

PRESTRESSED CONCRETE**Professional Elective- V****(CIVIL ENGINEERING)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

	Marks	CO	Blooms Level
1. a) Discuss the principle and types of pre stressing.	5	CO1	2
b) Explain about different methods of pre-stressing	5	CO1	2
(OR)			
2. A PSC beam of span 8m cross section 100mm x 300mm is pre stressed by a straight cable carrying an effective pre stressing force 250kN located at an eccentricity of 40mm. The beam supports a live load of 1.2 kN/m.	10	CO1	3
i. Calculate the resultant stress distribution for the central cross section of the beam. The density of concrete 24K _N /m ³			
ii. Find the magnitude of pre stressing force with an eccentricity of 40mm which can balance the stresses due to dead load and live load at the bottom fiber of the central section of the beam.			

UNIT-II

3. a) Explain loss of pre-stress due to shrinkage of concrete	3	CO2	2
b) A simply supported post-tensioned concrete beam of span 10 m has section 250 mm × 450 mm is subjected to an initial pre-stressing force of 350kN applied at an eccentricity of 100 mm by tendons of 350 mm ² . Find the total loss of prestress in the tendons using the following data: ES = 2×10 ⁵ N/mm ² , EC = 35 kN/mm ² , anchorage slip = 3 mm creep coefficient of concrete = 1.5,	7	CO2	3
(OR)			
4. a) Explain Loss due to elastic shortening in pre-tensioned and post tensioned pre-stressed concrete with reasons	3	CO2	2
b) A concrete beam is pre-stressed by a cable carrying an initial pre-stressing force of 450kN. The cross-sectional area of the wires in the cable is 350 mm ² . Calculate the percentage loss of stress in the cable only due to shrinkage of concrete using IS: 1343 recommendations assuming the beam to be, (a) pre-tensioned and (b) post-tensioned. Assume E _s = 200Gpa and age of concrete at transfer = 8days.	7	CO2	3

UNIT-III

5. A Pre-tensioned concrete girder with 400mm X 800 mm. It is prestressed with tendons of area 2000 mm ² with effective prestress of 1600 MPa and grade of concrete is M40. Estimate the flexural strength of the member as per IS:1343 -2012. Take effective cover as 100 mm	10	CO3	3
(OR)			
6. A double T-section having a flange of 1200 mm wide and 150 mm thick is prestressed by 4700 mm of high tensile steel located at an effective depth of 1600 mm. The ribs have a thickness of 150 mm each. If the cube strength of concrete is 40 N/mm and tensile strength of steel is 1600 N/mm, determine the flexural strength of double T-girder using IS:1343 provisions.	10	CO3	3

UNIT-IV

7. The concrete beam of size 120mmx250mm is subjected to a horizontal prestress at the centroid is 8Mpa and the maximum shear force on the beam is 100kN, calculate the maximum principal tensile stress. What is the minimum vertical pre-stress required eliminating this principal tensile stress. 10 CO4 3

(OR)

8. A pre-stressed concrete beam 120mm x 250mm is subjected to an ultimate shear force of 80kN. The compressive pre-stress at the centroid is 5MPa and concrete grade is M40. grade of steel is Fe:415. cover to reinforcement is 40mm. design suitable shear reinforcement as per IS:1343. 10 CO4 3

UNIT-V

9. a) discuss about the effect of tendon profile on deflection 3 CO5 2
b) A rectangular beam 250×500 mm in section is simply-supported over a span of 10m. It is pre-stressed with a parabolic cable which has a maximum eccentricity of 200 mm at mid span and 40 mm at support sections. Effective pre-stressing force is 1400 kN. Concrete grade is M40. Determine the deflection due to pre-stress and self weight. 7 CO5 3

(OR)

10. The cross-sectional area of a concrete beam is 120mm x 300mm subjected to UDL of 3Kn/m over the span of 6m. The beam is subjected to a straight cable carrying an effective pre stressing force of 180Kn at constant eccentricity 50mm. Take $E_c = 38\text{GPa}$ and modulus of rupture 5MPa., area of the cable 200mm^2 and modular ratio= 6, estimate the deflection of the beam at following stages 10 CO5 3
(a) Working load (b) Cracking load
(c) 1.5 times the cracking load

UNIT-VI

11. A two span continuous beam ABC ($AB = BC = 12$ m) has a uniform cross section with a width of 100 mm and depth of 300 mm. A cable carrying an effective pre-stressing force of 500 kN is provided at a constant eccentricity of 75mm towards soffit of the beam. a. Determine resultant moment developed at B due to pre-stressing only. b. Determine resultant moment developed at B when a load of 5kN/m is applied. 10 CO6 3

(OR)

