Enrolment No._____

SARVAJANIK UNIVERSITY

W-2024 Date: 18-10-24 Time: 09:30 AM to 12:30 PM

Backlog Exam

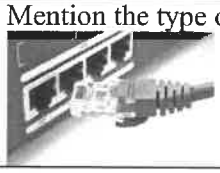
B.ARCH - SEMESTER– IV EXAMINATION

Course Code: BRAR12402 **Total Marks: 180**

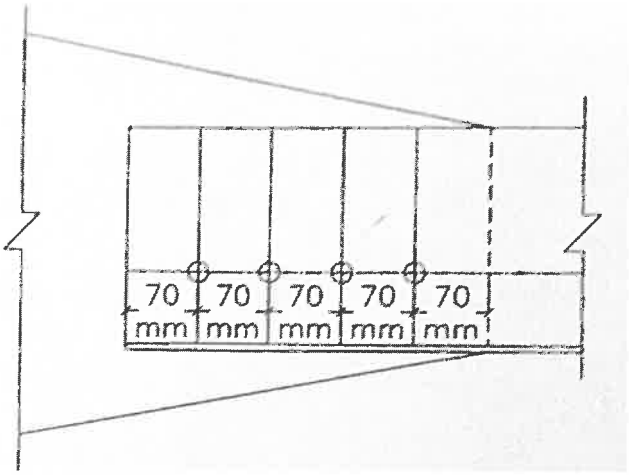
Course Name: Building Technology II- Const., Structure & Services

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 be used.**
7. **Use of a nonprogrammable scientific calculator is allowed.**

Q.1.	**Answer the following: (ANY SIX)**	**12 Marks**
1	Mention the type of cable shown in the image. 	
2	What is a "Belt Truss?" Sketch and explain.	
3	Explain the term "Prefabricated Construction".	
4	What is the unit of current ?	
5	Draw any one detail to construct steel staircase.	
6	What is the unit of watt ?	
7	Enlist and sketch typical cross sections of steel components used as structural elements (Specifically for beam and column)	
8	Which kind current flow in Residence Circuit?	
Q.2		
(A)	**Answer the following (Any TWO)**	**20 Marks**
1	Explain the concept of modular construction with reference to "Container structures" along with its pros and cons.	
2	Draw schematic plan of Taipei 101 with location of major structural component and explain "super column".	
3	What is a Diagrid structure? Explain the advantages and disadvantages of Diagrid system based on the case study.	
4	Discuss how steel structures can be impacted by environment	
(B)	**Answer in Detail**	**30 Marks**
	Design a steel structure enclosing an exhibition space covering 40 mt X 80 mt area. Your answer should have following details: Well-illustrated, neat and clear sketches/drawings (Plans/Sections/Elevations) are expected as an answer of each of the above point	
a)	Schematic plan explaining entry, exit, primary zoning (Segregation of display space and circulation) and location of services for exhibition space	2
b)	Sketch of structure visualized to cover the area	3
c)	Types of components selected for the structure (Specify Approx. size)	5
d)	Structural Assembly of the components (Primary/Secondary/Tertiary)	5
e)	Location of various structural components in plan (Structural plan at various level explaining various layers, with dimensions	5

f)	Covering materials and its fixing details	5
g)	Important connection (Joinery) details	5
Q.3.		
(A)	**Answer the following (ANY TWO)**	**08 Marks**
1	What factors should be taken into consideration in selecting the types of lighting and light fixtures for a living room and bedroom	
2	Define the following 1. MCB 2 Voltage	
3	Mention different types of wire and expalin any three in detail	
4	Explain A.C and D.C	
(B)	Draw electrical layout for the plan given in the attached sheet showing 1.SB, light points(wall and ceiling both),fan points and equipments points 2. Electric schedule Note: Attach the given plan with the answer book	**20 Marks**
Q.4.		
(A)	**Do as directed. / Select the correct answer**	**05 marks**
1	The Design Compressive Stress, fcd (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	
2	The Rise of the Pitched roof truss is governed by, a) Dead Load b) Live Load c) Wind Load d) Earthquake load	
3	Which type of steel connection relies on friction between the connected surfaces to transfer loads? a) Welded connection b) Pinned connection c) Bolted connection d) Rigid connection.	
4	The phenomenon of "buckling" in steel structures refers to a) Excessive deformation under cyclic loading b) Sudden fracture of steel members c) Localized corrosion due to moisture d) Instability and failure under compressive loads	
5	Which Section gives higher load-carrying capacity, while subjected to an axial tensile load? a) Equal angle sections b) Double Angle sections c) Unequal Angle section connected by longer leg with a gusset plate. d) Unequal Angle section connected by shorter leg with a gusset plate.	
4 (B)	A single unequal angle ISA 100X75X 8 mm is connected to a 10mm thick gusset plate at the ends with 4 nos.,16 mm diameter bolts to transfer tension through the longer leg as shown in Figure. Determine the tensile load-carrying capacity of the section. The yield strength of steel is 250 N/mm2 & ultimate	**25 marks**

	strength is 410 N/mm2.  FIG:4B	
Q5	**Attempt any Three questions out of these four Questions**	**60 marks**
1)	A column comprising ISHB 450@ 87.2 Kg/m of a length of 3 m is used as a column. The Column is fixed at one end and hinged at another end. Find the load-carrying capacity of a column. Take fy = 250 N/mm^2	
2)	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 4.5 m and subjected to 60 KN /m uniformly distributed load including self-weight.	
3)	Design a slab-based footing for a column section ISHB 300 @ 63.0 Kg/m, subjected to a factored axial load of 2000 KN. Take SBC of soil =250 KN/sqm, Grade of concrete =M-20, fy = 415 N/mm^2, E = 2 X 10 5 N/mm^2.	
4)	**Sketch and label the following in detail.** (a)Gusseted-based footing. (b)Beam-to-Beam Framed Connection	

Q.3 (B) - LAYOUT PLAN.