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06CV42

Fourth Semester B.E. Degree Examination, June-July 2009
Building Construction

Time: 3 hrs. Max. Marks:100

Note:1. ***Answer any FIVE full questions, by selecting at least two questions from each part.***
2. Assume missing data suitably.

Part–A

1 a. What are the requirements of a good foundation? **(04 Marks)**

b. Discuss the various methods of improving the bearing capacity of soils. **(06 Marks)**

c. Design a rectangular combined footing for columns A and B spaced at 3200 mm c/c for the following data:
Column A : 230×450mm , carries an axial load 1200 kN.
Column B : 230×600mm , carries an axial load 1800 kN.
Restrict the width of footing to 3200 mm. SBC of soil is 180 kN/m^2. **(10 Marks)**

2 a. What is bonding in brickwork? What are the considerations to be ensured for good bonding? **(06 Marks)**

b. Distinguish between English Bond and Flemish bond. **(04 Marks)**

c. What are the various types of joints used in stone masonry? Briefly describe any four of them with sketches. **(10 Marks)**

3 a. Define 'Scaffolding' and mention its component parts. **(05 Marks)**

b. Define 'underpinning' and mention some of the situations which demand underpinning. **(05 Marks)**

c. Define an arch. Mention the various components used with neat sketches. **(10 Marks)**

4 a. Compare the advantages and disadvantages of flat roofs over pitched roofs. **(10 Marks)**

b. Draw a neat sketch of Queen post (wooden) roof truss for a span of 12 meters. Label its parts. **(10 Marks)**

Part–B

5 a. Design a dog legged stair case for a room of size 2.5m×5.5m for a floor height of 3.0 m. Draw a neat sketch of plan and sectional elevation of a stair. **(10 Marks)**

b. Write briefly on any two of the following with neat sketches: i) Panelled door ii) Collapsible gate iii) Bay window iv) Corner window v) Ventilator. **(10 Marks)**

6 a. What are the requirements of a good plaster? **(04 Marks)**

b. Describe the procedure for carrying out the plastering with lime or cement mortar in two coats. **(10 Marks)**

c. Explain the procedure of painting for iron and steel surfaces. **(06 Marks)**

7 Write short notes on:

a. Hollow concrete blocks.

b. Stabilized mud blocks.

c. Micro concrete tiles.

d. Precast roofing elements. **(20 Marks)**

8 a. What is formwork? What are the chief requirements of a good formwork? Briefly discuss them. **(10 Marks)**

b. What is damp proof course? Explain its necessity in a building. **(05 Marks)**

c. What are the requirements of ideal material for damp proofing? **(05 Marks)**

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06CV43

Fourth Semester B.E. Degree Examination, June-July 2009
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. Distinguish between static and Kinematic indeterminate structures with examples. **(04 Marks)**

b. Write the assumptions made in the analysis of a Pin jointed plane truss. **(04 Marks)**

c. Find the forces in all members of the Pin jointed truss shown in Fig.Q.1(c) by using method of joints. **(12 Marks)**

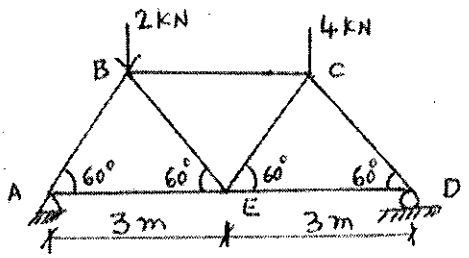

Fig.Q.1(c).

2 a. State and explain moment area theorems. **(04 Marks)**

b. Find the deflection at free end of cantilever beam shown in Fig.Q.2(b) using moment area method. EI constant. **(06 Marks)**

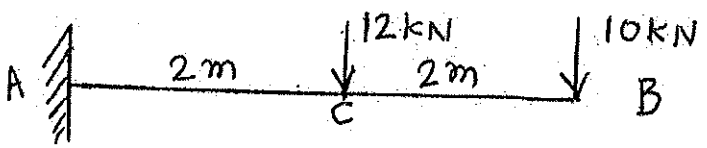

Fig.Q.2(b).

c. Find the deflection under the concentrated load for beam shown in Fig.Q.2(c), using conjugate beam method. Take $E = 200 \times 10^6$ kN/m^2 and $I = 14 \times 10^{-6}$ m^4. **(10 Marks)**

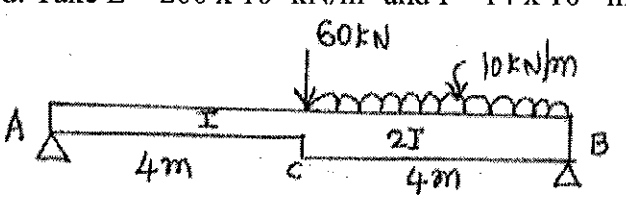

Fig.Q.2(c).

