Answer all the questions. Support your answers with relevant sketches where necessary. Well drafted and neat sketches shall be given extra credit.

Q.No. Question M.M.
1 Explain the following terms: (any four) [4X4=16]
   (i) Local street
   (ii) National highway
   (iii) Garden city
   (iv) High rise-high density concept
   (v) Ribbon development

2 What were the implications of industrial revolution on towns? Explain the development of modern day town planning in the nineteenth and twentieth century. [12]

   OR

2' Explain the evolution of settlements in India during the vedic period. Explain the socio-economic characteristics of the society during the above period. [12]

3 "River valleys are cradles of civilization". Explain the concept in the backdrop of evolution of settlements. [12]

Contd.....2.
4 Write short notes on the town planning ideas of the following (any two):

a) Sir Patrick Geddes
b) Clarence Stein
c) J. S. Buckingham

5 Sketch the layout of a 30m ROW collector street giving preference to pedestrians and curtailing the vehicular movement. Explain the design with the help of following details:

(a) Plan
(b) Section
Q.No. | Question                                                                                                                                                                                                                                                                         | M.M. |
------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
  1    | Define the term illumination level, what are the factors on which degree of illumination depends upon?                                                                                                                | [10] |
  2    | Why acoustical design is important in an auditorium, What are the various methods of acoustical treatments used in an auditorium?                                                                                           | [10] |
  2’   | Explain sound absorption, what are the different ways by which sound can be absorbed in a concert hall?                                                                                                                                                                          |      |
  3    | Why switches are used in an electrical circuit, explain the difference between tumbler and concealed switch?                                                                                                                                                                   | [10] |
  3’   | How is gas filled lamp different from an incandescent lamp, explain the advantages of a halogen lamp over normal incandescent lamp?                                                                                   |      |
  4    | Explain with working diagram the assembly of different parts of an escalator and how they works in synchronization with each other?                                                                                | [10] |
  5    | What are the different type of air conditioning systems which are commonly used, as an architecture student, suggest which type of air conditioning can be best suited in a lecture hall of 8m X 14 m and why?                                         | [10] |
  6    | Sketch on your answer sheet, the electrical layout of an architect’s office with size 4m X 6m with attached toilet on the short wall. The size of the toilet is 2m X 2.5m.                                               | [10] |

Provide the legend of electrical fixtures used and specification chart for the same.
2015-16
B.Arch. (Winter Semester) Examination
Architecture
Construction and Materials-IV
AR 308N

Maximum Marks: 40 Credits: 05 Duration: Three Hours

Answer all the questions. Assume suitable data if missing.

Q.1. Write short notes on the following with neat sketches (any two): [2x6=12]
   a) Curtain glazing
   b) Wall panelling with neat sketches
   c) Pre stressing of prefabricated structural members

Q.2. Draw the sectional detail of a top runner set for sliding door. [08]

Q.3. Draw a steel roof truss (6m span) in elevation with ridge details. [08]

Q.3'. Draw the eaves detail of aluminium sheet roof covering in section. [08]

Q.4.a) Write down the reasons for development of cracks in buildings and methods to prevent them. [06]
Q.4.b) What are the various types of paints used in building interiors and exteriors? Write about the various constituents of paints in detail. [06]
Use of standards is permitted, however their supply in the examination hall is not guaranteed.
Present the scheme through the to-scale drawn and drafted sketches.
Neat presentation of graphics and write-ups carry additional weight-age within maximum marks.
Concept of design shall be evaluated through viva-voice.
Assume suitable data if missing.

MUSEUM

Design and present a design of a Museum for locks and door-hardware being produced in Aligarh for Locks and Hardware Manufacturers Association on a site measuring 30mx60m (deep) with smaller side abutting a 30m internal road on its West at UPSIDC Tala Nagri at Ram Ghat road Aligarh. Lay out the building (s) with 6m front and 3m all round set backs. The designed spaces worked out for an FAR of 1.25 should have the following:

1. 2nos Exhibition Galleries and General Toilets and other amenities for public
2. 1nos curator's office
3. 1nos workshop
4. 1nos Office of Secretary of the Association with meeting room of capacity 10 and attached toilet and pantry
5. Guard room and parking as per norms considering ECS 1

Present the scheme with following to suitable scale

- Design Concept and Site Layout 15
- Floor Plans 15
- Front and North Side Elevation 10
Answer all the questions.
Assume suitable data, if missing.
Notations used have their usual meaning
Use of IS-800:2007 and Steel Table is permitted.

