T.Y.B.Arch sem- V

MANOHARGAD – V (2010 COURSE) : WINTER - 2015

SUBJECT : THEORY OF STRUCTURES & BUILDING MATERIALS - V

Day : Tuesday
Date : 17-11-2015

Time : 10.00A.M. To 1.00 P.M
Max. Marks : 100

N.B.

1) Answer any **THREE** questions in Section – I. Answer all questions from Section –II.
2) Answers to the two sections should be written in **SEPARATE** answer books.
3) Use of electronic non-programmable calculator is allowed.
4) Figures to the right indicate **FULL** marks.
5) Neat diagrams must be drawn wherever necessary.
6) Assume suitable data if necessary.

SECTION – I

Q.1 Answer any **FOUR** of the following: **(20)**

a) Explain under ground water tank in RCC with a neat cross sectional sketch.
b) Explain with sketches active and passive earth pressure.
c) Compare RCC and pre stressed concrete in a tabular form.
d) Write a short note on any two types of steel girder.
e) Explain with neat cross sectional sketches → any two uses of retaining walls.

Q.2 a) Check the stability of a masonry retaining wall having: **(14)**

1. Height of wall = 4.50 m
2. Width of base = 3.10 m
3. Thickness of wall at top = 610 mm
4. Unit weight of soil = 18 kN/m^3
5. Angle of internal friction = 26^0
6. Unit weight of masonry = 20 kN/m^3
7. Coefficient of friction = 0.55

The vertical face of retaining wall retains the backfill in the horizontal.

b) Explain with sketches cross section of RCC overhead water tank. **(06)**

Q.3 a) A simply supported beam with length 6 m and 550 mm deep is 200 mm wide. Udl of 40 kN/m (including self weight) over entire length. Prestressing force of 700 kN at an eccentricity of 200 mm from centre. Find the extreme fibre bending stresses for the same. **(08)**

b) Explain Rankine's theory of earth pressure. **(06)**

c) Sketches showing reinforcement details of any two types of RCC staircases. **(06)**

Q.4 Design the staircase of a residential building, having following parameters: **(20)**

1) Floor to floor height = 3050 mm
2) Riser height = 160 mm, Tread projection = 300 mm
3) Width of landing = 1050 mm
4) Width of flight = 1450 mm

The staircase is supported on 270 mm wide beam at outer edges of landing sketch the reinforcement details. Use M20 concrete and Fe 415 steel.

SECTION – II

Q.5		Explain constituent of guniting and advantages and disadvantages of guniting.	(15)
Q.6		Explain in detail any two special concretes used in building industry.	(10)
Q.7	a)	Explain water proofing for Basements.	(10)
	b)	Write short note on any one material used for water proofing.	(05)

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MANOHARGAD- V: (2010 COURSE): SUMMER-2016
SUBJECT: THEORY OF STRUCTURES AND BUILDING MATERIALS-V

Day: Thursday
Date: 28-04-2016

Time: 2:00 P.M. TO 5:00 P.M.
Max Marks: 100

N.B.:

1) Answer any three questions from Section-**I** and all questions from Section-**II** are **COMPULSORY**.
2) Both the sections should be written in the **SEPARATE** answer books.
3) Neat diagrams must be drawn **WHEREVER** necessary.
4) Figures to the **RIGHT** indicate full marks.
5) Use of electronic calculator ant steel table is **ALLOWED**.
6) Assume suitable data, if necessary.
7) In R.C.C. Design use M-20 grade concrete and Fe 415 (Tor) grade of steel.

SECTION-I

Q.1 Write a short-note on **ANY FOUR** of the following: **(20)**

i) Steel castellated girder
ii) Types of retaining wall
iii) Post tensioning method for pre-stressed concrete
iv) Portal frames
v) Foundation problems of site
vi) Steel plate girder

Q.2 **a)** Design a simply supported dog-legged R.C.C. staircase for a school building with following data: **(16)**

i) Floor to floor height 3900mm
ii) Riser= 130mm, tread = 300mm
iii) Width of landing = 1500mm

Staircase is supported at the outer edges of the landing, on the beams of 300mm width on either side. Draw neat reinforcement sketch. Make a schedule mentioning thickness, Cover and main and distribution steel. Use M20 grade concrete and fe415 steel.

b) Draw typical reinforcement of counterfort type retaining wall. **(04)**

Q.3 **a)** Check the stability of a masonry retaining wall with following data: **(20)**

i) Height of wall = 4.2m
ii) Top width = 1m
iii) Base width=1.4m
iv) Angle of repose=27^0
v) Co-efficient of friction= 0.6
vi) Unit weight of masonry 21 kN/m^3
vii) Unit weight of soil 16 kN/m^3
viii) Backfill is horizontal with vertical face towards retained earth
ix) Soil Bearing Capacity 280 kN/m^3

Q.4 **a)** A simply supported beam is having span of 7.5m and cross sections of 350 mm X 800 mm. The beam carries udl of 42kN/m (including self weight) over its entire span. If per-stressing force of 800kN is applied at an eccentricity of 320 mm from the neutral axis, find maximum stresses in top and bottom fibres. **(10)**

b) Write a short note on: **(10)**

i) Types of staircases based on supports.
ii) Elements of overhead water tank.

