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Fourth Semester B.E. Degree Examination, Dec.09-Jan.10
Building Construction

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Define foundation and discuss various functions served by foundation. (06 Marks)
b. List the different methods of site exploration and explain any two of them. (08 Marks)
c. Explain with neat figure : i) Combined footing and ii) Strap footing. (06 Marks)
- 2 a. Why brick masonry is preferred over size stone masonry? (06 Marks)
b. Draw the plan and elevation of $1\frac{1}{2}$ brick thick wall of English bond. (08 Marks)
c. Explain with neat sketch random rubble masonry. (06 Marks)
- 3 a. Explain the following with neat figure :
i) Relieving arch ii) Segmental arch. (08 Marks)
b. Write short notes on : i) Lintel ii) Chejja. (06 Marks)
c. What do you understand by shoring? List the various types and explain any one of them. (06 Marks)
- 4 a. What are the factors to be considered in selecting the flooring materials? (06 Marks)
b. Draw the neat sketch of king post wooden truss and indicate the parts. (07 Marks)
c. Define roof. What are the requirements of a good roof? (07 Marks)

PART – B

- 5 a. What are the requirements of a good stair element? (08 Marks)
b. Plan a dog legged stair for a building with 3.60m as floor height. The stair room measures 2.50m x 5.25m. (12 Marks)
- 6 a. What are the objects of plastering? List the requirements of a good plaster. (08 Marks)
b. Explain briefly :
i) Stucco plastering ii) Lath plastering. (06 Marks)
c. List the constituents of a paint and mention their specific function. (06 Marks)
- 7 a. What are the prefabrication techniques? Discuss the advantage and disadvantage of the techniques. (07 Marks)
b. List the different alternative building material and explain briefly any two of them. (07 Marks)
c. Explain pre cast doors and windows. (06 Marks)
- 8 a. What are the requirements of a good form work? (06 Marks)
b. Draw the neat sketch of formwork for an R.C.C. column and indicate the parts. (06 Marks)
c. Explain : i) Slip forming ii) Damp proof construction. (08 Marks)

Fourth Semester BE Degree Examination, Dec.09-Jan.10
Structural Analysis - I

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:
i) Static Indeterminacy ; ii) Kinematic indeterminacy ; iii) Degree of freedom. (03 Marks)
b. Analyse the truss shown in Fig.1(b) by method of joints. Indicate the member forces on a neat sketch of the truss.

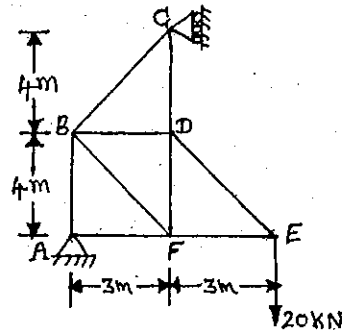


Fig.1(b)

(17 Marks)

- 2 a. Determine the slope and deflection at the free end of a cantilever beam shown in Fig.2(a) by moment area method (Take $EI = 8000 \text{ KN-m}^2$)

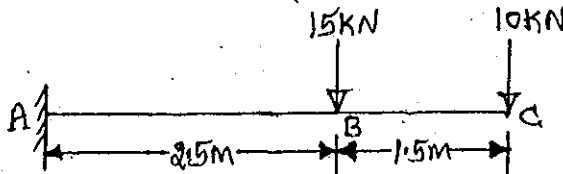


Fig.2(a)

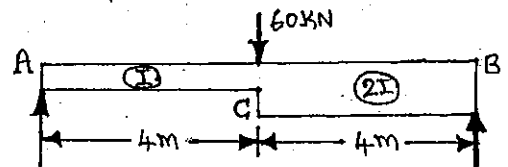


Fig.2(b)

(10 Marks)

- b. Using conjugate beam method, Find the deflection at point C and slope at A for the simply supported beam shown in Fig.2(b). (10 Marks)

- 3 a. Find the deflection under Concentrated load for the beam shown in Fig.3(a) using Castigliano's first theorem. Take $E = 2 \times 10^8 \text{ KN/m}^2$ and $I = 14 \times 10^{-6} \text{ m}^4$.

