

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE  
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

|                                 |                              |                         |
|---------------------------------|------------------------------|-------------------------|
| Semester : VI (Old)             | Term : II                    | Academic Year : 2017-18 |
| Course No. : FS 365             | Title : Design of Structures |                         |
| Credits : 3 (2+1)               | Time : 09.00 to 12.00        | Total Marks : 80        |
| Day & Date : Friday, 04.05.2018 |                              |                         |

- Note :
1. Solve ANY EIGHT questions from SECTION "A".
  2. All questions from SECTION "B" are compulsory.
  3. All questions carry equal marks.
  4. Draw neat diagrams wherever necessary.

SECTION "A"

- Q.1 a) State and explain any four types of loads acting on the structure.  
b) Calculate design constants for material concrete grade M-15 and Fe-415 steel reinforcement, by considering the balance design.
- Q.2 a) State and explain modes of failure of R.C. sections.  
b) R.C. beam of rectangular section 250 mm wide and 500 mm effective is reinforced with 4 bars of 20 mm diameter in tension zone. Calculate the ultimate moment of resistance of the section. The materials used are concrete grade M-15 and steel grade Fe-250.
- Q.3 a) Explain working stress method.  
b) Explain steps in production of concrete.
- Q.4 A R.C column 3.5 m effective length is required to resist an axial ultimate load of 1750 kN. Design the column using M-20 concrete and Fe-250 steel.
- Q.5 Explain in detail any four types of footing.
- Q.6 State various types of retaining walls and Explain any two types of retaining walls.
- Q.7 a) Explain design procedure of compression member.  
b) Calculate strength of ISA 50X50X6 mm used as a compression member in roof truss 1.06 m long. It is connected by one rivet at each end.
- Q.8 a) Show with neat sketch the major components of compound Pratt truss.  
b) Differentiate between tension member and compression member.
- Q.9 Find the wind pressure for design of a sloping roof of span 10 m and pitch  $\frac{1}{4}$ . The height of eaves is 5 m above ground. The building is situated in Madras and its permeability is normal, Assume, probability factors = 1.0, topography factors = 1.0 and terrain factor = 0.8.
- Q.10 Write short notes ( Any Two ):  
a) Double reinforced section  
b) One way slab  
c) Reinforcement in column

(P.T.O.)

## SECTION "B"

Q.11 Fill in the blanks.

- 1) Earthquake load shall be computed in accordance with IS: \_\_\_\_\_.
- 2) In limit state method characteristics load is multiplied by \_\_\_\_\_ to get design load.
- 3) In over reinforce beam \_\_\_\_\_ material will fail first.
- 4) The property of diminishing in volume of concrete during the process of hardening is termed as \_\_\_\_\_.
- 5) In limit state method factor of safety for concrete is \_\_\_\_\_.
- 6) Compound fink trusses are used up to maximum span of \_\_\_\_\_ m.
- 7) Recommended value of effective length for compression member which is effectively held in position at both the ends but not restrained against rotation is equal to \_\_\_\_\_.
- 8) Spacing of root trusses is kept \_\_\_\_\_ to \_\_\_\_\_ of the span.

Q.12 Define the following terms.

- |                          |               |
|--------------------------|---------------|
| 1) Structural design     | 2) IS code    |
| 3) Earth pressure        | 4) Purlin     |
| 5) Partial safety factor | 6) Rafter     |
| 7) Tension member        | 8) Foundation |

