



Enrolment No. _____
SARVAJANIK UNIVERSITY

S-2026 Date: 04-05-26 Time: 09:30 AM to 11:30 AM
 Regular / Backlog Exam 12:30

B.ARCH -II - SEMESTER- IV EXAMINATION

Course Code: BRAR12402

Total Marks: 180

Course Name: Building Technology II- Construction, Structure & Services

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Draw a sketch wherever necessary.
5. Assume suitable data whenever necessary & specifically mention it.
6. IS 800:2007, IS 875- part I, part II, part III, and Steel table are allowed to use.
7. Use of a nonprogrammable scientific calculator is allowed.

Q.1.		
(A)	Explain the Terms: (Any SIX)	(12)
1	Explain what do you mean by bracing in steel frame construction.	
2	Explain the term "Prefabricated Construction".	
3	Explain steel beam and girder. What's the difference?	
4	Explain Steel Truss ? What is its function?	
5	Explain A.C & D.C .	
6	What is a cable?	
7	Explain Parallel circuit.	
8	What do you mean by Lumens & Voltage. Explain .	
(B)	Answer the following (Any THREE)	(18)
1	Where are steel frame structures used ? Explain elements of steel frame structure.	
2	Explain "Bolted Connection and its components" with reference to steel frame construction.	
3	Enlist and sketch typical cross sections of steel components used as structural elements (Specifically for beam and column).	
4	Discuss the advantages and disadvantages of steel construction.	
Q.2.	Answer in Detail (Any ONE)	(30)
a)	• Design a steel structure enclosing an event space covering 30 mt X 50 mt area. Your answer should have following details: Well-illustrated, neat and clear sketches/drawings (Plans/Sections/Elevations) - o Schematic plan explaining entry, exit, primary zoning (display space and circulation) - o Sketch of structure visualized to cover the area - o Types of components selected for the structure (Specify Approx. size) - o Structural Assembly of the components (Primary/Secondary/Tertiary) - o Location of various structural components in plan (Structural plan at various level explaining various layers, with dimensions) - o Covering materials and its fixing detail & Important connection (Joinery) details	
b)	• Design a steel structure for a Ground + Ten Story Residential building. Your answer should consist of following points: - o Schematic design grid of the residence (Typical Floor Plans with service core) - o Types of components selected for building elements (Beam/Column/Slab/Walls/Staircase- Also specify approx size) - o Structural components in plan (Structural grid/plan at various level explaining	

	layers, with dimensions	
Q.3.		
(A)	Answer the following (any TWO)	(10)
1.	Enlist type of wire and explain any three in detail	
2.	Define type of circuit and explain which circuit is used in residences	
3	What are the considerations for choosing the lighting system for a given space.	
(B)	Design an electrification plan of the ground floor for the given plan of a residence . Detailed Ground floor electrification plan Complete electrical layout with wiring points Switchboard locations and configurations Switchboard schedule Standard legend for symbols used	(20)
Q.4.		
(A)	Do as directed. / Select the correct answer	(05)
1	What is the purpose of lateral bracing in a steel structure? (a) To support gravity loads (b) To provide access between floors (c) To resist wind and seismic forces (d) To enhance thermal insulation	
2	The Design Compressive Stress, f_{cd} (N/sqmm) increases as _____. (a) Slenderness Ratio increases. (b) Slenderness Ratio decreases. (c) Cross section Area of the column increases. (d) As the Section changes from slender to Plastic	
3	Select the Limiting 'Width to Thickness' & 'depth to thickness' Ratios for the Flange and Web of the 'I / H' rolled section for Plastic Class-1. (a) $b/t_f > 9.4 \epsilon$ & $d/t_w > 84 \epsilon$ (b) $b/t_f < 9.4 \epsilon$ & $d/t_w > 84 \epsilon$ (c) $b/t_f < 9.4 \epsilon$ & $d/t_w < 84 \epsilon$ (d) $b/t_f = 9.4 \epsilon$ & $d/t_w = 84 \epsilon$	
4	Which type of steel structure is composed of elements that work together to resist applied loads? (a) Truss (b) Arch (c) Beam (d) Column	
5	Which Section is preferable for column design? (a) ISLB (b) ISJB (c) ISHB (d) ISMB	
4(B)	(d) A 220 mm X 10 mm plate of grade Fe 410 steel is connected with six bolts of 12 mm diameter, with a gusset plate as shown in fig. Determine the design strength of the plate. The yield & ultimate stresses of steel are 250 N/sq.mm & 410 N/Sq.mm respectively	(25)