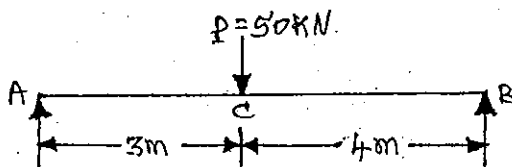


Fig.3(a)

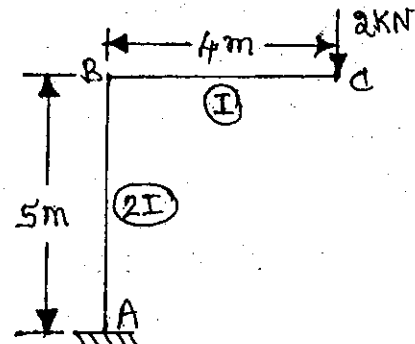


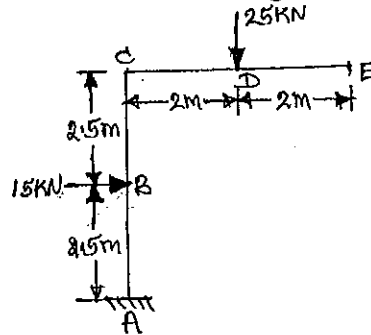
Fig.3(b)

(10 Marks)

- b. Determine the vertical deflection at C in the frame shown in Fig.3(b). Take $E = 200 \times 10^6 \text{ KN/m}^2$ and $I = 3 \times 10^7 \text{ mm}^4$. Using strain energy method. (10 Marks)

- 4 Determine the vertical and the horizontal deflection at the free end of the bent by unit load method as shown in Fig.4. Take EI is constant throughout. (20 Marks)

Fig.4

**PART - B**

- 5 a. Show that BM at any section on a three hinged parabolic arch of span ' l ' and rise ' h ' carrying an udl of w/m over the entire span, is zero. (06 Marks)
- b. A three hinged parabolic arch has a span of 20m and central rise of 4m. It is loaded with udl of intensity 2 kN/m on the left 8m length. Find
- Direction and magnitude of reactions at the hinges A and B.
 - The maximum + ve and - ve B.M. and position
 - Draw B.M.D.
- (14 Marks)
- 6 a. By consistent deformation method, analyze the cantilever beam loaded as shown in Fig.6(a). Draw SFD and BMD. (10 Marks)

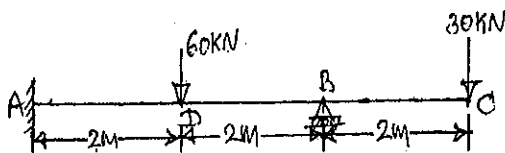


Fig.6(a)

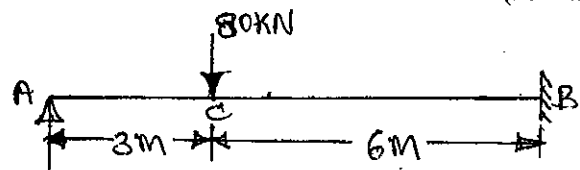
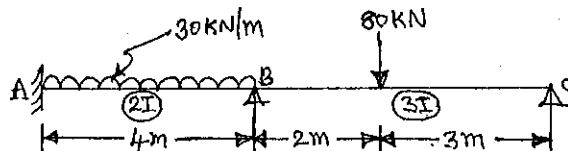


Fig.6(b)

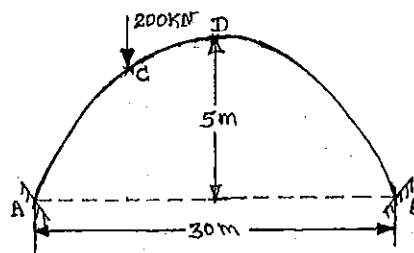
- b. Analyse the propped Cantilever beam shown in Fig.6(b) using strain energy method. Sketch the BMD. (10 Marks)
- 7 Analyse the Continuous beam shown in Fig.7 by theorem of three moments. Support B settles by 10 mm and support A settles by 5mm. Take $EI = 12 \times 10^3 \text{ KN} - \text{m}^2$. Also sketch BMD and SFD. (20 Marks)

Fig.7



- 8 Find the horizontal thrust of two hinged parabolic arch as shown Fig.8. The moment of inertia of a section is $I_c \sec\theta$. Neglect effect of rib shortening. Also calculate the max B.M. (20 Marks)

