

THIAGARAJAR POLYTECHNIC COLLEGE, SALEM
(Autonomous)

Reg. No.

October/November 2019 Examinations
DIPLOMA IN CIVIL ENGINEERING
Engineering Mechanics

Year/Sem: II / III (ODD-II)

Max. Marks : 75

Time : 3 hr.

PART-A**(5 x 2 = 10 Marks)**

Note: (i) Answer any FIVE questions out of which question No.8 is compulsory.
(ii) All questions carry equal marks.

- 1 Define the term toughness and give examples.
- 2 What is meant by factor of safety?
- 3 What is shear force?
- 4 Differentiate centroid and centre of gravity.
- 5 Define polar moment of inertia.
- 6 Define simple bending.
- 7 What do you mean by determinate frame?
- 8 Define flexural rigidity.

PART-B**(5 x 3 = 15 Marks)**

Note: (i) Answer any FIVE questions out of which question No. 16 is compulsory.
(ii) All questions carry equal marks.

- 9 Explain the stress strain curve of a ductile material.
- 10 Write short notes on composite sections.
- 11 Explain the different types of supports with sketches.
- 12 Explain parallel axis theorem.
- 13 Write down the assumptions in theory of simple bending.
- 14 Compare hollow and solid shafts.
- 15 Differentiate perfect frame and imperfect frame with example.
- 16 Write short notes on point of contra flexure with sketch.

PART-C**(5 x 10 = 50 Marks)**

Note: (i) Answer all the questions choosing either sub-division (A) or sub-division (B) of each question.

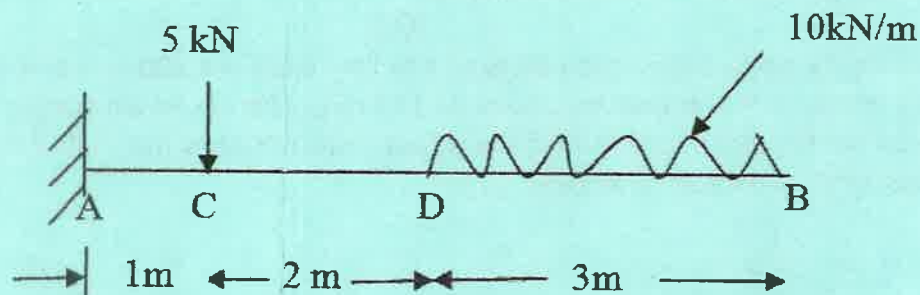
(ii) All questions carry equal marks.

- 17 A A circular rod of diameter 10 mm and length 200 mm elongates 0.5 mm under an axial load of 50 KN. If the change in diameter is 0.01 mm, calculate the values of Young's modulus, modulus of rigidity, Poisson's ratio and Bulk modulus. 10

(OR)

- B A bar of 400 mm long, 40 mm square in section for the first 190 mm length, 25 mm diameter for the next 120 mm length and 35 mm x 30 mm rectangular in section for the remaining length is subjected to an axial tension of 120 KN. Find the maximum and minimum stresses induced in the bar. Also calculate the total elongation. Take $E = 2.10 \times 10^5 \text{ N/mm}^2$. 10

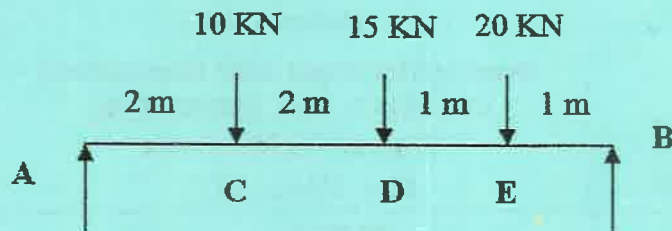
- 18 A Draw SFD and BMD for the cantilever beam shown in figure. 10



(OR)

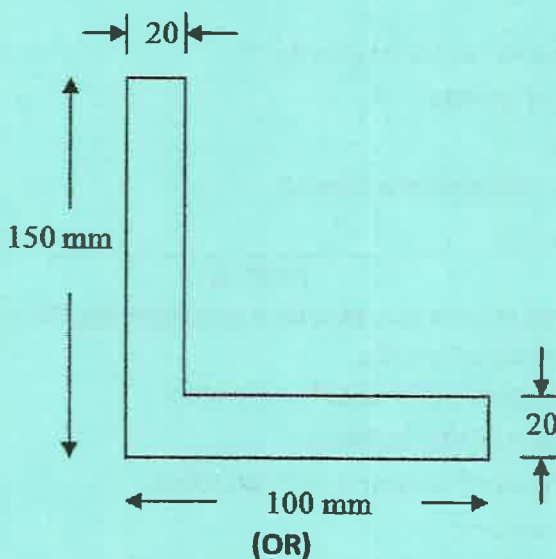
B Draw SFD and BMD for the simply supported beam shown in fig.