3 a. State i) Castigliano's first theorem; ii) Betti's law. **(06 Marks)**

b. For the bent beam shown in Fig.Q.3(b). Find horizontal and vertical deflections at free end by strain energy method. **(14 Marks)**

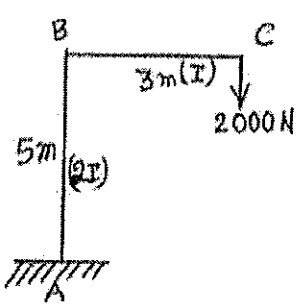

Fig.Q.3(b).

4 Find the vertical deflection at 'F' for the Pin jointed truss shown in Fig.Q.4, using unit load method. Assume cross sectional area of each member as 1000 mm^2 and E = 200 GPa. **(20 Marks)**

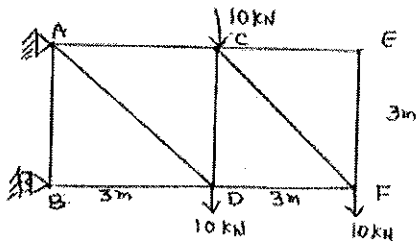

Fig.Q.4

PART – B

5 a. A parabolic arch hinged at springings and crown has a span of 20m and central rise of arch is 4m. It is loaded with a uniformly distributed load of intensity 20 kN/m on the left half of the span. Calculate reactions at supports and Bending moment, normal thrust and radial shear at 4m from left end. **(10 Marks)**

b. A suspension cable 160m and 16m central dip carries a load of 1kN/m. Calculate maximum tension in the cable. Also find the horizontal and vertical forces in each Pier if the anchor cable is inclined at 30° to the horizontal under the following alternative conditions.

i) If the cable passes over frictionless rollers on the top of Pier.

ii) If the cable firmly clamped to saddles carried on frictionless roller on the top of the Pier. **(10 Marks)**

6 a. Analyze the Propped cantilever beam shown in Fig.Q.6(a) by consistant deformation method. Also sketch BMD and SFD. **(10 Marks)**

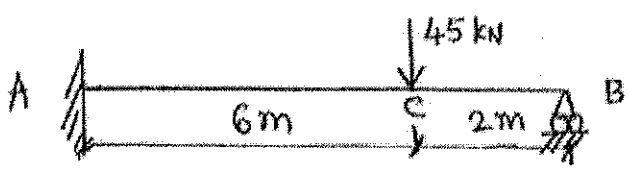

Fig.Q.6(a).

b. Analyze the beam shown in Fig.Q.6(b) by strain energy method. Also draw BMD. **(10 Marks)**

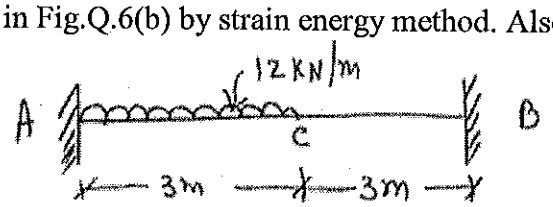

Fig.Q.6(b).

7 Analyze the continuous beam shown in Fig.Q.7 and draw Bending moment diagram, shear force diagram and elastic curve. **(20 Marks)**

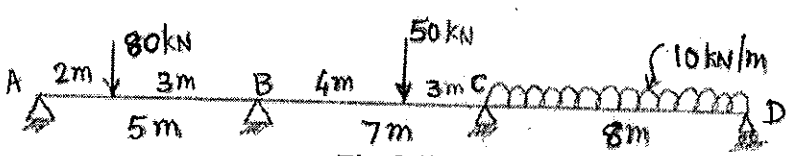

Fig.Q.7.