Fig.8



Fourth Semester B.E. Degree Examination, Dec.09-Jan.10
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. Enumerate the applications of a theodolite. (06 Marks)
 - b. Explain with a neat sketch, the method of prolonging a straight line using a theodolite, when the instrument is in adjustment and when not in adjustment. (06 Marks)
 - c. Describe the method of measuring the horizontal angle by repetition method and list the errors eliminated by that method. (08 Marks)
2.
 - a. Explain a method to be adopted in the field to determine the difference in elevation of the instrument station and top of a chimney when the base of the chimney is inaccessible. (08 Marks)
 - b. Mention the advantages of total station over the conventional instruments. (04 Marks)
 - c. Find the elevation of the top of the chimney from the following data:

Instrument Station	Reading on BM	Angle of Elevation	Remarks
A	0.865 m	18° 36'	RL of BM = 530.25 m
B	1.225 m	10° 20'	Distance AB = 50 m

(08 Marks)

3.
 - a. List the fundamental lines of a theodolite and their desired relationship. (08 Marks)
 - b. Write a note on "principle of reversal". (04 Marks)
 - c. In a two peg test on a dumpy level, following readings were taken :

Instrument at	Reading on		Remarks
	A	B	
O	1.555	1.250	'O' is exactly midway between A and B.
A	1.325	1.010	Distance AB = 60 m

Determine the correct staff reading on B when the line of sight is horizontal at A. Also find the collimation error. (08 Marks)

4.
 - a. Enumerate the advantages of tacheometric survey. (06 Marks)
 - b. Describe the field procedure to determine the tacheometric constants. (06 Marks)

The following data were obtained in a tacheometric survey. The staff was held vertically. Multiplying constant = 100. Height of axis at instrument station 'P' was 1.560 m and the RL of P was 130.00 m.

Instrument at	Staff at	WCB	Vertical angle	Staff reading
P	Q	12° 25'	0° 0'	1.88, 2.25, 2.62
	R	60° 45'	15° 10'	1.83, 2.15, 2.47

Determine the distance QR and the difference in elevation between Q and R. (08 Marks)

PART – B

- 5 a. Define degree of a curve. Establish the relationship between degree of a curve and its radius. (06 Marks)
- b. Explain the procedure of setting out a simple curve by offsets from chords produced method. (06 Marks)
- c. Tabulate the necessary data to set out a right handed simple circular curve of 250 m radius connecting two straights, having a point of intersection at a chainage 3450 m by Rankine's method. The deflection angle of is 50° . Take peg interval of 20 m. (08 Marks)
- 6 a. Distinguish between compound curve and reverse curve with sketches. (06 Marks)
- b. Two straights AV and BV are intersected by a line MN. The angle AMN and MNB are 150° and 160° respectively. The radius of the first arc is 650m and that of the second arc is 450m. Find the chainage of the tangent points and the point of compound curvature, given that the chainage of the point of intersection V is 4756 m. (08 Marks)
- c. A reverse curve connects two parallel tangents 30m apart. If the radii of the two branches are 120m and 150m, determine the following :
- The distance between the two tangent points.
 - The total length of the curve.
 - If the chainage of the first tangent point is 1988m, determine the chainages of the point of reverse curvature and the second tangent point. (06 Marks)
- 7 a. List the functions and requirements of a transition curve. (06 Marks)
- b. Why are vertical curves provided on highways? List the different types of vertical curves with sketches. (06 Marks)
- c. On a railway track of 1.68m width, the design speed is 90kmph. Transition curves are to be provided to join a circular curve with a radius of 500m. If the rate of change of radial acceleration is $0.3\text{m/s}^2/\text{s}$. Determine the following :
- Length of transition curve
 - Shift of the circular arc
 - Super elevation required. (08 Marks)
- 8 a. The following offsets were taken from a chain line to an irregular boundary line at an interval of 10m. Compute the area by :
- Mid ordinate rule
 - Trapezoidal rule
 - Simpson's rule
- Offsets : 0, 2.5, 3.5, 5.0, 4.60, 3.20 and 0. (10 Marks)
- b. An embankment of width 10m and side slope of $1V:1\frac{1}{2}H$ is required. The central heights at 40m interval are as follows : 0.90, 1.25, 2.15, 2.50, 1.85, 1.35 and 0.85m. Calculate the volume of earth work. (10 Marks)