MANOHARGAD- V: (2010 COURSE): SUMMER-2016
SUBJECT: THEORY OF STRUCTURES AND BUILDING MATERIALS-V

Day: Thursday
Date: 28-04-2016

Time: 2:00 P.M. TO 5:00 P.M.
Max Marks: 100

N.B.:

1) Answer any three questions from Section-**I** and all questions from Section-**II** are **COMPULSORY**.
2) Both the sections should be written in the **SEPARATE** answer books.
3) Neat diagrams must be drawn **WHEREVER** necessary.
4) Figures to the **RIGHT** indicate full marks.
5) Use of electronic calculator ant steel table is **ALLOWED**.
6) Assume suitable data, if necessary.
7) In R.C.C. Design use M-20 grade concrete and Fe 415 (Tor) grade of steel.

SECTION-I

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b) Write a short note on: **(10)**

i) Types of staircases based on supports.
ii) Elements of overhead water tank.

SECTION-II

Q.5	What is Guniting? Explain advantages of Guniting?	**(10)**
Q.6	Explain advantages and disadvantages of Light Weight Concrete?	**(10)**
Q.7	Explain types of Waterproofing and methods of waterproofing?	**(10)**
Q.8	Explain the method of applications of Guniting?	**(10)**

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MANOHARGAD – VI (2010 COURSE): WINTER - 2015

SUBJECT : THEORY OF STRUCTURE & BUILDING MATERIALS - VI

Day : Wednesday
Date : 18-11-2015

Time : 2.00 P.M. To 5.00 P.M.
Max. Marks : 100

N.B.:

1) Attempt **ANY THREE** questions from Section – I and attempt **ANY FOUR** questions from Section – II.
2) Answers to both the sections should be written in **SEPARATE** answer books.
3) Draw illustrative sketches **WHEREVER** necessary.
4) Use of non programmable **CALCULATOR** is allowed.
5) Figures to the right indicate **FULL** marks.
6) Assume suitable data if necessary.

SECTION - I

Q.1 a) Explain isolated and combined footing. **[08]**

b) Design the footing for the following data: **[12]**

Axial load on column	= 150kN
Size of column	= 250 × 500 mm
Longitudinal reinforcement in column	= 6 bars of 20mm
Allowable pressure on soil	= 250 kN/m^2
Characteristic strength of conc.	= 25N/mm^2
Characteristic strength of steel	= 415N/mm^2

Q.2 a) What is over reinforced section? Explain with the help of sketch. **[08]**

b) A simply supported beam of 4.5m span carries udl of 30kN/m inclusive of self weight. The width of beam is 230mm and is reinforced on tension side only. Design the smallest section. Conc. = M20, steel = Fe 250. Assume load factor = 1.5. **[12]**

Q.3 a) Draw stress block diagram for balanced reinforced beam having rectangular section. **[10]**

b) Give basic assumptions for L.S.M. **[10]**

Q.4 a) Give general requirements of lacking as per I.S. Code. **[10]**

b) Give seismic design requirements for R.C.C. and steel buildings. **[10]**

SECTION – II

Q.5 What are the different insulating materials used for ceiling and partitions? Explain any two in detail. **[10]**

Q.6 What are Sealants? Elaborate the properties of good sealants used in buildings. **[10]**

Q.7 Explain the term Adhesive and elaborate its applications. **[10]**

Q.8 Write a note on manufacturing process of glass. **[10]**

Q.9 Draw the sketch of fixing a glass with aluminium section in partition. **[10]**

MANOHARGAD- VI: (2010 COURSE): SUMMER-2016
SUBJECT: THEORY OF STRUCTURES AND BUILDING MATERIALS-VI

Day: Friday
Date: 29-04-2016

Time: 10:00 AM TO 1:00 P.M.
Max Marks: 100

N.B.:

1) Solve **ANY THREE** from Section-**I** and **ALL FOUR** from Section-**II.**
2) Figures to the right indicate **FULL** marks.
3) Answers to both the sections should be written in separate answer book.
4) Assume suitable data of necessary.
5) Draw illustrative sketches wherever necessary.

SECTION-I

Q.1 **a)** Write a short note on: **(10)**
i) Necessity of combined footing
ii) Pile foundations

b) Find area of rectangular combined footing for following and draw plan for the same data. **(10)**
i) Two columns C1 and C2 are carrying compressive load of 900 kN and 1200kN respectively.
ii) Column C1 is 350 mm x 350 mm and C2 is 420 mm x 420mm
iii) C/C distance between columns is 1.6 m
iv) Soil bearing capacity is 180 kN/m^2

Q.2 **a)** Give general specifications of battening system for steel stanchions. **(06)**

b) A built-up column is composed of two channel sections placed back to back at a distance of 260 mm. find the maximum load it can carry. The length of column is 7 m, with both ends hinged. Use ISLC 400, design battening system for the same .Draw neat sketch. **(14)**

Q.3 **a)** Differentiate between ultimate load method and limit the method. **(06)**

b) Draw earthquake resistant detailing of RCC beam-column junction. **(04)**

c) Calculate area of steel required for a singly reinforced beam 230 mm wide and 420 mm deep to resist ultimate moment of 60 kNm. Assume M20 grade concrete, fe 415 grade steel effective cover 40mm. **(10)**

Q.4 **a)** Design isolated pad footing for a square column 400 mm x 400 mm carrying axial compressive load of 1000 kN. Soil bearing capacity is 220 kN/m^2. Use M20 grade concrete and fe415 grade steel. Use 16 mm diameter bars. Check for one way shear only. Draw neat reinforcement sketch for the same. **(16)**

b) Explain: Raft foundation. **(4)**

SECTION-II

Q.5 What is double skin partition? Explain method of insulation material used in double skin partition? **(10)**

Q.6 Write note on sound insulation materials used for ceilings? **(10)**

Q.7 Write note on mastic, sealant and adhesives used in building industry? **(10)**