8 A symmetrical two-hinged parabolic arch has a span of 24m and a rise of 5m. If carries an udl of 20kN/m for 10m from left hand support. The MI varies as the secant of the slope of the arch axis. Determine the horizontal thrust for the arch and draw the BMD showing the salient points. **(20 Marks)**

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06CV44

Fourth Semester B.E. Degree Examination, June-July 2009
Surveying – II

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions selecting at least TWO questions form each part.*

2. Missing data, if any, may be suitably assumed.

PART – A

1 a. Differentiate between the following terms
   i) Face left and face right observations
   ii) Pinging and swinging the telescope
   iii) Clamp screw and tangent screw. **(06 Marks)**

b. Explain the measurement of a horizontal angle by repetition method. Mention the errors eliminated by this method. **(10 Marks)**

c. Explain the method of prolonging a straight line when the instrument is in poor adjustment. **(04 Marks)**

2 a. What are the permanent adjustments of a theodolite? Explain the spire test. **(10 Marks)**

b. The following observations were taken during the testing of dumpy level.

Instrument at	Staff readings at A	Staff readings at B
A	1.275	2.005
	1.040	1.660

Is the instrument in adjustment? To what reading should the line of sight be adjusted, when the instrument is at B? **(10 Marks)**

3 a. Derive the expressions for the horizontal distance, vertical distance and the elevation of an elevated object by double plane method, when the base is inaccessible. **(08 Marks)**

b. What are the applications of Total station? **(02 Marks)**

c. The following observations were made on a hill top to ascertain its elevation. The height of the target F was 5m. The instrument stations were 100m apart and were in line with F. **(10 Marks)**

Instrument station	Staff readings on B.M	Vertical angle	R.L of B.M (m)
A	2.550m	18°6′	345.580
B	1.670m	28°42′	

4 a. What is tacheometry? What are different systems of tacheometric measurements? **(04 Marks)**

b. A subtense theodolite was used to determine the horizontal distance of a point from the instrument station. The micrometer readings of the drum of the diaphragm were respectively 3.425 and 3.930, when the staft intercept was 3m. The micrometer screw has 100 threads for 10mm. The focal length of the object glass was 225mm. The distance of the instrument axis from the centre of the object glass was measured as 200mm. **(06 Marks)**

c. Determine the gradient from a point P to another pint Q from the following observations made with a tacheometer fitted with an anallaetic lens. The constant of the instrument was 100 and the staft was held vertical. **(10 Marks)**

Instrument station	Staft station	Bearing	Vertical angle	Staft readings
R	P	150°	+10°32′	1.255, 1.810 2.365
	Q	240°	+5°06′	1.300, 2.120 2.940

PART – B

5 a. Differentiate between the following
   i) Mid – ordinate and apex distance
   ii) Point of curve and point of tangency. **(04 Marks)**

b. Determine the ordinates of the points on a circular curve having a long chord of 100m and a versed sine of 5m. The ordinates are to be measured from the long chord at an interval of 10m. **(06Marks)**

c. Two straight lines having a deflection angle of 25°12′ are to be connected by a circular curve of radius 500m. If the chainage of the intersection point is 1000.0m Calculate the data for setting out curve by Rankine's deflection angle method. Take the normal chord as 20m. **(10 Marks)**

6 a. The following data refer to a right hand compound curve
   i) Total deflection angle = 80°
   ii) Radius of the first arc = 200m
   iii) Radius of the second arc = 250m
   iv) Chainage of the point of intersection = 1504.80m
   v) Deflection angle of the first arc = 50°
   Determine the chainages of the starting, the point of compound curve and the point of tangency. **(10 Marks)**

b. A reverse curve ACB is to be set out between two parallel straights 30m apart. The distance between two tangent points A and B is 120m. Find
   i) The radius R if $R_1 = R_2 = R$
   ii) The radius R_2 if $R_1 = 100$m.
   Also calculate the lengths of both the arcs of reverse curve. **(10 Marks)**

7 a. What is a transition curve? Explain the requirements of a transition curve. **(06 Marks)**

b. A road bend which deflects 85° is to be designed for maximum speed of 80km per hour with a curve consisting of a circular arc combined with two cubic parabola. If the maximum centrifugal ratio is 1/4 and the maximum rate of change of radial acceleration is 0.3m/s^3. Calculate i) The radius of circular curve and ii) The length of the transition curve. **(08 Marks)**

c. With neat sketches explain the types of vertical curves. **(06 Marks)**

8 a. What is zero circle of a planimeter? Explain any one method of finding its area. **(06 Marks)**

b. Determine the lengths of the tracing arm and the anchor arm from the following data. M = 100cm^2, Area of zero circle = 2200cm^2, diameter of the roller = 2cm. The roller was placed beyond the hinge at a distance of 3cm. **(06 Marks)**

c. The areas enclosed by various contours are given below

Contour (m)	100	105	110	115	120	125
Area (ha)	3	8	10	15	20	25

Determine the capacity of the reservoir, if the full reservoir level is 125.0m by both the prismoidal and trapezoidal rule. Ignore the volume below R.L 100.0m. **(08 Marks)**

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06CV45

Fourth Semester B.E. Degree Examination, June-July 2009
Hydraulic and Hydraulic Machines

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions selecting at least TWO from each part.*
2. Missing data if any may be suitably assumed.

