. **10** Assume that the load moves along the bottom chord.
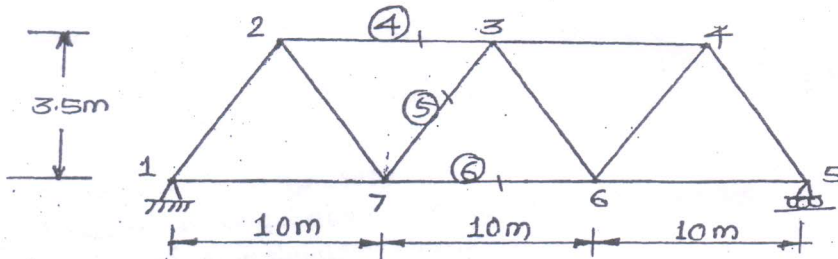
(b) A three hinged parabolic arch of 20 m span and 3 m rise is carrying a point **10** load of 100 kN at a section 7.5 m from left support. Find the values of horizontal thrust and BM at a point from right support.

5. (a) A cable of suspension bridge of span 60 m is suspended from piers which are **10** 7.5 m and 1.5 m respectively above the lower point of cable. The load carried by each cable is 20 kN/m. Find out the

    (a) Horizontal tension in the cable

    (b) Maximum tension in cable at pier.

(b) A wooden cantilever beam of rectangular cross section supported at an **10** inclined load P at its free end. Calculate maximum tensile stress and maximum deflection of the beam due to load P. Details of beam are as follows:

B= 75 mm, h = 150 mm, L= 1.5 m, P= 800 N, $\theta = 29.52°$

QP Code : NP-19707

(3 Hours) [Total Marks : 80
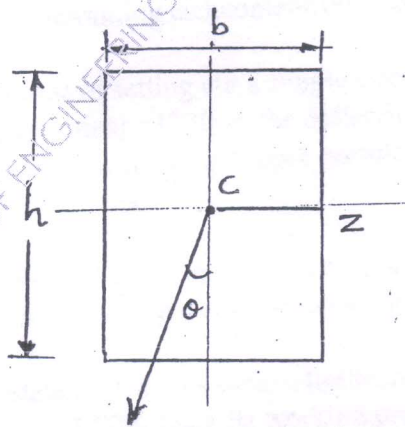
N.B. : (1) Question **No.1** is **compulsory**.
    (2) Attempt any **three** questions from the remaining questions.
    (3) Assumptions made should be clearly stated.
    (4) **Figures** to the **right** indicate **full marks.**

1. Attempt any **two** questions :—
    (a) Explain in detail the tacheometric radial contouring project?   10
    (b) Describe the procedure of setting out a bridge?   10
    (c) Write an exhaustive note on block contouring project?   10

2. (a) A tacheometer is set up at an intermediate point on a straight line PQ and the following   10
    readings were marked on a vertically held staff.

Inst St^n	Staff St^n	Vertical Angle	Staff intercept (m)	Central hair Reading (m)	Remarks
0	P	+6^{0}00′	2.055	1.875	K = 100
0	Q	−3^{0}30′	2.250	2.105	C = 0.3

    Compute :— (i) The horizontal distance PQ?
                (ii) The RLs of P and Q if the RL of instrument station '0' is 100.000
                m and the ht. of instrument is 1.410 m?

  (b) Explain the methods of determining tacheometic constants?   10

3. (a) Describe the linear methods of setting out a simple circular curve?   10
  (b) Two tangents intersect at chainage 1230 m, the deflection angle being 30^0. Calculate   10
    all the data necessary for setting out a simple circular curve of 330 m radius by
    Rankine's method? Take P.I. = 30m.

4. (a) Differentiate between the composite curve and compound curve with sketches?   10
  (b) Explain the procedure of setting out a vertical curve by chord gradient method.   10

5. (a) What is total station? State the various uses of the same?   10
  (b) Write explanatory note on EDM. State its working principle and corrections to the   10
    distances measured by EDM.

6. Write notes on :— (any **four**)   20
    (a) Principle of tacheometry
    (b) Setting out a culvert
    (c) Reverse curve
    (d) GPS
    (e) GIS.