

Name:	 <b>UPES</b> <small>UNIVERSITY WITH A PURPOSE</small>
Enrolment No:	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, May 2019**

**Course: Fire Engineering III (Material & Fire Control)**

**Semester: VI**

**Program: B Tech- Fire & Safety Engineering**

**Time 03 hrs.**

**Course Code: FSEG 302**

**Max. Marks: 100**

**Instructions:**

**SECTION A**

S. No.	Questions	Marks	CO
Q 1	Name various aspect in connection of calculating fire resistance rating of any structural members.	4	CO1
Q 2	Explain the stressing of concrete and its types.	4	CO2
Q 3	Brief of glass and its various usage in a building or compartment.	4	CO1
Q 4	Explain the various technique used or recommended for maintaining/ justifying structural integrity.	4	CO2
Q 5	Differentiate between control and uncontrolled fire with an example.	4	CO3

**SECTION B**

Q 6	Discuss in detail about various aspect of estimation of fire duration and its behavior for a structural member.	10	CO3																																
Q 7	<p>Justify the need of preliminary survey and highlight of its effectiveness. List out the various steps involved in conducting preliminary survey.</p> <p style="text-align: center;">OR</p> <p>A manufacturing process industry uses the following material. Calculate the Fire load by using the following data: -</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Material</th> <th rowspan="2">Quantity in Kg.</th> <th rowspan="2">Area in Sq. mtr.</th> <th colspan="2">Calorific value</th> </tr> <tr> <th>(kJ/kg)</th> <th>(Kcal/kg)</th> </tr> </thead> <tbody> <tr> <td>Paper</td> <td>100</td> <td>100</td> <td>15600</td> <td>3725.28</td> </tr> <tr> <td>Wood</td> <td>2000</td> <td>300</td> <td>17500</td> <td>4179</td> </tr> <tr> <td>Coal</td> <td>10000</td> <td>500</td> <td>20000</td> <td>4776</td> </tr> <tr> <td>Rubber</td> <td>500</td> <td>200</td> <td>40000</td> <td>9552</td> </tr> <tr> <td>Petroleum product</td> <td>5000</td> <td>400</td> <td>43000</td> <td>10268.4</td> </tr> </tbody> </table>	Material	Quantity in Kg.	Area in Sq. mtr.	Calorific value		(kJ/kg)	(Kcal/kg)	Paper	100	100	15600	3725.28	Wood	2000	300	17500	4179	Coal	10000	500	20000	4776	Rubber	500	200	40000	9552	Petroleum product	5000	400	43000	10268.4	10	CO4
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Q 8	Explain various reparability technique in details and responsibility of team members involved in it.	10	CO2																																

Q 9	A three story building is to be constructed of 4 hours of fire duration. Being an expert analyze the various recommendation suggested by a structural designer in connection to integrity of structure.	10	CO4
<b>SECTION-C</b>			
Q 10	Identification or demarcation of fire areas plays important role in functional planning of any building or zone. Describe in detail the fire zone, its types and role of concerned authority involved in functional planning and approval of fire zones.	20	CO3
Q 11	<p>List out the purpose of providing fire resistance boards. Describe in detail of various fire resistance board and evaluate the condition of a most suitable fire resistance board if structural integrity is to be maintained for 2 hours of fire resistance.</p> <p style="text-align: center;">OR</p> <p>A building has a square plan with a floor area of 400 m<sup>2</sup> and has windows on opposite walls. If the fire load of the building is 75 kg/m<sup>2</sup> with a window opening of 25%, 50% &amp; 100% and the floor to ceiling height as 3.0m, calculate the fire resistance period required for the building.</p>	20	CO5

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**SECTION A**

S. No.	Questions	Marks	CO
Q 1	Explain the ventilation control fire and aspect considered in building design.	4	CO2
Q 2	Brief of schematic diagram, its need and effectiveness in building design.	4	CO1
Q 3	Explain the standard heating condition used in the connection of fire resistance testing of materials.	4	CO2
Q 4	Name various types of fire resistant board and highlight its selection criteria.	4	CO1
Q 5	Discuss most common and effective reparability technique used for regaining structural stability.	4	CO2

**SECTION B**

Q 6	Briefly discuss fire load/ fire load density of any load bearing and non-load bearing structural members. Highlight factors effecting fire load of any structural members in a building.	10	CO3
Q 7	<p>Discuss general principle of building by laws and role &amp; responsibility of expert panel involved in it.</p> <p style="text-align: center;">OR</p> <p>Discuss fire resistant partition and its types in detail. Highlight the purpose of providing fire resistant partition and factors contributing in increasing fire resistance rating of partition members.</p>	10	CO2 CO3
Q 8	Explain principle of calculation of fire resistance limit of structural members. Also, discuss various factor influencing coefficient of fire resistance of a structural member.	10	CO2
Q 9	Analyze the standard condition of steel structure members as load bearing member in a building. Explain the effect of temperature on steel member with respect to rise in temperature.	10	CO3

**SECTION-C**

Q 10	Building by laws are the most important for designing, constructing and ensuring the general requirements of the building. Discuss its general principle and role of expert panel.	<b>20</b>	<b>CO3</b>
Q 11	Discuss assessment of fire severity and preliminary survey in a building or structure. Explain in detail of assessment of damages to (i) Concrete members (ii) Steel members  OR A building has a square plan with a floor area of 400 m <sup>2</sup> and has windows on opposite walls. If the fire load of the building is 75 kg/m <sup>2</sup> with a window opening of 25%, 50% & 100% and the floor to ceiling height as 3.0m, calculate the fire resistance period required for the building.	<b>20</b>	<b>CO5</b>