Roll No: ----------

UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: B Tech (Fire & Safety Engineering) **Semester: VII**

Subject (Course): Risk Assessment & Planning (Fire Engineering IV) **Max. Marks : 100**
Course Code : FSEG 401 **Duration : 3 Hrs**
No. of page/s:2

Section A
4x5= 20 Marks
Attempt all questions

1. Write short notes on National Building Code and purpose of framing NBC. [4 Marks]
2. Brief of length of stride and its consideration during building evacuation route and exits. [4 Marks]
3. Highlight the need of training & education at work place. [4 Marks]
4. Discuss relative density of movement of people in a building and its application. [4 Marks]
5. Expand institutional building and its sub-types with examples. [4 Marks]

Section B
10x4= 40 Marks
Attempt all questions

6. Routs and exits are important features during building evacuation. Discuss general requirements of routs and exit of a twenty-story building. [10 Marks]
7. Fire safety requirements in modern building is a major concern and NBC has given codes of practices since construction stage to existing building. Give your insight over construction and execution of building fire safety requirements *versus* cost effectiveness of building. [10 Marks]
8. Discuss in detail of classification of building based on construction. Highlight the fire resistant rating of each types of building based on construction. [10 Marks]
9. List various fire protection facilities available in modern building. Highlight their need and applications during emergency evacuation. [10 Marks]

Section C
20x2=40 Marks
Attempt any two questions

10. An auditorium of capacity 2000 has four columns. Each columns of seat is having a width of 16m with total evacuation time two minutes during any fire emergency. Calculate -

    (i) Distance travelled if aisles are closed either side. [7 Marks]

    (ii) Distance travelled if aisles are open either side. [7 Marks]

    (iii) Width and number of exits required [6 Marks]

    Assume the speed of motion of people in unary stream as 40m/min. and that in primary stream as 16m/min., width of aisle is 2.0m, specific traffic capacity of exit, q = 50 persons/m-min, Width of each opening is 2m.

11. Parameters of movement of people in a building are major consideration in planning and designing of building evacuation paths. Discuss in detail of various parameters related to movement of people in a building. [20 Marks]

12. Fire safety audits has major role in improving fire safety condition of any building. Explain in detail of -

    (i) Fire safety Audits, their types & its importance. [8 Marks]

    (ii) Steps involved in conducting fire safety audit at work place [6 Marks]

    (iii) Advantage and disadvantage of internal & external audit. [6 Marks]

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Section A

2x10= 20 Marks

Attempt all questions

1. Complete the following sentence:
   i. NBC part IV is applicable for ----------
   ii. Exits used in occupancies are----------
   iii. Floor area ration is ----------
   iv. The standard size of tread & Riser is---------- respectively
   v. Fire safety audit is ----------
   vi. FRR values for horizontal exit is ----------
   vii. As per NBC Parts IV maximum numbers of steps in a single flight of staircase are----------
   viii. Arson is----------
   ix. Length of stride is----------
   x. Unary or elementary stream is----------

Section B

10x4= 40 Marks

Attempt all questions

2. Discuss various types of movement in a building and their importance in designing emergency evacuation paths. [10 Marks]
3. List various fire protection facilities available in modern building. Highlight their need and applications during emergency evacuation. [10 Marks]

4. Fire safety audits are a parameter assessing fire safety arrangement in an occupancy or building. List out objectives and steps involved in fire safety audits of occupancy. [10 Marks]
5. Exits are important means of access for emergency evacuation in any occupancy. Justify the requirements of designing of an exit with respect to its cost effectiveness or capital investment. [10 Marks]

Section C

20x2=40 Marks

Attempt any two questions

6. Building evacuation time is one of major concern while designing building emergency evacuation routes. Discuss in detail of building evacuation time based on maximum travel distance. [20 Marks]
7. Seating arrangements are most important considerations during designing of building occupancy or an auditorium. Briefly discuss about design & general considerations listed in NBC for seating arrangement. [20 Marks]
8. An auditorium of capacity 2000 has four columns. Each columns of seat is having a width of 16m with total evacuation time two minutes during any fire emergency. Calculate -
    (iv) Distance travelled if aisles are closed either side. [7 Marks]
    (v) Distance travelled if aisles are open either side. [7 Marks]
    (vi) Width and number of exits required [6 Marks]

    Assume the speed of motion of people in unary stream as 40m/min. and that in primary stream as 16m/min., width of aisle is 2.0m, specific traffic capacity of exit, q = 50 persons/m-min, Width of each opening is 2m.