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06CV42

Fourth Semester B.E. Degree Examination, May/June 2010
Building Construction

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, choosing atleast TWO questions from each part.***

PART – A

1 a. List the objects of foundations. **(04 Marks)**

b. With the help of neat sketch, explain the plate load test method of determining the bearing capacity of soil. **(10 Marks)**

c. Classify the different types of piles based on functions. **(06 Marks)**

2 a. With a neat sketches, discuss the features of English and Flemish Bond in brick masonry. **(10 Marks)**

b. Explain the types of stone masonry, using neat sketches. **(05 Marks)**

c. Write short notes on : i) Reinforced Brick work ii) Hollow block construction. **(05 Marks)**

3 a. What are the classifications of Arch according to shape? Explain them in brief. **(10 Marks)**

b. Define Lintel, Chejja and Balcony with sketches. **(06 Marks)**

c. What do you mean by shoring and seaffolding? **(04 Marks)**

4 a. With the help of neat sketches, of king post and steel roof truss (half portion) indicating bearing plates, purling and roof covering. Name all the parts. **(10 Marks)**

b. Explain ceramic flooring. **(05 Marks)**

c. Write a note on weather proof course for R.C.C roof slab. **(05 Marks)**

PART – B

5 a. Sketch a fully panelled door including the frame and name all parts. **(10 Marks)**

b. List different types of windows. Explain any two. **(05 Marks)**

c. List different types of stairs and explain any two. **(05 Marks)**

6 a. Explain the procedure of plastering using cement mortar. **(10 Marks)**

b. Explain constituents of paint and list the types of paint. **(10 Marks)**

7 a. Write a brief note on cost effective building materials. **(10 Marks)**

b. State the advantages and disadvantages of stabilized blocks, precast doors and precast roofs. **(10 Marks)**

8 a. Why form work is necessary? Explain shuttering details of a R.C.C beam and slab floor. **(10 Marks)**

b. Write a note on :
i) Slip forming ii) Damp proof construction. **(10 Marks)**

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06CV43

Fourth Semester B.E. Degree Examination, May/June 2010
Structural Analysis - I

Time: 3 hrs. Max. Marks:100

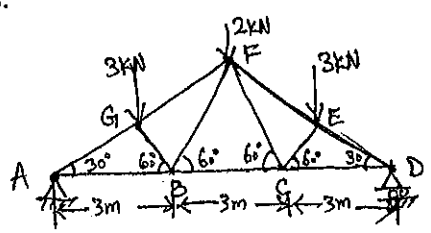
Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART - A

1 a. Distinguish between the statically determinate structures and statically indeterminate structures, with examples. **(06 Marks)**

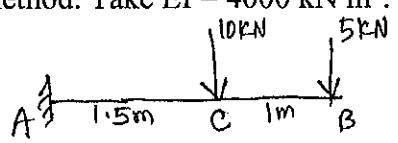
b. Analyze the truss shown in fig. Q1(b) by the method of joints. Indicate the member forces on a neat sketch of the truss. **(14 Marks)**

Fig.Q1(b)



2 a. Determine the slope and deflection at the free end of the cantilever beam shown in fig.Q2(a), by moment area method. Take EI = 4000 kN m^2. **(10 Marks)**

Fig.Q2(a)

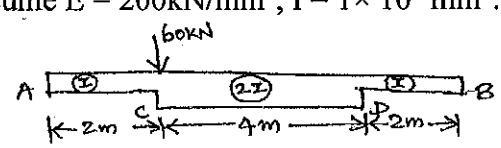


b. A beam AB and span 6m carries a point load of 45kN at a distance of 4m from the left end A. Find i) the slope at A ii) the deflection under the load iii) the section where the deflection is maximum and iv) maximum deflection.
Take E = 200kN/mm^2 and I = 8.325×10^7 mm^4. Adopt conjugate beam method. **(10 Marks)**

3 a. With usual notations, show that the strain energy stored due to bending is given by $\int \frac{M^2 ds}{2EI}$. **(06 Marks)**

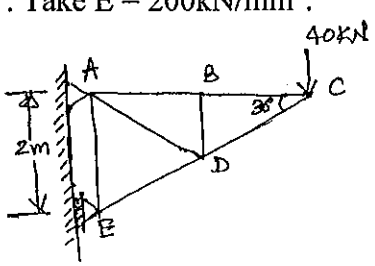
b. Find the deflection under the concentrated load, using beam energy method, for the beam shown in fig. Q3(b). Assume E = 200kN/mm^2, I = 1×10^7 mm^4. **(14 Marks)**

Fig.Q3(b)