PART – A

1 a. Distinguish between open channel flow and pipe flow. **(04 Marks)**

b. Show that the length of one sloping side of a most economical trapezoidal channel is equal to half the top width. Also determine the hydraulic mean depth for this condition. **(08 Marks)**

c. A rectangular channel 6m wide and 1m deep has a slope of 1 in 900 and is lined with smooth concrete layer having Manning's roughness N = 0.012. It is required to increase the discharge to a maximum by changing the dimension of the channel but taking the amount of lining as same. Compute the new dimensions of rectangular channel and the percentage increase in discharge. **(08 Marks)**

2 a. Define specific energy. Derive the condition for minimum specific energy for a given discharge. **(06 Marks)**

b. Derive the expression for sequent depths of hydraulic jump occurring in a rectangular channel. **(06 Marks)**

c. It is observed in the formation of hydraulic jump in a 1.5m wide rectangular channel that the depth of flow before and after the jump are 0.15m and 1.2m respectively. Find the discharge, critical depth and loss of head in the jump. **(08 Marks)**

3 a. Explain the phenomenon of water hammer in pipes. **(04 Marks)**

b. Derive an expression for rise of pressure due to sudden closure of elastic pipe. **(08 Marks)**

c. A water main of concrete pipe 3.2km long and 300mm is diameter discharges into a reservoir at the rate of $0.1041 m^3/s$. If the line is gradually closed by a valve at reservoir end in 16 secs, show that there is a risk of pipe burst. Assume that pressure of concrete pipe is 25m. **(08 Marks)**

4 a. What is Rayleigh's method of dimensional analysis? Explain with an example. **(05 Marks)**

b. Explain briefly the following
i) Geometric similarity ii) Kinematic similarity iii) Dynamic similarity **(06 Marks)**

c. Using Buckingham's π theorem show that the velocity through a circular orifice is given by $V = \sqrt{2gH}\ \phi\left[\frac{D}{H}, \frac{\mu}{\rho v h}\right]$ where H is the head causing the flow, D is the diameter of orifice, μ is the coefficient of viscosity, ρ is the mass density and g is the acceleration due to gravity. **(09 Marks)**

PART – B

5 a. Show that the maximum efficiency for the jet striking a single curved vane symmetrical about the axis of jet moving in the direction of jet is 16/27. **(10 Marks)**

b. A pelton wheel has to be designed for the following data:
Power to be developed = 6000KW,
Net head available = 300m, speed = 550 rpm.
Ratio of jet diameter the wheel diameter = 1/10
Overall efficiency = 85%
Find the number of jets, diameter and jet, diameter of wheel and quantity of water required.
Assume C_v = .98 speed ratio = 0.46. **(10 Marks)**

6 a. A Francis turbine has to be designed to give an overall out put of 375 KW under a head of 80m. The rotational speed is 700 rpm. Determine the main dimensions of the runner, runner vane angles, assuming hydraulic losses as 10%, flow ratio 0.15, ratio of inner to outer diameter = 0.5, ratio of width to diameter at outlet = 0.1, overall efficiency as 0.82, Area blocked by thickness of runner vanes is 0.5%. **(10 Marks)**

b. A Kaplan turbine working under a head of 20m develops 12000 KW. The outer diameter of the runner is 3.5m and inner diameter of the hub is 1.75m. The guide blade angle at the extreme edge of the runner is 35°. The hydraulic and overall efficiencies are 88% and 84% respectively. If the velocity of whirl is zero at the outlet, determine the runner vane angle at outlet and inlet and also speed of the turbine. Draw the velocity triangles. **(10 Marks)**

7 a. Define specific speed of a hydraulic turbine. Derive an equation for specific speed in terms of operating speed, power and head. **(08 Marks)**

b. What is a draft tube? What are its functions? Write the different types of draft tube along with sketches. **(06 Marks)**

c. Define unit speed, unit discharge and unit power. Derive the expression for these terms. **(06 Marks)**

