


Name : Enrolment No:		
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination, December 2022</b>		
<b>Programme Name: B Tech- Fire &amp; Safety Engineering</b> <b>Course Name: Fire Engineering III</b> <b>Course Code: HSFS 3027</b> <b>No of pages 01</b>		<b>Semester: V</b> <b>Time : 03hrs</b> <b>Max. Marks: 100</b>
<b>SECTION A</b> <b>Attempt all question. Each question carries 4 marks.</b>		
Sr. No	Questions	CO
Q 1	Write short notes on Standard pressure condition performed during testing of materials.	CO1
Q 2	What is natural and manmade fibers?	CO1
Q 3	Explain the process “spalling of concrete”	CO2
Q 4	Brief the role of structural engineer in reparability of structure.	CO2
Q 5	Differentiate between unstressed and stressed concrete.	CO3
<b>SECTION B</b> <b>Attempt all question. Each question carries 10 marks.</b>		
Q 6	Explain the ventilation control fire in connection to post flashover condition. OR Explain the standard heating condition used in the connection of fire resistance testing of materials.	CO2
Q 7	Justify the need of schematic diagram, and its effectiveness in fire safety design.	CO3
Q 8	Create an inspection checkpoint for verifying building materials to be used as a fire protection material against any severe fire.	CO5
Q 9	Discuss various types of fire-resistant board and highlight their selection criteria.	CO1
<b>SECTION B</b> <b>Attempt all question. Each question carries 20 marks.</b>		
Q 10	Explain in detail of fire behavior of building material to be used as structural members as load bearing / non load bearing or protective members.	CO2
Q 11	(a) A wooden beam requires a cross section of 200 mm × 300 mm to resist the dead load and live load coming over it. Determine the cross section required. If it has to resist a fire of 4 hr duration. Assume the rate of combustion as 0.3 mm/min (b) Justify how fire load is one of the susceptibility criteria for building fire. <b>OR</b> (a) For a beam of breadth 0.25 m and depth 0.50 m, if the load of the beam is considered to be 50% of the allowable load, calculate the fire resistance of the beam. (Assume beam factor for % of allowable load > 75% = 1; Between 75%-50%= 1.1 and upto 50% = 1.3) (b) Determine the time to general failure and localized failure of the timber floor of 19 mm thick under sprinkler failure scenario. (Assume average charring rate of wood = 0.009 mm/s, Timber density= 600 kg/m <sup>3</sup> )	CO4