12. Explain the following i) Concordant cable profile ii) Primary and secondary moments in a continuous beam. 10 CO6 2

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	<u>UNIT-I</u>	Mark s	CO	Blooms Level
1. a)	Compare the extra-terrestrial & terrestrial solar radiation	5	CO1	5
b)	List & describe in detail about the non-conventional resources	5	CO1	2
	(OR)			
2.	Discuss in detail about the potential of renewable energy in India	10	CO1	6
	<u>UNIT-II</u>			
3. a)	Compare the concentrating & non-concentrating type solar collectors	5	CO2	5
b)	Explain about the parabolic trough collector with sketch	5	CO2	2
	(OR)			
4.	Discuss briefly about the extraction of power from a solar PV cell	10	CO2	6
	<u>UNIT-III</u>			
5. a)	List the advantages of wind energy over conventional energy sources	5	CO3	2
b)	Why PMSG is preferred mostly in WECS.	5	CO3	1
	(OR)			
6.	Derive the expression for power extracted from wind considering Betz model of a wind turbine.	10	CO3	5
	<u>UNIT-IV</u>			
7. a)	Explain the factors that affect the performance of a digester.	5	CO4	2
b)	Explain with neat sketch about the anaerobic digestion process?	5	CO4	2
	(OR)			
8. a)	What are the advantages and disadvantages of geothermal energy?	5	CO4	2
b)	Explain about Indian type bio gas plant with help of neat sketch?	5	CO4	6
	<u>UNIT-V</u>			
9.	Explain with neat sketch about the tidal power generation. What are the limitations?	10	CO5	2
	(OR)			
10.	Explain the floating type wave power generators in detail	10	CO5	2
	<u>UNIT-VI</u>			
11. a)	Explain about open loop MHD power generation with the help of sketch.	5	CO6	2
b)	List the advantages of MHD power generation?	5	CO6	2
	(OR)			
12. a)	Explain the need for DEC	5	CO6	2
b)	Describe in detail about the MHD closed loop power generation	5	CO6	2

**Mobile Computing
(INFORMATION TECHNOLOGY)****Time: 3 Hours****Max Marks: 60**

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	Describe the architecture of mobile computing systems and the concept of generation of mobile services. How do mobile system networks support these services?	10	CO1	L1
(OR)				
2.	Describe the evolution of wireless communication from its early beginnings to modern generations. Explain the characteristics and key features of each generation of mobile services.	10	CO1	L1
<u>UNIT-II</u>				
3. a)	Distinguish between the new data services available in GSM and their applications	5	CO2	L2
b)	Describe briefly the Handover in GSM	5	CO2	L1
(OR)				
4.	Illustrate the GSM system architecture with a neat sketch. Describe the key subsystems and interfaces involved in GSM communication.	10	CO2	L3
<u>UNIT-III</u>				
5.	Compare and contrast ALOHA, Slotted ALOHA, and CSMA MAC protocols. Highlight how each protocol manages access to the shared medium.	10	CO3	L4
(OR)				
6.	Explore hidden and exposed terminal, near and far terminal problem with neat sketch	10	CO3	L3
<u>UNIT-IV</u>				
7.	Explain the primary goals, assumptions, and requirements, Entities, and terminology of Mobile IP in enabling mobility over the Internet.	10	CO4	L2
(OR)				
8.	Explain the mechanisms of agent discovery, location management, and registration in Mobile IP.	10	CO4	L2
<u>UNIT-V</u>				
9.	Explain the working of Traditional TCP and contrast it with Indirect TCP and Snooping TCP used in mobile environments.	10	CO5	L2
(OR)				
10.	Describe Mobile TCP and discuss its mechanism for handling disconnections and maintaining end-to-end TCP semantics in mobile networks.	10	CO5	L2
<u>UNIT-VI</u>				
11.	Describe various applications of MANETs in real-world scenarios and classify the main routing algorithms used in MANETs.	10	CO6	L2
(OR)				
12.	Explain the following four protocols/technologies: WAP, Bluetooth, XML, and Java Card. State their role and importance in mobile computing.	10	CO6	L2

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	Describe the Rapid Prototyping Process Chain in detail with steps and examples.	10	01	03
(OR)				
2. a)	Write short notes on Commonly Used Terms in Rapid Prototyping.	05	01	02
b)	What are the main roles and functions of prototypes? How do you think rapid prototyping satisfies these roles?	05	01	02
<u>UNIT-II</u>				
3. a)	List the applications of SGC in industry.	05	02	02
b)	Differentiate between laser and laser scanning in SLA.	05	02	03
(OR)				
4.	Explain the complete process of Solid Ground Curing (SGC) with suitable diagrams.	10	02	02
<u>UNIT-III</u>				
5.	Explain the step-by-step process of FDM with neat diagrams.	10	03	02
(OR)				
6. a)	State the working principle of LOM.	05	03	02
b)	What is the basic working principle of Fused Deposition Modeling (FDM)?	05	03	02
<u>UNIT-IV</u>				
7.	Describe the working principle and specifications of SLS in detail.	10	04	03
(OR)				
8. a)	What are the specifications of Selective Laser Sintering (SLS)?	05	04	02
b)	Write short notes on models and specifications of 3D Printing (3DP).	05	04	02
<u>UNIT-V</u>				
9. a)	What are some of the limitations of the solutions, both generic and special cases, described to solve STL-related problems?	05	05	02
b)	Mention any two generic solutions for STL file repairs.	05	05	02
(OR)				
10. a)	What is the common format used by RP systems? Describe the format and illustrate with an example.	05	05	02
b)	Differentiate between valid and invalid tessellated models.	05	05	03
<u>UNIT-VI</u>				
11. a)	How does RP support the application-material relationship?	05	06	02
b)	Compare the relative merits of using LOM parts with SLA parts for investment casting	05	06	03
(OR)				
12. a)	Define customized implants and prosthesis in the context of RP.	05	06	02
b)	Describe how RP models can be used for pre-surgical operation planning. Use appropriate examples to illustrate your answer.	05	06	02