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Part – B

- 5 a. Draw a neat sketch of a layout of hydroelectric plant and explain the terms including various heads and efficiency. (10 Marks)
- b. A double jet Pelton wheel develops 895 kW with an overall efficiency of 82%, under a head of 60 m. The speed ratio = 0.46, jet ratio = 12 and the nozzle coefficients = 0.97. Find the jet diameter, wheel diameter and speed in rpm. (10 Marks)
- 6 a. Determine the output power, speed, specific speed and vane angle at exit of a Francis runner using the following data: Head = 75 m, Hydraulic efficiency = 92%, Overall efficiency = 86%, Runner diameters = 1 m and 0.5 m, Width = 150 mm and guide blade angle = 18°. Assume that the runner vanes are set normal to periphery at inlet. (10 Marks)
- b. Write a neat sketch of a Kaplan turbine, explain the parts and functioning of the turbine. Write the equation involved to solve the problem. (10 Marks)
- 7 a. Draw a neat sketch of governor of a turbine and explain its functioning. (08 Marks)
- b. Derive the equation for specific speed of a turbine. (06 Marks)
- c. Suggest a suitable type of turbine to develop 7500 kW of power under a head of 25 m, while operating at 220 rpm. If the same turbine has to work under a head of 10 m, which power would it develop? (06 Marks)
- 8 a. What is priming of a centrifugal pump and how is it done? (04 Marks)
- b. Draw a neat sketch of a centrifugal pump and explain the parts. (08 Marks)
- c. A centrifugal pump lifts water against a head of 40 m. The suction and delivery pipes are each 150 mm in dia. The head loss in the suction and delivery pipes are respectively 2.2 m and 7.5 m. The impeller is 400 mm in dia and 25 mm wide at mouth. It revolves at 1200 rpm and the vane angle at exit is 30°. If the manometric efficiency is 80%. Calculate the discharge. (08 Marks)

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Fourth Semester B.E. Degree Examination, Dec.09-Jan.10
Building Planning and Drawing

Time: 4 hrs.

Max. Marks:100

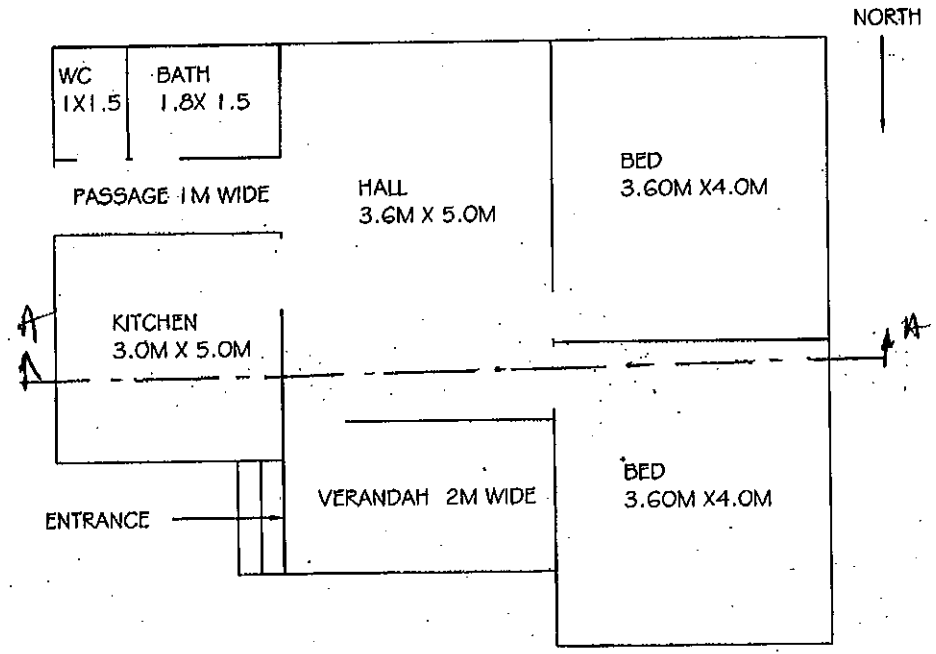
Note: Part-A is compulsory and answer any TWO full questions from Part-B.

PART - A

- 1 The line sketch of a residential building is given in Fig.Q1. Draw to a scale of 1 : 100.
- Plan at all level (25 Marks)
 - Front elevation (15 Marks)
 - Section A-A (15 Marks)
 - Schedule of openings. (05 Marks)
- Note : All walls 300mm thick, partition walls 200mm thick, roof height = 3.0m, lintel height = 2.1m. Assume suitable size for openings.