10



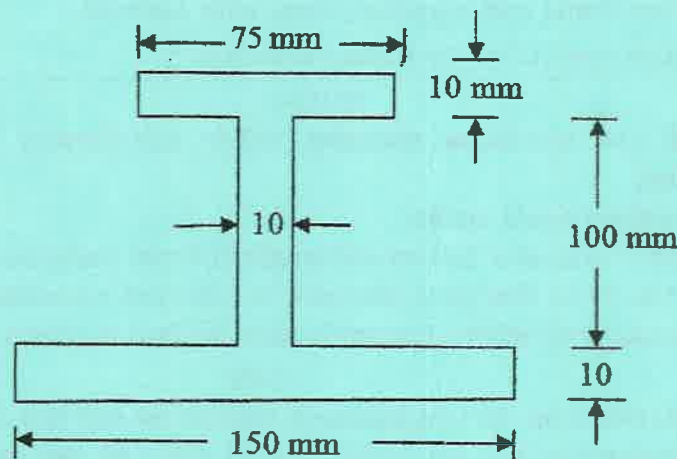
19 A Determine the moment of inertia of an angle section shown in figure about X-X and Y-Y axes.

10



B A steel beam of an I section is shown in fig. Determine the moment of inertia about X-X and Y-Y axes.

10



20 A A simply supported beam of 5m span carries a point load of 60 kN at its centre. Its cross section is a rectangle of section 300 mm x 400 mm. Determine
 i) Maximum bending stress
 ii) Bending stress at 40 mm above the N.A

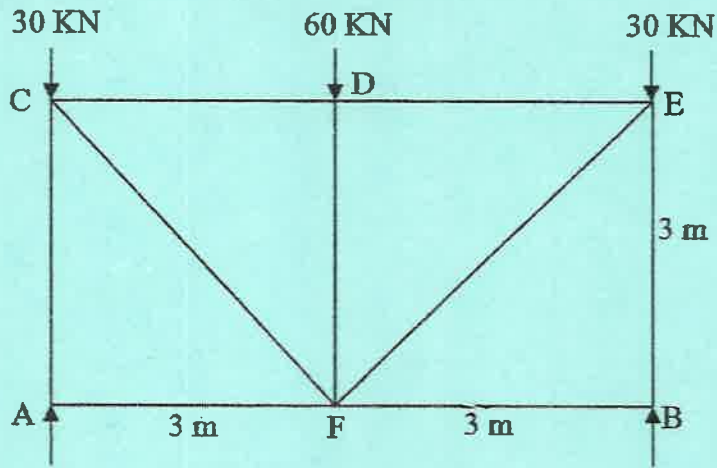
10

(OR)

B The internal and external diameters of a hollow shaft are 200 mm and 250 mm respectively. It is transmitting power at 120 rpm. The maximum torque is 20 % more than the mean torque. Find the power transmitted by the shaft if the shear stress is not to exceed 70 N/mm^2 .

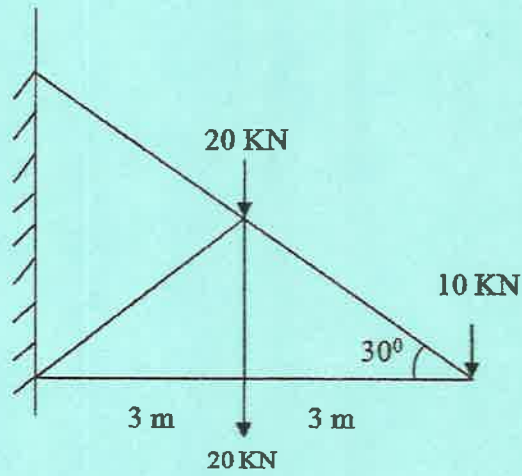
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- 21 A Determine the magnitude and nature of forces in the members of truss shown in fig. 10
by the method of joints.