8 a. Define
i) Manometric efficiency
ii) Mechanical efficiency
iii) Overall efficiency. **(06 Marks)**

b. What is priming of centrifugal pump and how it is done? **(08 Marks)**

c. The diameter of an impeller of a centrifugal pump at inlet and outlet are 300mm and 600mm respectively. The velocity of flow at outlet is 2m/s and the vanes are set back at an angle of 45° at the outlet. Determine the minimum starting speed of the pump if the manometric efficiency is 70%. **(06 Marks)**

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06CV46

Fourth Semester B.E. Degree Examination, June-July 2009
Building Planning and Drawing

Time: 4 hrs. Max. Marks:100

Note: ***Section I is compulsory and answer any two full questions from Section II.***

Section – I

1 It is proposed to construct a residential building as shown in figure Q1. Draw to a scale 1:100.

a. Plan at sill level. **(25 Marks)**
b. Front Elevation. **(15 Marks)**
c. Section at 'AA'. **(15 Marks)**
d. Schedule of openings. **(05 Marks)**

Note : All load bearing walls are 230 mm thick and partition walls are 115 mm thick (for the purpose of drawing) respectively. All walls are Burnt Brick Masonry (BBM) in C.M – 1:6 built on foundation using sized stone masonry in C.M. 1:8. Foundation depth is 1.20 m below Ground Level (G.L). The opening shall be suitably located with appropriately given dimensions. The given line diagram is not to scale and indicates carpet dimensions only. Take roof height is 3.0 m and lintel level at 2.10 m from floor level.