PART - B

- Draw to a scale of 1 : 10 the elevation of fully paneled door for an opening of 1m x 2.1m. (10 Marks)
 - Draw to a scale of 1 : 20 the elevation of a steel truss for a clear span of 12m. (10 Marks)
- 3 Prepare a bubble diagram for a school building and develop a single line diagram based on the bubble diagram. The following amenities shall be provided :
- Head master's room
 - Office
 - Staffrooms – 2 numbers
 - Classrooms – 10 numbers
 - Sanitary block for boys and girls separately
 - Sports room
 - Library (20 Marks)
- 4 Prepare a bubble diagram and a line diagram for a college canteen with following requirements.
- Dining area for staff, girls and boys separately.
 - Kitchen
 - Store
 - Hand wash
 - Students' strength of college is 1000. (20 Marks)
- 5 The line diagram of a residential building is shown in Fig.Q5. Prepare water supply and sanitary layout plans with usual notations. (select suitable scale) (20 Marks)



GROUND FLOOR PLAN
Fig.Q1

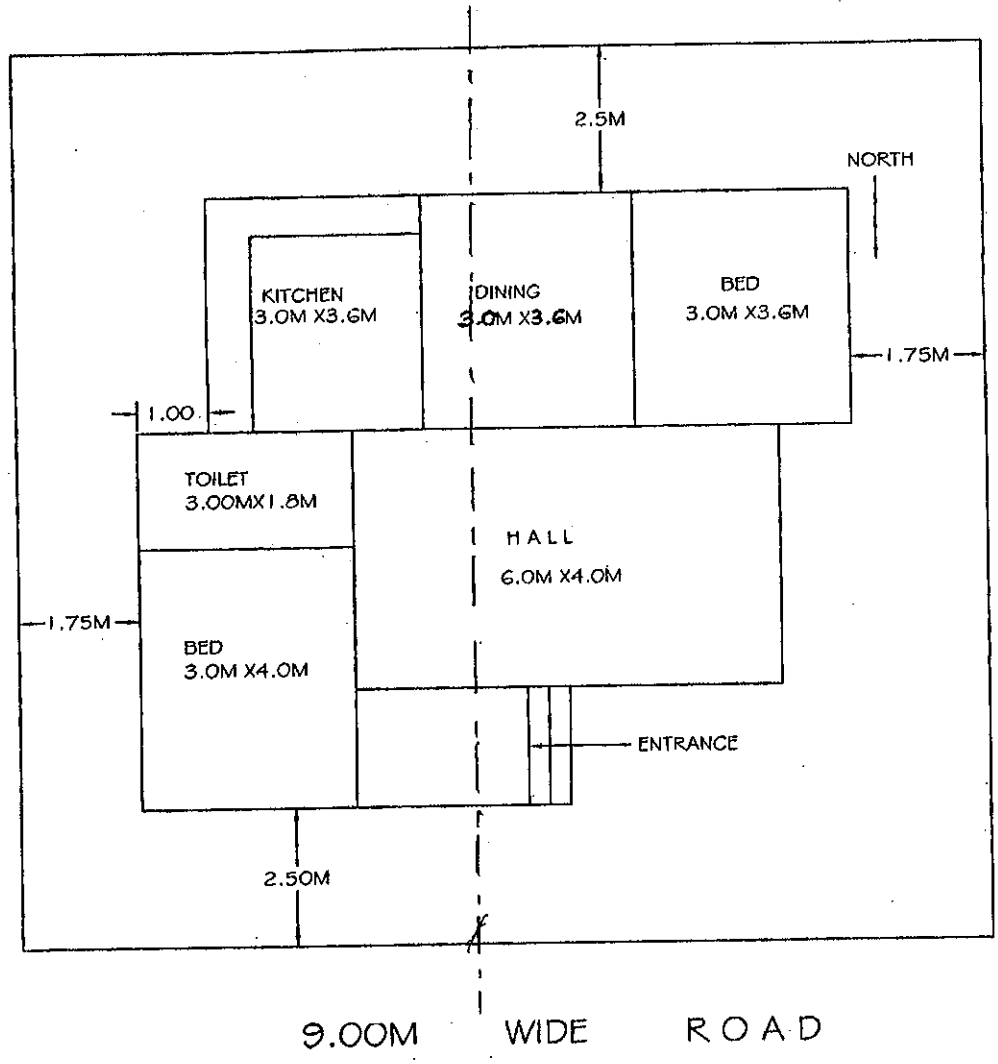


Fig.Q5
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