(OR)

- B Determine the magnitude and nature of forces in the members of the truss given below by graphically. 10



19 A Explain in detail the various steps in temporary adjustment of a dumpy level. 10
(OR)

B The following consecutive readings were taken with a leveling instrument at intervals of 20m: 10
2.375, 1.730, 0.615, 3.450, 2.835, 2.070, 1.835, 0.985, 0.435, 1.630, 2.255, and 3.630.
The instrument was shifted after fourth and eighth readings. The R.L. of last point was 107.780. Calculate reduced levels of all the points by rise and fall method.

20 A What is mean by reciprocal leveling? Explain the method with a neat sketch. 10
(OR)

B A level is set up at a station O. The reading on the staff when held at A, 360m away from A is 2.150 and 3.895 when held at B, 550 m away. Find the true difference of level between A and B. 10

21 A i) Explain the characteristics of contour with sketch 5
ii) At the site of a reservoir area enclosed between the dam and contour are as follows: 5

Contour level(m)	Enclosed area(m ²)
95	552
97	6,350
99	52,600
101	78,000
103	3,68,000

Calculate the capacity of reservoir by trapezoidal formula.
(OR)

B i) Write short notes on differential GPS. 5
ii) What are the applications of GPS? 5

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DIPLOMA IN CIVIL ENGINEERING

Civil Engineering Drawing-I

Year/Sem: II / III (ODD-II)

Max. Marks : 75

Time : 3 hr.

Note:

1. Answer all questions under Part A in the answer sheet supplied.
2. Answer question under Part B in the drawing sheet supplied.
3. The sketches under Part A should be drawn using pencil and drawing instruments, not necessarily to scale.
4. Any data, not given may be assumed suitably and should be indicated in the drawing.

Part-A (15 Marks)**I Answer the following:**

- i) Write the Abbreviations of the following. 3
 - a) Bench Mark
 - b) Damp Proof Course
 - c) Full Tank Level
 - ii) Write the minimum floor area of the following rooms 3
 - a) Bath room alone
 - b) Bath room cum Toilet
- II** Draw Partly Glazed and Partly Panelled Window of size 1200 mm x 2100 mm and indicate its important parts. 9

Part-B (60 Marks)

- III** The sketch shows the line plan of "A Residential building with R.C.C. flat roof". The dimensions noted there indicate the clear dimensions between the inside walls. The specifications are given below:

1. Foundation : The Foundation for all main walls will be in Plain Cement Concrete 1:5:10, 1000 mm wide and 150 mm thick laid at 1050 mm ground level. The masonry footings will be in R.R.M. in C.M. 1:8. The first footing being 800 mm x 400 mm size. The second footing being 600 mm x 450 mm.

2. Basement : The basement will be in R.R.M. in C.M. 1:8, 400 mm wide and 450 mm thick above ground level for all walls and is filled with clean earth to a depth of 350 mm depth.

3. Superstructure : All walls will be in Brick Work in C.M. 1:5, 200 mm thick and 3050 mm height above floor level. All the walls including basement will be plastered smoothly. The Parapet will be also in Brick Work, 200 mm thick and 450 mm height above roof level.

4. Roofing : The roofing will be of R.C.C. 1:2:4, 120 mm thick flat slab over the rooms. A weathering course in brick jelly lime concrete 1:5:9 mix 75 mm thick over the roof slab.

5. Doors, Windows and Ventilators:

D1	-	Panelled Door	1100 x 2100 mm
D2	-	Panelled Door	900 x 2100 mm
D3	-	Panelled Door	750 x 2100mm
W1	-	Glazed Window	1350 x 1200 mm
W2	-	Glazed Window	1250 x 1200 mm
W3	-	Glazed Window	1200 x 1000 mm
V	-	Glazed Ventilator	750 x 450 mm

6. Lintel and Sunshade : All internal openings will be provided with R.C.C. 1:2:4 Lintels, 150 mm thick. All external openings will be provided with R.C.C. 1:2:4 Lintel cum sunshades. Width of sunshade is 600 mm from the face of the wall and average thickness of sunshade is 90 mm.

