Hall Ticket Number :										

R-19

Code: 19B13ET

M.Tech. III Semester Regular & Supplementary Examinations March 2023

Industrial Safety

(Common to SE & EPS)

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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			Marks	CO	BL
		UNIT–I			
1.	a)	What are the types of mechanical and electrical hazards in an industrial setting? Describe the causes and preventive measures that can be taken to control these hazards.	6M	CO1	L1
	b)	What are the salient points of the Factories Act 1948 with respect to health and safety? Explain how it ensures that the workplaces are safe and healthy for the workers.	6M	CO1	L2
		OR			
2.	a)	What are the safety color codes used in industries? Explain how these codes help in identifying the potential hazards and ensuring safety.	6M	CO1	L1
	b)	What are the different types of fires that can occur in an industrial setting? Explain the equipment and methods used for fire prevention and firefighting.	6M	CO1	L2
		UNIT–II			
3.		What are the different types of maintenance? Describe each type with examples and explain when each type is used in an industrial setting.	12M	CO2	L2
		OR			
4.	a)	How is maintenance cost related to replacement economy?	6M	CO2	L2
	b)	Explain the concept of service life of equipment and how it impacts maintenance costs.	6M	CO2	L2
		UNIT–III			
5.		Explain the causes and effects of wear in industrial settings. How can wear be reduced using different methods?	12M	CO3	L3
		OR			
6.		What are the different methods used for corrosion prevention? Explain how each method works and its applications in industrial settings.	12M	CO3	L3
		UNIT–IV			
7.		Explain the concept of decision tree and how it is used for fault tracing. Provide examples of its need and applications.	12M	CO4	L3
		OR			
8.		How can fault tracing be used to diagnose and resolve problems in industrial boiler?	12M	CO4	L3
		UNIT–V			
9.		What is periodic inspection and why is it necessary for maintaining industrial equipment? Explain the degreasing, cleaning, and repairing schemes used for periodic inspection, and provide examples of when each scheme is used.	12M	CO5	L3
		OR			
10.		What is preventive maintenance and why is it important in industrial settings? Describe the steps and advantages of preventive maintenance and provide its application in Diesel generating (DG) sets.	12M	CO5	L3

****END****

Hall Ticket Number :										

R-19

Code: 19B13BT

M.Tech. III Semester Regular & Supplementary Examinations March 2023

Design of Prestressed Concrete Structures

(Structural Engineering)

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60 Marks)

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Marks

UNIT–I

1. a) Explain with sketches 'Hoyer's long line system of pretensioning'. 5M

   b) A prestressed concrete beam with a rectangular section 120 mm wide by 300 mm deep supports a udl of 4 kN/m, which includes the self-weight of the beam. The effective span of the beam is 6 m. The beam is concentrically prestressed by a cable carrying a force of 180 kN. Locate the position of the pressure line in the beam. 7M

OR

2. A Prestressed pretensioned beam of 200mm x 300mm is prestressed by 10 wires each of 7mm diameter, initially stressed to 1200Mpa with their centroids located 100mm from the soffit. Estimate the final percentage loss of stress due to elastic deformation, creep, shrinkage and relaxation. Assume relaxation of steel = 60MPa, Es = 210GPa, Ec= 36.9 GPa, Residual Shrinkage strain = 300 x 10^{-6} , creep coefficient =1.6 12M

UNIT–II

3. The cross-section of a symmetrical I-section prestressed beam is 500 mm by 650 mm (overall), with flanges and web 150mm thick. The beam is post-tensioned by cables containing 45 wires of 5mm diameter high-tensile steel wires at an eccentricity of 250mm. The 28-days strength of concrete in compressing is 40N/mm^2 and the ultimate tensile strength of wires is 16500N/mm^2. Assuming that the grouting of the tendons is 100 percent effective, determine the ultimate moment of the section as per IS 1343. 12M

OR

4. A prestressed concrete beam 10m span of rectangular section 200mm wide and 600mm deep, is axially prestressed by a parabolic cable located at an eccentricity of 100mm at midspan and zero at the supports The beam supports a total udl of 4kN/m which includes the self-weight of the member. Evaluate the forces and principal stresses at support section.the density of concrete is 24 kN/mm3 12M

UNIT–III

5. A prestressed concrete beam 300 mm wide and 600 mm deep is prestressed with tendons of area 250 mm^2 located at a constant eccentricity of 100 mm and carrying an initial stress of 1050 MPa. The span of the beam is 10.5 m. Calculate the percentage loss of stress in tendons if (i) the beam is pretensioned and (ii) the beam is post tensioned, using the following data:

   Modular ratio = 6; Anchorage slip = 1.5 mm; Friction coefficient for wave effect = 0.0015 / m; Ultimate creep strain = 40 x 10^{-6} and 20 x 10^{-6} mm / mm per N/mm^2 for pre tensioned and post tensioned member; Shrinkage of concrete = 300 x 10^{-6} for pre tensioned and 200 x 10^{-6} for post tensioned member and relaxation of steel stress = 2.5%. 12M

OR

6. A prestress concrete beam spanning over 8 m is of rectangular section, 150 mm wide and 300 mm deep. The beam is prestressed by a parabolic cable having an eccentricity of 75 mm below the centroidal axis at the centre of span and an eccentricity of 25 mm above the centroidal axis at the support sections. The initial force in the cable is 350 kN. The beam supports 3 concentrated loads of 10 kN each at intervals of 2 m. E_c = 38 kN/mm^2.
   a) Neglecting losses of prestress, estimate the short-term deflection due to (prestress + self-weight); and
   b) Allowing for 20 percent in prestress, estimate the long-term deflection under (prestress+ self-weight + live load), assuming creep coefficient as 1.80.

UNIT–IV

7. A precast Pretensioned beam of rectangular section has a breadh of 100 mm and depth of 200mm. The beam with an effective span of 5m is prestressed by the tendons with their centroids coinciding with the bottom kern. The initial force in the tendon is 150KN. The loss of prestress is15%. The top flange width is 400 mm with the thickness of 40mm. If the composite beam supports a liveload of 7 KN/m^2, calculate the resultant stresses developed if the section is unpropped. M40 and M20 concrete are used for Pretensioned and in-situ concrete. 12M

OR

8. A Continuous concrete beam ABC (AB=BC) has a uniform cross-section throughout its length. The beam is pre-stressed by a straight cable carrying an effective force of P. The cable has an eccentricity ‘e’ towards the soffit at end supports A and C and e/2 towards the top fibre at the central support B. Show that the cable is concordant. 12M

UNIT–V

9. A two-span continuous beam ABC (AB=BC=10m) is of rectangular section, 200 mm wide and 500 mm deep. The beam is prestressed by a parabolic cable, concentric at end supports and having an eccentricity of 100 mm towards the soffit of the beam at centre of spans and 200 mm towards the top of beam at mid support B. the effective force in the cable is 500 kN.
   a) Show that the cable is concordant.
   b) Locate the pressure line in the beam when, in addition to its self-weight, it supports an imposed load of 5.6 kN/m 12M

OR

10. Design a prestressed concrete water tank of diameter 15 m and height 8m. Assuming a flexible base, design the wall of the tank and find the spacing of 5 mm diameter high tensile steel wire for circumferential prestressing. Take f_{ct} = 14 N/mm^2 and f_{pe} = 1100 N/mm^2. Use M40 grade concrete. 12M

END