4 Find the vertical and horizontal deflections of the joint C of the loaded truss, shown in fig.Q4. The cross – sectional areas of the members CD and DE are each 2500mm^2 and those of the other members are each 1250mm^2. Take E = 200kN/mm^2. **(20 Marks)**

Fig.Q4



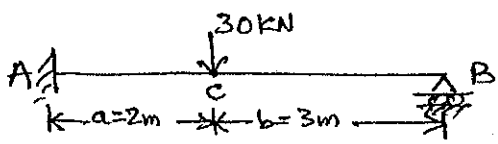
PART – B

5 a. A three hinged parabolic arch has a span of 20m and rise of 5m. It carries a uniformly distributed load of 25kN/m over the left half of the span and a point load of 120kN at 5m from the right end. Find the bending moment, normal thrust and radial shear at a section 4m from the left end. **(12 Marks)**

b. A cable of span 20m and dip 4m carries a uniformly distributed load of 20kN/m over the whole span. Find i) maximum tension in the cable ii) minimum tension in the cable iii) the length of the cable. **(08 Marks)**

6 a. Determine the reaction components in the propped cantilever shown in fig. Q6(a). EI is constant throughout. Use the method of consistent deformation. **(10 Marks)**

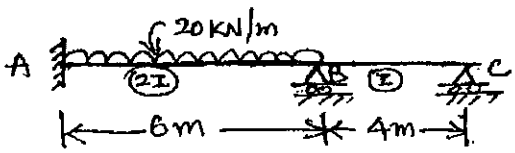
Fig.Q6(a)



b. A propped cantilever beam of span 4m is subjected to uniformly distributed load of intensity 30kN/m throughout the span. Analyze the beam by strain energy method. Also draw the BM diagram. **(10 Marks)**

7 Analyze the continuous beam shown in fig. Q7, by using three moment equation and draw the bending moment diagram. **(20 Marks)**

Fig.Q7



8 a. Show that for a two hinged parabolic arch of uniform flexural rigidity, the horizontal thrust at each support is given by $H = \frac{\int my\ ds}{\int y^2 ds}$. **(10 Marks)**

b. A two hinged parabolic arch of span 20m and rise 4m carries an uniformly distributed load of 50kN/m, on the left half of the span. Find the reactions at the supports and the position and amount of maximum bending moment. **(10 Marks)**

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06CV44

Fourth Semester B.E. Degree Examination, May/June 2010
Surveying – II

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the measurement of horizontal angles by the method of repetitions with the necessary, standard tabular format. Mention the errors eliminated. **(10 Marks)**

b. Explain the temporary adjustments of a theodolite. **(10 Marks)**

2 a. List the order in which permanent adjustments of a theodolite should be made to prevent the disturbance of earlier adjustments. **(05 Marks)**

b. Explain the 'TWO – PEG TEST' with reference to permanent adjustments of a dumpy level. **(05 Marks)**

c. Explain the adjustment of horizontal axis of a transit theodolite by the 'SPIRE TEST'. **(10 Marks)**

3 a. In order to ascertain the elevation of the top of a signal (Q) on a hill, the observations were made from two stations P and R at a horizontal distance 100.00 m apart, the stations 'P' and 'R' being in line with 'Q'. The angle of elevation of Q from 'P' and 'R' were 28°42′ and 18°06′ respectively. The staff reading on bench mark (RL = 287.280 m) were 2.870 m and 3.750 m respectively from 'P' and 'R' with telescope horizontal. Determine the elevation of foot of the signal if the height above its base is 3.0 m. **(10 Marks)**

b. From the ends of a base line AB 150 m long two points P and Q were observed with the theodolite and the following angles were recorded :

$\angle PAB = 95^\circ$, $\angle PBA = 40^\circ$, $\angle QAB = 50^\circ$, $\angle QBA = 78^\circ$, $\angle PAQ = 45^\circ$, vertical angle from A to the top of P = 23°, vertical angle from A to the top of Q = 19°. Back sight on BM (RL = 152.000m) from A = 1.600 m (with telescope horizontal). Compute RL of P and Q and horizontal distance between P and Q. Also find the gradient between P and Q. **(10 Marks)**

4 a. A fixed hair tacheometer fitted with anallactic lens was set up at a station 'D' with the following observations :

Station Sighted	Bearing	Staff Readings (m)	Vertical Angle
A	340°30′	0.800, 1.855, 2.910	+ 6°30′
B	70°30′	0.660, 2.200, 3.740	- 4°20′

