Sixth Semester B. Arch. (CGS) Examination

ARCHITECTURAL STRUCTURE–V

Paper – 06 AR 03

(USC – 10049)

P. Pages : 3

Time : Three Hours] [Max. Marks : 80

Note : (1) Separate answer book must be used for each section in the subject Geology, Engineering material of civil branch and Separate answer–book must be used for Section A and B in Pharmacy and Cosmetic Tech.

(2) Answer **Three** questions from Section **A** and **Three** questions from Section **B**.

(3) Due credit will be given to neatness and adequate dimensions.

(4) Assume suitable data wherever necessary.

(5) Illustrate your answers wherever necessary with the help of neat sketches.

(6) I. S. I. Hand book for structural Steel section, I. S. Code 800 / 1962 or 1964, I. S. 456 (Revised) I. S. 875 may be consulted.

(7) Use pen of Blue / Black ink / refill only for writing the answer book.

SECTION A

1. What is precast concrete ? How the manufacturing of various precast units is carried out ? 13

OR

2. What are the advantages and disadvantages of precast concrete over the cast in situ concrete ? 13

3. Write a short note on :—
Application of thumb rules for beam, columns, slab for fixing sectional properties. 13

OR

4. What are the Primary and Secondary functions of precast concrete construction ? 13

5. Design a circular water tank with Rigid base for capacity of 3 lakh liters of water. The depth of water is to be 3.5 m. freeboard = 200 mm. Use M 20 concrete and Fe 250 steel grade permissible direct tensile stress in concrete $= 1.2\ N/mm^2$. Permissible stress in steel $= 100\ N/mm^2$.
Sketch also the Reinforcement details. 14

OR

6. Design a circular water tank resting on a ground and having a flexible base at the bottom for the following data :—

   (a) Capacity of tank = 250000 Liters

   (b) Concrete = M 20 grade

   (c) Steel = Fe 250

   (d) $\sigma_{cvc} = 7\ N/mm^2$

   (e) $\sigma_{ct} = 1.2\ N/mm^2$

   (f) $m = 13.33$

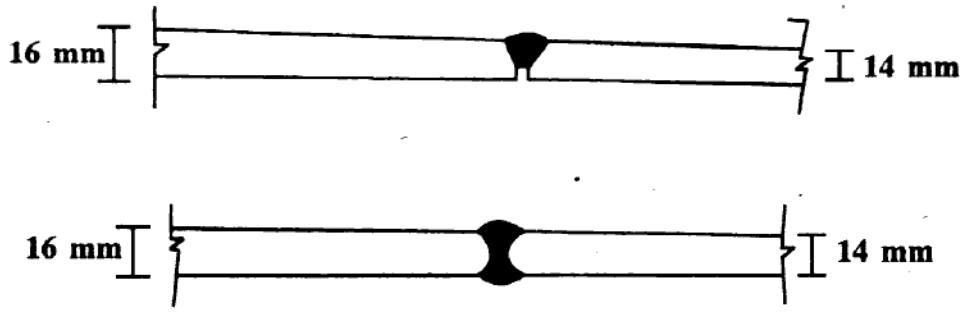
   (g) $\sigma_{st} = 100\ N/mm^2$ 14

SECTION B

7. Two plates of thickness 16 mm and 14 mm are to be jointed by a butt weld. The joint is subjected to a tensile force of 280 kN. Due to some reason the effective length of the weld that could be provided was 175 mm only. Check the safety of joint if

   (a) Single V – butt weld is provided

(b) Double V – butt weld is provided.



13

OR

8. Explain with neat sketches different types of failure in a riveted joint. 13

9. Calculate the strength of a discontineous strut of length 3.2 m. The strut consist of two unequal Angles 100 x 75 x 8 mm [fy = 250 N / mm^2] with long legs connected and placed on a same side of a gusset plate. The strut is tack bolted and connected to a 10 mm gusset plate. 14

OR

10. A tie member used as a diagonal in a roof truss consist of two angles 75 x 50 x 8 mm [fy = 280 MPa] placed back to back on same side of gusset plate. The rivets are 18 mm ϕ provided in one row and the angles are tack riveted. Determine the tensile strength of a member. 14

11. Design a Single Angle discontineous strut to carry a load of 47 kN. The length of a strut is 3 m between intersection. The strut is connected by 12 mm thick gusset plate,

(i) 24 mm ϕ Power driven rivet

(ii) 20 mm ϕ Hand driven rivet. 13

OR

12. Design a tension member of a roof truss to carry a factored tensile force of 55 kN. The effective length of the member is 2.3 m. Use 20 mm dia. Shop bolts of grade 4.6 for the connection and Fe 410 grade of steel. 13