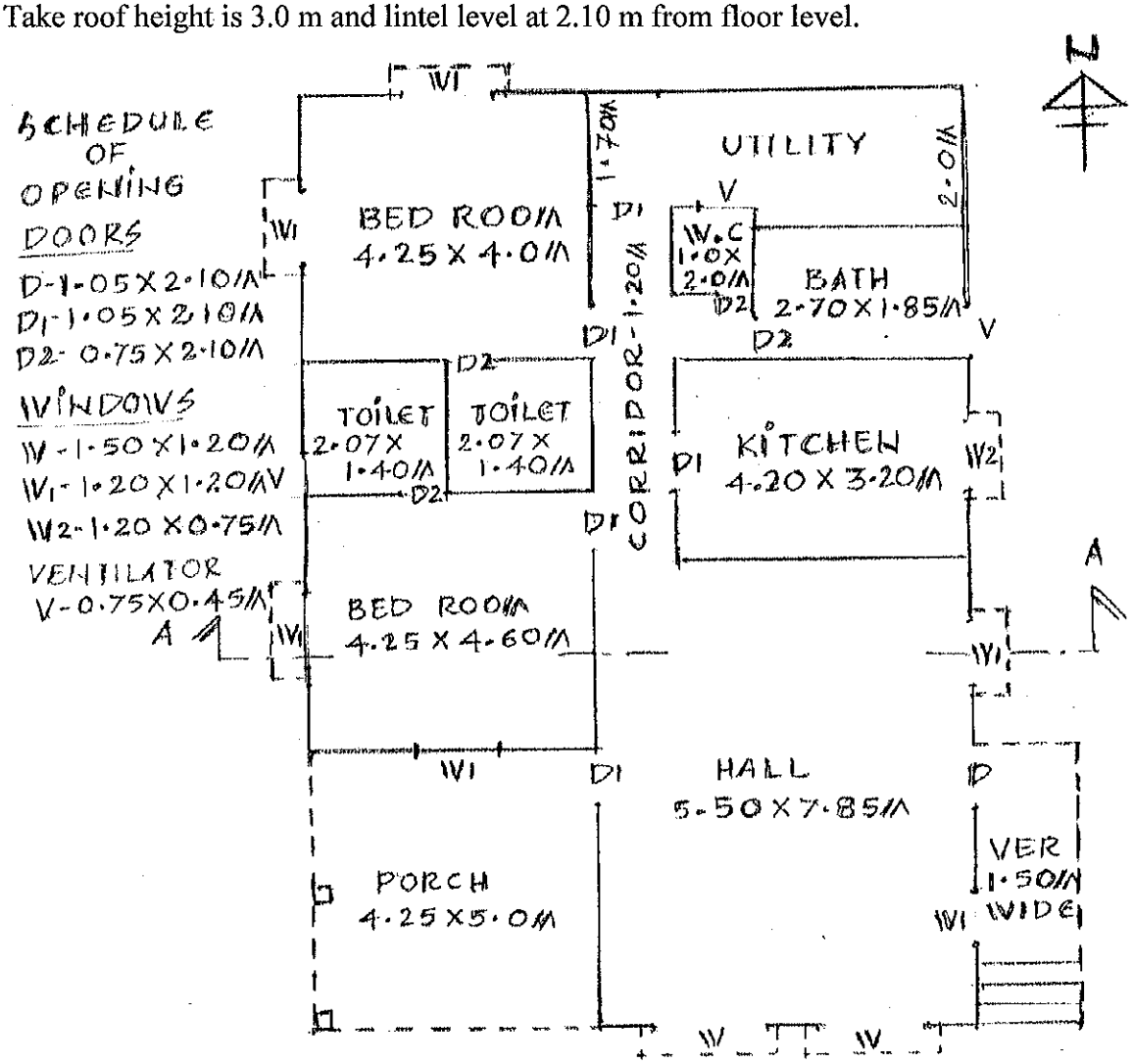

Fig. Q 1

Section - II

2 a. Draw cross section of a S.S.Masonry foundation to be provided for a load bearing wall of 230 mm thick in Burnt Brick Masonry in superstructure of a residential building. Use following data:

i) Width of foundation = 1.20 m
ii) Depth of foundation below G.L = 1.20 m
iii) Width of P.C.C = 1.20 m
iv) Thickness of P.C.C in 1:3:6 = 75 mm (0.075 m)
v) Width of first footing above P.C.C. = 1.05 m
vi) Depth of first footing above P.C.C. = 0.375 m
vii) Width of second footing = 0.90 m
viii) Depth of second footing = 0.375 m
ix) Width of third footing = 0.75 m
x) Depth of third footing = 0.375 m
xi) Width of plinth wall = 0.45 m
xii) Depth of plinth wall = 0.60 m
xiii) Thickness of D.P.C in 1:2:4 = 100 mm (0.1 m) **(10 Marks)**

b. Draw the front elevation and sectional plan view of fully six-paneled, double shutter door of size -1.0 m × 2.10 m **(10 Marks)**

3 Prepare a bubble diagram (connectivity diagram) for a canteen building of an Engineering college and develop a single line diagram based on the bubble diagram (to a suitable scale).

i) Dining Area for boys and girls separately.
ii) Kitchen.
iii) Dining area for staff.
iv) Stores for kitchen.
v) Hand washing.
vi) Utilities attached to kitchen.

Students strength of the college is 2000. **(20 Marks)**

4 a. What is F.A.R.? Calculate the carpet area, plinth area and floor area ratio of the building shown in figure Q4 (a). The plot size is 10.50 × 12.62 m. **(10 Marks)**

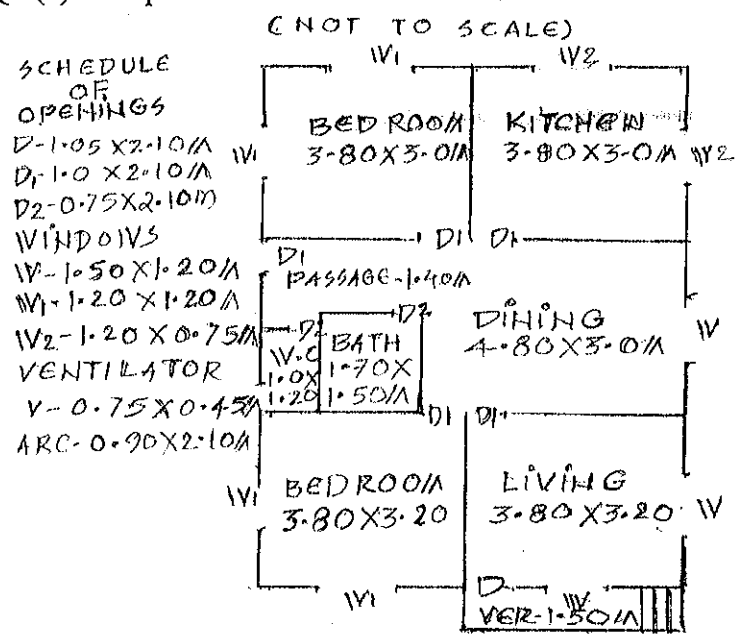

Fig. Q4 (a)

b. Prepare a set of working drawings for the residential building plan as shown in figure Q4 (a). **(10 Marks)**

5 The line diagram of a residential building is shown in figure Q4 (a). Prepare water supply and sanitary layout plans with usual notations. (select suitable scale). **(20 Marks)**

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