Calculate the gradient from A to B. **(10 Marks)**

b. Two vertical angles to vanes fixed at 1 m and 3 m above the foot of the staff held vertically at a station 'A' were + 2°30′ and + 5°48′ respectively. Find the horizontal distance and R.L. of 'A'. R.L of horizontal axis of instrument is 438.550 m above the datum. If any equation is used derive the same. **(10 Marks)**

PART – B

5 a. Derive the expressions for the following elements of a simple curve :
   i) Length of the curve
   ii) Tangent length
   iii) Length of the long chord
   iv) Apex distance. **(10 Marks)**

   b. Two tangents intersect at a chainage of 1190 m. Deflection angle of simple curve is 36°. Compute all the data necessary for settling out a simple curve of radius 300 m by Rankine's deflection angle method. Take peg interval of 30 m. Tabulate the results showing deflection angle to be set in a 20″ theodolite. **(10 Marks)**

6 a. Two straights AB and BC are intersected by a line KM. $\angle MKA = 140^\circ$ and $\angle KMC = 145^\circ$. The radius of the first arc is 600 m and that of second arc is 400 m. Find the chainage of tangent points and point of compound curvature given that the chainage of point of intersection 'B' is 3415 m. **(10 Marks)**

   b. The first branch of a reverse curve has a radius of 200 m. Find the radius of second branch so that the curve can connect parallel straights 18 m apart. The distance between tangent points is to be 110 m. Also calculate the lengths of two branches of the curve. **(10 Marks)**

7 a. Explain how the length of the transition curve can be computed form i) Time rate ; ii) Rate of change of radial acceleration. **(10 Marks)**

   b. With neat sketches, distinguish between summit curves and valley curves. **(05 Marks)**

   c. A vertical curve has an upgrade of 2.5 % followed by a downgrade 0.5%. The recommended rate of change of grade is 0.15% per chain of 20m. Compute the length of the vertical curve. **(05 Marks)**

8 a. The latitudes and departures of the lines of a closed traverse ABCDA are given below. Compute the area of traverse by independent co-ordinate method. **(10 Marks)**

Line	Latitude	Departure
AB	- 164.50	+ 162.10
BC	+ 217.80	+ 59.80
CD	+ 168.10	- 105.60
DA	- 221.40	- 116.30

   b. A road embankment is 30 m wide at the top with side slopes of 2:1. The ground levels at 100 m intervals along a line AB are as under : A, 170.30, 169.10, 168.50, 168.10, 166.50, B. The formation level at 'A' is 178.70 m with uniform falling gradient of 1 in 50 from 'A' to 'B'. Determine the volume of earthquake by prismoidal formula. Assume the ground to be level in cross section. **(10 Marks)**

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06CV45

Fourth Semester B.E. Degree Examination, May/June 2010
Hydraulics and Hydraulic Machines

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Derive the Chezy's equation for uniform flow in an open channel. List the assumptions made in deriving the same. Hence establish a relation between Manning's n and Chezy's C. **(10 Marks)**

b. A trapezoidal channel with side slopes of 0.5 H : 1 V is to be designed as the most efficient channel to carry 30 m^3/sec discharge at a slope of 0.000556. Using Chezy's C as 60, determine the bottom width and depth of flow. **(10 Marks)**

2 a. Define the term specific energy. With a neat sketch, explain specific energy diagram. Derive the formulae for critical depth and minimum specific energy for critical flow in a rectangular channel. **(10 Marks)**

b. Water flows at a rate of 12 cumecs through a 6 m wide rectangular channel, depth of flow being 400 mm. Find out if a hydraulic jump will occur and if yes, what is the depth after the jump? Calculate the loss of energy due to the jump. **(10 Marks)**

3 a. A hydraulic pipeline 2 km long and 400 mm diameter is used to convey water with a velocity of 1.5 m/s. Determine the pressure rise if the valve provided at the outlet end is closed in (i) 12 seconds (ii) 2 seconds. Consider the pipe to be rigid and take bulk modulus of water $K_{water} = 20 \times 10^8$ N/m^2. **(10 Marks)**

b. Prove that the discharge over a spillway is given by the relation:

$$Q = VD^2 f\left[\frac{\sqrt{gD}}{V}, \frac{H}{D}\right]$$

where, V = velocity of flow ; D = depth at the throat ; H = head of water ; g = acceleration due to gravity. **(10 Marks)**

4 a. Derive the equation for the work done by a jet on a moving symmetrical curved vane and the jet striking at the centre. **(10 Marks)**

b. A square plate weighing 120 N has an edge of 350 mm. The thickness of the plate is uniform. It is hung so that it can swing freely about the upper horizontal edge. A horizontal jet of 25 mm diameter having 18 m/s velocity impinges on the plate. The centre line of jet is 200 mm below the upper edge of plate. Find what force must be applied at the lower edge of plate in order to keep it vertical. **(10 Marks)**

PART – B

5 a. What are turbines? Discuss in detail the classification of turbines. **(10 Marks)**

b. A pelton wheel has to develop 13200 KW under a net head of 820 m while running at a speed of 600 rpm. If the coefficient of jet C_V = 0.98, speed ratio ϕ = 0.46 and the jet diameter is $\frac{1}{16}$ of wheel diameter, calculate:

i) Pitch circle diameter
ii) The diameter of the jet
iii) The quantity of water supplied to the wheel
iv) The number of jets required.

