MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION
B.Tech. (Agril. Engg.)

Semester	: VI (New)	Term : II	Academic Year	: 2015-16
Course No.	: FS 365	Title : Design of Structures		
Credits	: 3 (2+1)			
Day & Date	: Tuesday, 03.05.2016	Time : 09.00 to 12.00	Total Marks	: 80

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) Calculate design constants for material concrete grade M-15 and Fe-250 steel reinforcement, by considering the balance design.

b) Explain various types of loads acting on the structure with IS codes.

Q.2 a) R.C. beam of rectangular section 230mm wide and 400 mm deep is reinforced with 4 bars of 12mm diameter provided with an effective cover of 31mm. Calculate the ultimate moment of resistance of the section and the maximum uniformly distributed super-imposed load this beam can carry if it is simply supported over a span of 3.5m. The materials used are concrete grade M-20 and steel grade Fe-415.

b) State and explain modes of failure of R.C. sections.

Q.3 a) State situations where doubly reinforced sections are required.

b) Calculate moment of resistance of doubly R.C. beam of size 300x450 mm reinforced with 6 bar of 20 mm diameter on tension side and 4 bar of same diameter on compression side. Assume effective cover of 35 mm on both sides. Use M-15 concrete and Fe-250.

Q.4 a) Explain design requirement for short R.C. column.

b) Calculate number of bars of 12 mm diameter for short R.C. column 400 mm X450 mm in cross section to carry an axial load of 1160kN. Using M-20 concrete and Fe-250 steel.

Q.5 a) Explain design procedure of compression member.

b) Calculate strength of ISA 40x25x6 mm when used as a tension member with its longer leg connected by fillet weld.

Q.6 Explain in detail any four types of footing.

Q.7 Explain any four types of retaining walls.

Q.8 a) Show with neat sketch the major components of prat truss.

b) Find the wind pressure for design of a sloping roof of span 10 m and pitch1/4.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

(P.T.O.)

Q.9 Design a column section to carry axial load of 410KN. Column is 4.2 m long and effectively held in position at both the ends but restrained against rotation at one end only. yield stress of steel = 250 mpa

Q.10 Write short notes on (Any two).
1) Quality control of concrete
2) Working stress method of design
3) Production of concrete

SECTION "B"

Q.11 Fill in the blanks.

1) Impact 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 upto 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) Clear cover in slab for reinforcement is _____mm.

12 Define the following terms.

1) Modular ratio   2) IS code

3) Development length   4) Gauge distance

5) Structural design   6) Rafter

7) Pitch of rivet   8) Two way slab

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