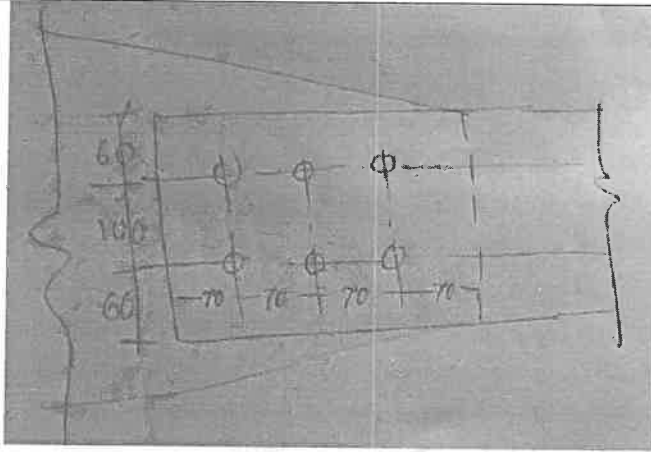


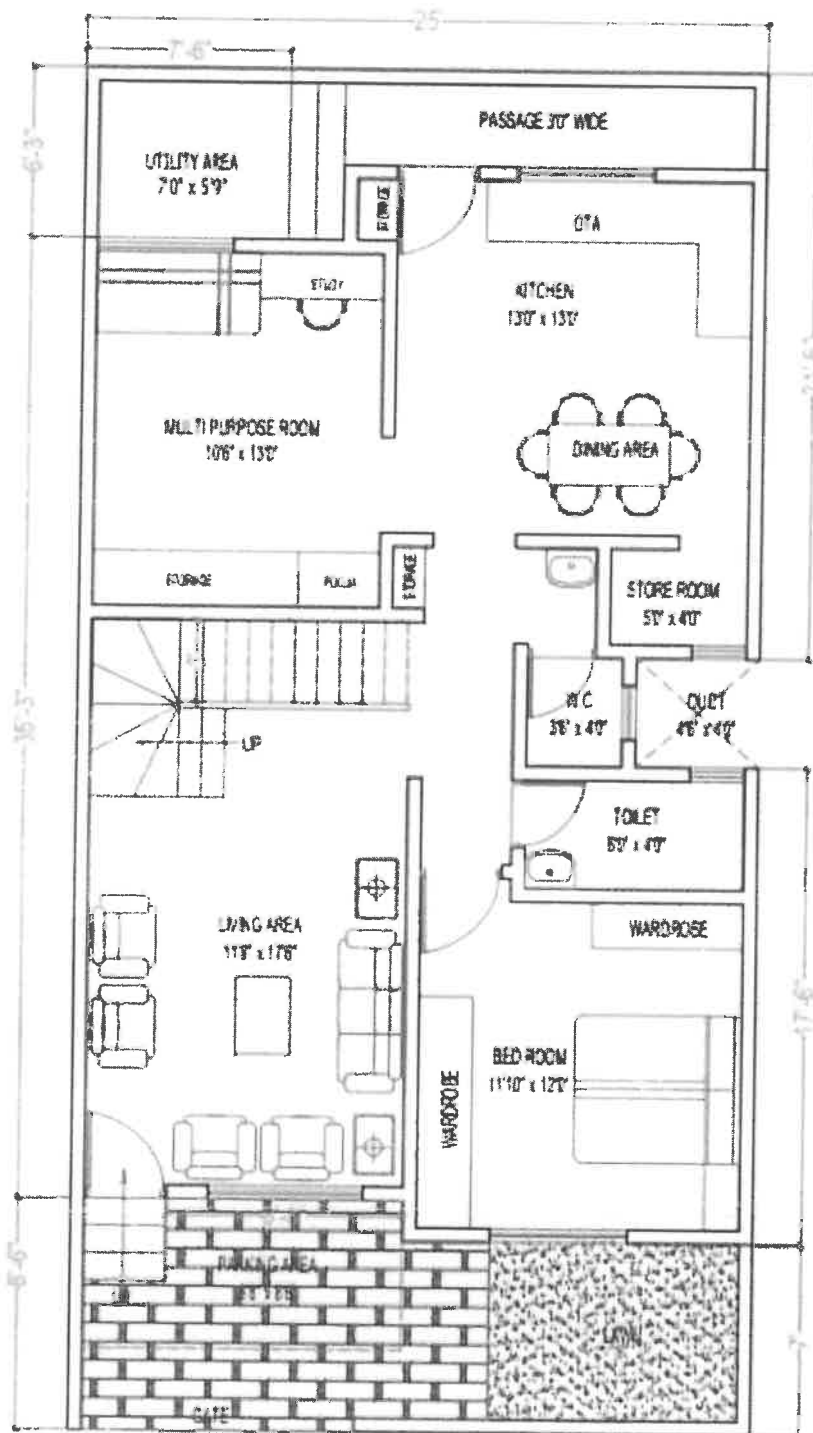
FIG 4(B)

All dimensions are in mm

	Attempt any three questions out of the following four: Q5, Q6, Q7, and Q8.	(60)
Q 5	A column of ISHB 450 @ 92.5 kg/m, having an effective length of 3.5 m, is used as a column. The lower end of the column is restrained against both rotation and translation, while the upper end is restrained against translation but free to rotate. Find the load-carrying capacity of the column, taking $f_y=250 \text{ N/mm}^2$ and $E=2 \times 10^5 \text{ N/mm}^2$	(60)
Q:6	Calculate the Moment of resistance of a laterally restrained beam, ISLB 550@ 86.3 kg/m, if the span of a simply supported beam is 5 m & subjected to 75 KN/m uniformly distributed load including self-weight.	
Q:7	Design a slab-based footing for a column section ISHB 350 @ 67.4 Kg/m, subjected to an axial load of 2000 KN. Take SBC of soil = 230 KN/sqm, Grade of concrete = M20, $f_y = 415 \text{ N/mm}^2$, $E = 2 \times 10^5 \text{ N/mm}^2$	
Q:8	Sketch and label the following in detail.	
1)	Beam to column Stiffened Seat Connection	
2)	Gusseted-based footing.	

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Q3) B – Give electrification plan for the ground floor plan given below .



GROUND FLOOR PLAN (AREA= 1000 SQ. FT)