Enrolment No._____

# SARVAJANIK UNIVERSITY

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S-2024 Date: 15-04-24 Time: 01:30 PM to 04:30 PM

Regular / Backlog Exam

**B. Architecture - III SEMESTER– VI EXAMINATION**

**Course Code: BRAR 12602** **Total Marks: 180**

**Course Name: Building Technology IV (Advanced Construction, Structure & Services )**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Draw Illustrations, Sketches, Labelled Diagrams where ever applicable**

| **Q1.** | **Answer the following (Compulsory) Attempt Any 16 ( 16 x 2 )** | |
|---|---|---|
| | **As Directed -- State True or False / Fill in The Blanks** | **32 Marks** |
| 1 | Double layer two way grid is more stiff then double layer three way grid . ( True/ False) | 2 Marks |
| 2 | Suspension cable structure can span more than the cable stayed structure. ( True / False) | 2 Marks |
| 3 | Double cable structure are used to decrease fluttering due to wind . ( True / False) | 2 Marks |
| 4 | Following is not a type of tensile structure : a. Cable net structure b. cable stayed structure c. suspension cable structure d. Castellated Structure | 2 Marks |
| 5 | Castellated structure is good for …….. loading only | 2 Marks |
| 6 | Lamella dome is a type of …….. structure | 2 Marks |
| 7 | Mast are carrying tension & bending in tensile structure ( True/ False) | 2 Marks |
| 8 | Hyperbolic Paraboloid Shell has Double Curvature and is also known as Saddle Shaped Shell. ( True / False ) | |
| 9 | Continuity and Curvature are Critical in Shell Structure Design. ( True / False ) | 2 Marks |
| 10 | Aluminum composite panel is a type of flat panel that consists of two thin aluminum sheets bonded to a non-aluminum core. (True / False) | 2 Marks |
| 11 | Patterned, Float, Sheet and Wired are the types of glasses used in Curtain wall glazing. (True / False ) | 2 Marks |
| 12 | High Pressure laminate used for building facades is a natural material. (True / False ) | 2 Marks |
| 13 | Full form of GFRC exterior facade panels is …….. | 2 Marks |
| 14 | Sound gets focused in a hall due to …… surfaces | 2 Marks |
| 15 | If the sound is falling on a convex surface, we will observe that the sound is moving towards a point. True/ False | 2 Marks |
| 16 | Fire Safety Norms can be referred from Documents of NBC and GDCR ( True or False ) | 2 Marks |
| 17 | NBC Stands For National …… Code. | 2 Marks |
| 18 | Light Weight Concrete is a Sound Insulating Material ( True / False ) | 2 Marks |
| 19 | Oxygen, Heat and …… are three attributes of the Fire Triangle | 2 Marks |
| 20 | R Value is the Number of Hours Materials / Buildings can resist Fire ( True / False ) | 2 Marks |
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| **Q.2** | **Explain In Brief With Sketches ( 20 + 20 )** | **40 Marks** |
| **Q2 A** | Explain any one existing space frame structure explaining plan , section along with dimensions, load transfer , cross section & size of structural member, connection details etc. | 20 Marks |
| **Q2 B** | Explain following terms along with load transfer and sketches<br>**(Any two)**<br>1. Cable net structure. (10 Marks )<br>2. Plate girder along with stiffeners . (10 Marks )<br>3. Single layer three way space frame vault. (10 Marks) | 20 Marks |
| | | |
| **Q.3.** | **Explain any THREE Question Out Of The Following ( 16 x 3 = 48 )** | **48 Marks** |
| i) | Classify All The Different Types Of Shells By Shape in Tabular / Schematic Form. ( 8 Marks) . Define the Singly Curved Developable Shell. (4 Marks ) With help of Labelled Sketches Explain Singly Curved Developable Shell ( 4 Marks). | 16Marks |
| ii) | List the Classification of Shell Structures By Materials (4 Marks). Explain the Advantages and Disadvantages of the materials ( 4 Marks) Select any one material and Explain the Folded Plate Shell with it's Principal Of Component (8 Marks). | 16 Marks |
| iii) | **a)** Write down properties of Tensile Structures. ( 8 Marks )<br>**b)** Explain Metal Roof decking with a neat sketch. Write down its Properties and Uses. Write only its types and draw sketches of it. ( 8 Marks ) | 16 Marks |
| | | |
| iv) | Explain the Difference between Cross Laminated Timber and Glue Laminated Timber. ( 8 Marks) Draw Neat Sketches to Explain . ( 8 Marks ) | 16 Marks |
| | | |
| | **ATTEMPT ANY THREE OUT OF FOUR ( 20 x 3 = 60 )** | **60 Marks** |
| **Q4) I)** | **Consider that You have to Design Acoustics for an Auditorium -** | **20 Marks** |
| a) | List all the Types Of Sound Insulating Materials. | 5 Marks |
| b) | What are the advantages Of Sound Insulating Material. | 5 Marks |
| c) | Describe In Detail the Various Sound Insulating Materials. | 10 Marks |
| **Q4 II)** | **Consider a Class room for 30 – 40 students of size 8m X 10mt X 4mt ht.** | **20 Marks** |
| a) | List all the Acoustical Considerations For the Same | 5 Marks |
| b) | Draw the Plan With Dimensions | 5 Marks |
| c) | Explain the Critical Distance in Context Of Volume Of Room and Reverberation Time in Detail. | 10 Marks |
| **Q4 III)** | Consider An Atrium Of Area Of 70m X 50m X 120 M. With Help Of Illustrations And Labelled Diagram Design A Service Core With Following Features For Fire Safety : | **20 Marks** |
| **a)** | A Layout Of Escape Route Of The Atrium Along With Position Of Sprinkler System, Smoke Detectors, Alarm System, Main Door And Openings For Windows / Ventilation System. | 5 Marks |
| **b)** | Draw A Service Core Indicating The Position Of Pressurized Staircase Cabin, Fire Lifts, Ducts For Services, Fire Door, Ventilation System. | 5 Marks |

| | | |
|---|---|---|
| **c)** | Indicate The Material Of The Wall For The Service Core For Fire Safety, The Width Of The Staircase And It's Landing, Height As Per NBC For Fire Safety. | 10 Marks |
| **Q4 IV)** | A Ten Storied Building has a Basement Parking and 10 Floors and Terrace Area.<br>• 1st Floor is Administration and Community Space<br>• 2nd to 4th Floor is Restaurant<br>• 5th to 7th is Office Space<br>• 8 to 10th Floor is Residential Accommodation for Employees. | **20 Marks** |
| a) | Which Type Of Fire Fighting System will you provide Dry or Wet Riser. Give Reason. | 5 Marks |
| b) | Design ( draw and label diagram) Compartmentation For the Building. | 5 Marks |
| c) | Draw The Provisions Of Both Active And Passive Fire Fighting System For The Same Through Plan And Elevation / Section Along With The Service Core. Label Diagram and Write Dimensions / Areas where ever applicable. | 10 Marks |