Q 1A Answer any two from Q1.A (a to c)

a. Find the maximum number of 20mm bolts that can be accommodated in one row in a 180mm wide flat.

b. Two plates of 8mm and 16mm thickness are to be jointed using longitudinal fillet weld. Suggest a suitable size of weld and length of end returns.

c. A butt joint has 12 bolts arranged in diamond pattern. Draw the arrangement of bolts and name the section at which the tensile strength will be critical in the main plate.  

(2)

Q 1B An ISA 100mm × 100mm × 10mm carries a factored tensile force of 100kN. It is to be jointed with a 12mm thick gusset plate. Design a high strength bolted joint when (a) no slip is permitted (b) when slip is permitted. Steel grade is Fe 410

(10)

OR

Contd....2
Q.1B'. Two plates 10mm and 18 mm thick are to be joined by double cover butt joint.
Design the joint for the following data
Factored design load = 750kN
Bolt diameter = 20mm
Thickness of cover plates= 8mm
Grade of steel Fe 415
Grade of bolts 4.6

Q. 2A Explain unsymmetrical bending in purlins of a roof truss

Q. 2B Design a double angle tension member connected on each side of 10mm thick gusset plate to carry an axial factored load of 375 kN. Use 20mm diameter black bolts. Assume shop connections. Assume the yield and ultimate stress of steel used as 250 MPa and 410 MPa respectively.

Q. 3 Design an unstiffened welded plate girder of span 24m to carry a superimposed load of 35kN/m. Check only the moment and shear capacity of the section. Assume the yield and ultimate stress of steel used as 250 MPa and 410 MPa respectively.

Q. 4 Design a built up column comprising of two rolled steel I sections to resist a factored axial compressive load of 4000kN. Length of column is 5m and is restrained in translation and rotation at base but not in translation at top. Use Fe410 grade steel. Also design single lacing system and welded connection of lacing with the main members and neglect the design of the tie plates

OR

Q. 4' Design a built up column comprising of two rolled steel channel sections to resist a factored axial compressive load of 1350 kN. Length of column is 5m and is restrained in translation and rotation at base but not in translation at top. Use Fe410 grade steel. Find the sections of end and intermediate batten and check for forces in battens. Design of connections is not required.
Q. 5 A. What is the impact allowance in percentage to be applied to the vertical forces transferred to the wheels of an electric overhead travelling crane in a gantry girder.

Q. 5 B. The following data refers to a gantry carrying a manually operated overhead travelling crane.

- Crane Capacity : 200KN
- Self-weight of crane girder excluding trolley : 200KN
- Self-weight of trolley, electric motor, hook etc : 40KN
- Minimum hook approach : 1.2m
- Wheel Base : 3.5m
- c/c distance between gantry rail : 16m
- c/c distance between columns (span of gantry girder) : 8m
- Self-weight of rail : 300N/m
- Diameter of crane wheels : 150mm
- Steel of Grade Fe 410.

Determine
(i) the maximum moment and shear force due to vertical loads and
(ii) check whether ISMB 600 with ISMC 300 on compression flange is adequate in limiting deflection

(2+10)

OR

Q. 5'a. Is the shape factor of rectangular cross section higher than the shape factor of an I section. If yes, give reasons

(2)

Q. 5'b. Find the collapse load for a single bay single storey portal frame, fixed at the ends for following data

- Span of beam = 3m
- Moment capacity of Beam = 2M_p
- Concentrated Vertical load at centre of span = 2W
- Concentrated Horizontal Load at column top = W
- Height of column = 3m
- Moment capacity of column = M_p

(10)