Enrolment No._____

SARVAJANIK UNIVERSITY

S-2025 Date: 02-05-25 Time: 09:30 AM to 12:30 PM
Regular / Backlog Exam

B.ARCH II - SEMESTER– IV EXAMINATION

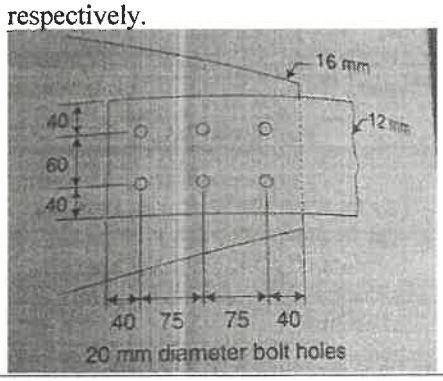
Course Code: BRAR12402 **Total Marks: 180**

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.		**30 Marks**
(A)	**Answer the following: (Any SIX)**	**12 Marks**
1	What is a steel frame construction?	
2	Sketch common types of steel beam sections.	
3	Explain suitability of steel frame construction with reference to sustainability.	
4	Explain bracing in steel frame construction.	
5	Explain A.C and D.C	
6	Define Earthing.	
7	Define Lux and Lumen	
8	What is RCCB?	
(B)	**Answer the following (Any THREE)**	**18 Marks**
1	Explain "Modular construction" with reference to container structures.	
2	Write short note on "connection in steel frame construction"	
3	Explain Properties of steel as a construction material.	
4	Explain steel roof construction with neat and illustrated sketches.	
Q.2.	**Answer in Detail**	**30 Marks**
	Using steel frame construction, design a temporary structure for a pavilion of size 5 m X 8m., to be installed in public park. The module of this pavilion should be prototype and should be easy to assemble and dismantle. Well-illustrated, neat and clear sketches/drawings (Plans/Sections/Elevations) are expected as an answer of each of the below mentioned point:	
a)	Schematic plan explaining plinth/levels/roof supports and sections-elevations to explain form of the structure.	5
b)	Structural system with location of various structural components in plan (with dimensions) and structural assembly with primary, secondary, tertiary layers	5
c)	Types of components selected for the structure (Specify Approx. size)	5
e)	Covering materials and its fixing details	5
f)	Important connection (Joinery) details	5
g)	Basic lighting layout for the space	5
Q.3.		**30 Marks**
(A)	**Answer the following (any TWO)**	**10 Marks**
1	Give Classification of cables based upon 1. Voltage Rating of the Cable 2. Installation And Laying of The Cable	
2	Mention different types of wire and explain any three in detail.	

3	What is fuse? Explain principles of its operation and mention the criteria to select th fuse	
4	What are the considerations for choosing the lighting system for a given space	
(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 answer book	**20 Marks**
Q.4.		
(A)	**Do as directed. / Select the correct answer**	**05 marks**
1	The Rise of the Pitched roof truss is governed by, a) Dead Load b) Live Load c) Wind Load d) Earthquake load	
2	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	
3	The pitch of tacking rivets, when double angles are connected back-to-back and acting as tension members should not be more than. a) 500 mm b) 600 mm c) 1000 mm d) 1100 mm	
4	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.	
5	Identify the class of an I section, ISWB 500@ ~~112.5~~ 95.2 Kg/m. a) Class-1, Plastic b) Class-2, Compact c) Class-3, semi-Compact d) Class-4, Slender	
(B)	A Single plate tension member of 100 mm X 12 mm is connected to a 16mm thick gusset plate at the ends with 6 -16 mm diameter bolts to transfer tension as shown in Figure. Determine the design tensile strength of the angle section assuming that, the yield & ultimate stress of steel are 250 N/mm^2 & 410 N/mm^2 respectively.  	**25 marks**

	Attempt any Three questions out of this Question Q5 , Q6, Q7 & Q8	
Q5	A column comprising of ISHB 350@ 72.4 Kg/m of length 3.2 m. The lower end of the column is restrained against both rotation and translation, while the upper end is only restrained against translation and free against rotation. Decide the economical spacing 'S' for the column section & find the load-carrying capacity of a column. Assume the column is laced, Take fy = 250 N/mm2	**20 marks**
Q6	Calculate the Moment of resistance of a laterally restrained beam, ISMB550@ 103.7 kg/m, if the span of a simply supported beam is 5.5 m & subjected to 80 KN /m uniformly distributed load including self-weight.	**20 marks**
Q7	Design a slab-based footing for a column section ISHB 450 @ ~~111.14~~ 87.2 Kg/m, subjected to a factored axial load of 1500 KN. Take SBC of soil =220 KN/sqm, Grade of concrete =M-20, fy = 250 N/mm^2,E = 2 X 10^5 N/mm^2.	**20 marks**
Q8	Sketch and label the following in detail (Any two)	**20 marks**
	Beam to column Stiffened Seat Connection	
	Slab Based footing