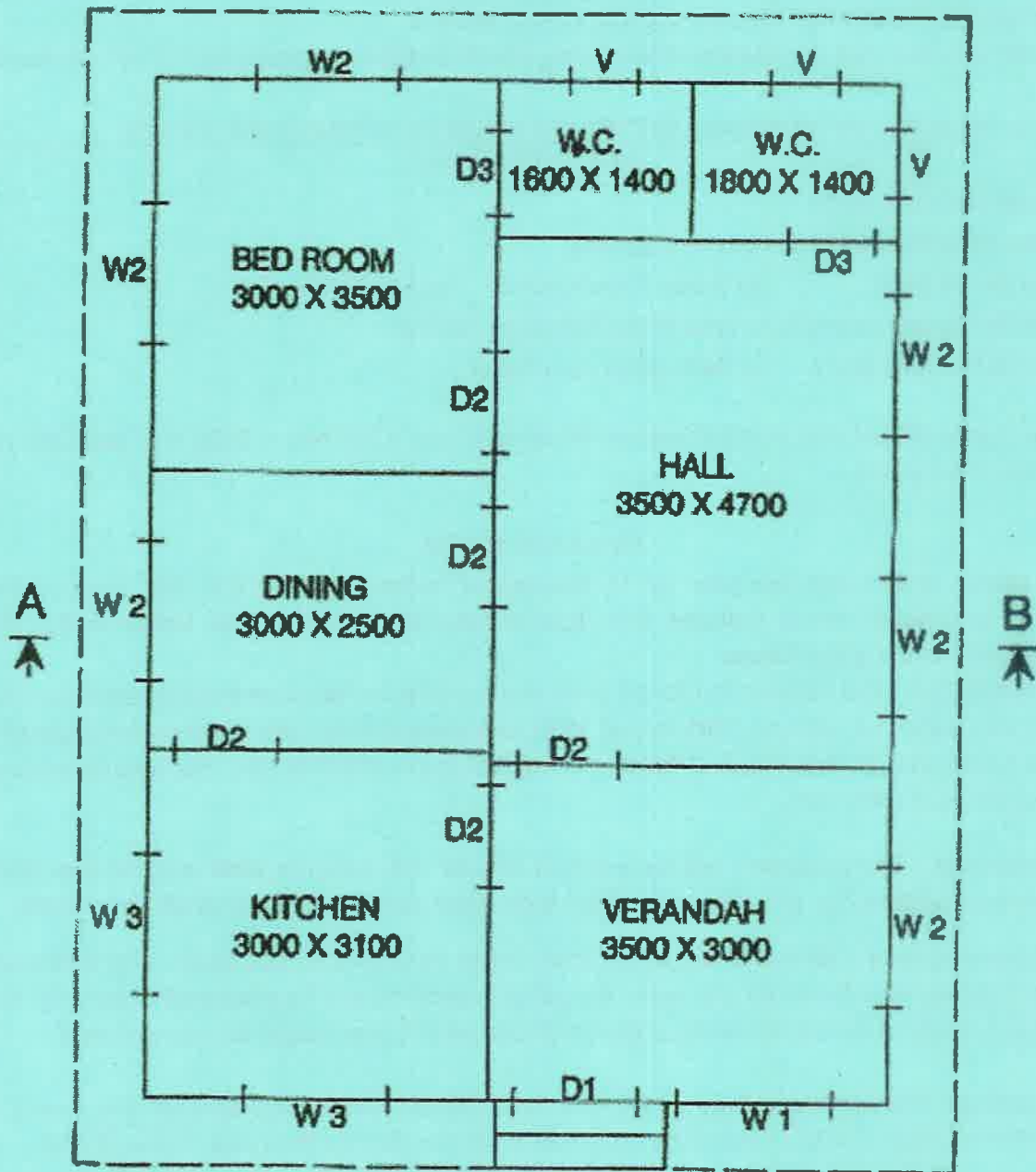
7. Flooring : The flooring will be in Plain Cement Concrete 1:4:8, 150 mm thick and plastered smoothly with C.M. 1:3, 20 mm thick.

8. Steps : Steps will be in Brick Work in C.M. 1:5, laid on 1400 x 750 mm size P.C.C. 1:4:8 bed. Thickness of concrete is 150 mm, Rise = 150 mm, Tread = 300 mm.

Note : All Dimensions indicated are in Millimeters.

Draw to a suitable scale the following views with complete dimensions and details.

- 1. Plan at Sill level 20
- 2. Sectional elevation on 'AB' 25
- 3. Front Elevation 15



LINE PLAN
(SCALE : NOT TO SCALE)

REFERENCE

- | | |
|---------------------------------|--------------------------------|
| D1- PANELLED DOOR- 1100 X 2100 | W1- GLAZED WINDOW- 1360 X 1200 |
| D2- PANELLED DOOR- 900 X 2100 | W2- GLAZED WINDOW- 1250 X 1200 |
| D3- PANELLED DOOR- 750 X 2100 | W3- GLAZED WINDOW- 1200 X 1000 |
| V- GLAZED VENTILATOR- 750 X 450 | |

ALL DIMENSIONS ARE IN mm