Assume overall efficiency as 85%. **(10 Marks)**

6 a. With a neat sketch of velocity triangles, derive the equation for efficiency of a Francis turbine. **(10 Marks)**

b. An inward flow water turbine has blades, the inner and outer radii of which are 30 cm and 50 cm respectively. Water enters the blades at the outer periphery with a velocity of 45 m/sec making an angle of 25° with the tangent to the wheel at the inlet tip. Water leaves the blade with a flow velocity of 8 m/sec. If the blade angles at inlet and outlet are 35° and 25° respectively, determine :

i) Speed of the turbine wheel

ii) Work done per Newton of water. **(10 Marks)**

7 a. With a neat sketch, explain the general layout of a hydroelectric power plant. **(10 Marks)**

b. Explain the terms specific speed and unit quantities, as applied to hydraulic turbines. How are they useful to practical engineers? **(06 Marks)**

c. Suggest a suitable type of turbine to develop 8000 kW power under a head of 20 m while operating at 220 rpm. What are the considerations for your suggestion? **(04 Marks)**

8 a. What is a centrifugal pump? Explain its working, with a neat sketch. **(10 Marks)**

b. Determine the overall efficiency of a centrifugal pump from the following test results:
Suction gauge reading = 120 mm of mercury
Delivery gauge reading = 220 kN/m^2
Height of delivery gauge over suction gauge = 200 mm
Discharge = 7500 *l*pm of water
Diameter of suction pipe = 300 mm
Diameter of delivery pipe = 200 mm
Power of motor = 40 KW. **(10 Marks)**

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06CV46

Fourth Semester B.E. Degree Examination, May/June 2010
Building Planning and Drawing

Time: 4 hrs. Max. Marks:100

Note: 1. ***Question No.1 from PART-A is compulsory.***
2. Answer any TWO questions from PART-B.

PART – A

1 Draw the plan, elevation and sectional elevation for the line diagram of the building shown in Fig.Q1. Also write the schedule of openings.

a. Plan of the building. **(25 Marks)**
b. Elevation. **(15 Marks)**
c. Section along A – A. **(15 Marks)**
d. Schedule of openings. **(05 Marks)**

PART – B

1 a. Draw a plan and sectional elevation of a RCC doglegged staircase. Floor to floor height is 3 m. Width of the stairs is 1.2 m. Adopt riser and tread 15 cm and 30 cm respectively. **(10 Marks)**

b. Draw to a suitable scale, the section and elevation of a fully paneled double shuttered door. **(10 Marks)**

2 Prepare a bubble diagram and develop a line diagram for a primary school building, with a strength of 200 students, with the following requirements:

i) Class rooms for 40 students each.
ii) Head master's room
iii) Office room
iv) Staff room
v) Sports room
vi) Science hall
vii) Library
viii) Toilet for boys and girls (separately) **(20 Marks)**

3 Prepare a bubble diagram and develop a line diagram for a primary health centre, with the following requirements:

i) Doctor's consulting room (with attached toilet)
ii) First aid room / treatment room
iii) Nurse room
iv) Medical store
v) Laboratory
vi) Store room
vii) Toilet block for men and women (separately) **(20 Marks)**

4 Prepare the water supply and sanitary layout for a residential building, shown in Fig.Q4, with suitable notations. **(20 Marks)**

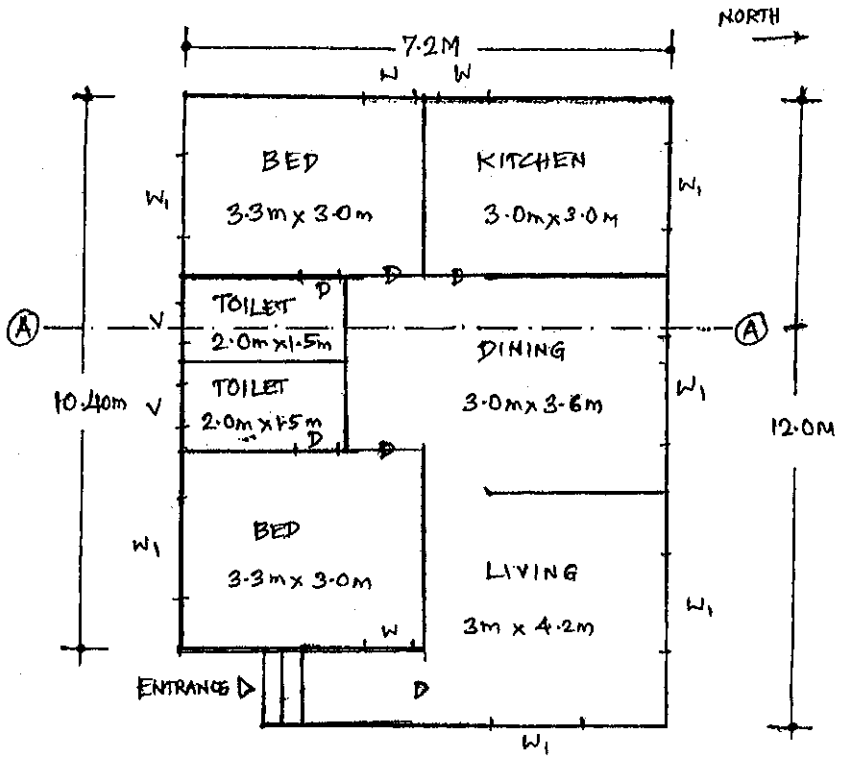
NORTH
7·2M
W W
BED
3·3m x 3·0m
KITCHEN
3·0m x 3·0m
W1
W1
D D D
TOILET
2·0m x 1·5m
V
A
A
DINING
3·0m x 3·6m
TOILET
2·0m x 1·5m
V
10·40m
W1
12·0M
BED
3·3m x 3·0m
W1
LIVING
3m x 4·2m
W1
W
ENTRANCE
D
W1

Fig.Q1

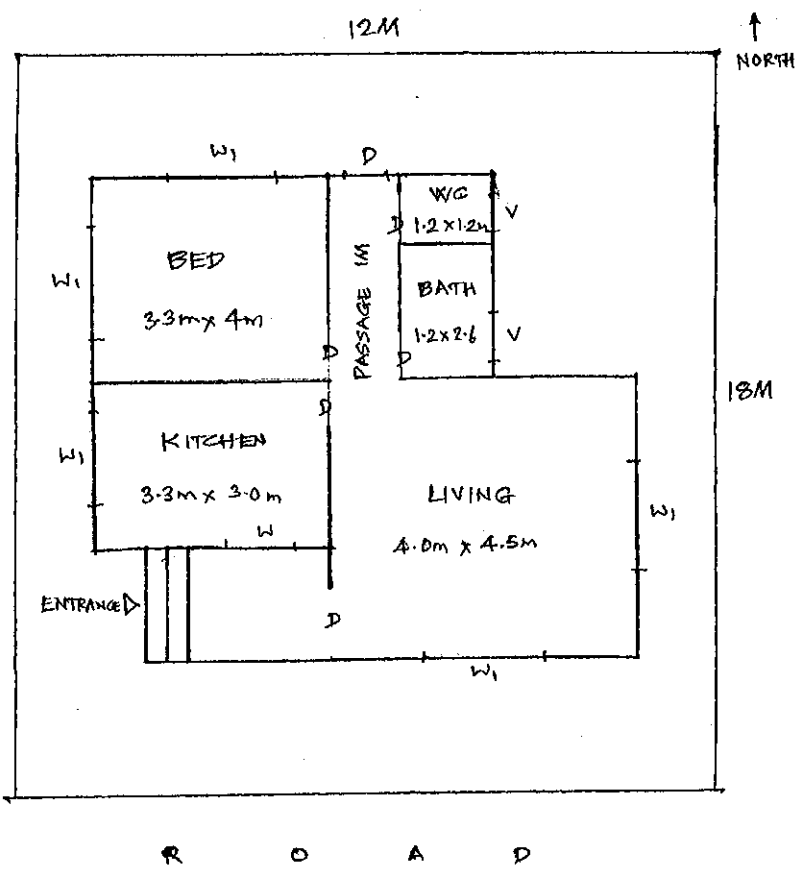
12M
NORTH
W1
D
WC
1·2 x 1·2m
V
BED
3·3m x 4m
W1
PASSAGE 1M
BATH
1·2 x 2·6
V
D
D
18M
KITCHEN
3·3m x 3·0m
W1
W
LIVING
4·0m x 4·5m
W1
ENTRANCE
D
W1
R O A D

Fig.Q4

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