Scheme – I

Sample Question Paper

Program Name : **Civil Engineering Program Group**

Program Code : **CE/CR/CS**

Semester : **Fifth**

22508

Course Title : **Precast and Pre-stressed Concrete (Elective)**

Max. Marks : **70** **Time : 3 Hours**

Instructions:

1) All questions are compulsory.
2) Illustrate your answers with neat sketches wherever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data, if necessary.
5) Preferably, write the answers in sequential order.
6) Use of non-programmable electronic pocket calculator is permissible.
7) Mobile phone, pager and any other electronic communication devices are not permissible in examination hall.

Q.1 Attempt Five of the following. **10 Marks**

a) State any four non structural components for which precast elements can be used..
b) State any four precast structural building components that can be used for speedy construction of building..
c) Define modules and modular coordination.
d) Define pre tensioning and post tensioning in case of pre stressed concrete.
e) State four necessary requirements of high grade materials for pre stressed concrete.
f) List any four losses in post tensioned pre stressed concrete .
g) Explain any four assumptions in analysis of pre stressed concrete beams. .

Q.2 Attempt Three of the following. **12 Marks**

a) State any four advantages and four disadvantages of precast concrete.
b) Describe any two design considerations for precast box culvert elements.
c) Describe with sketch any two joints for precast elements of door and window frames.
d) The damaged road due to earthquake is to be repaired immediately. Recommend suitable precast elements and justify the use of them.

Q.3 Attempt Three of the following. **12 Marks**

a) Explain the procedure of manufacturing non load bearing precast wall panels with neat sketch
b) Differentiate between mixed and composite construction with four points.
c) Distinguish between pre stressed concrete and reinforced concrete with respect to large span beams, slabs, electric poles and railway sleepers.
d) State the situation in which wire, cable and tendon are used with justification

Q.4 Attempt Three of the following. 12 Marks

a) Calculate the number of precast slab panels and number of beams using specifications for components as per I.S.15916-2010 for the room of size 3 m x 4m..

b) Differentiate between losses in pre stress due to shrinkage and creep of concrete with any two points and state two remedial measures to avoid them.

c) Illustrate cable profiles for concentric straight and parabolic cables with sketches.

d) Explain the effect of concentric and eccentric straight cables on stresses at mid span and at support with formulae.

e) A beam of span 25 m is to be pre stressed. Suggest the suitable cable profile with reasons.

Q.5 Attempt Two of the following. 12 Marks

a) Depict the effect of prefabricated building on the surrounding environment with respect to noise pollution , stacking of elements and transportaion.

b) Explain Hoyer system of pre stressing with respect to process and applications with sketch.

c) State with justification the situations in which Freyssinet , Magnel Blaton and Gifford Udall systems are applied.

Q.6 Attempt Two of the following. 12 Marks

a) A pre tensioned concrete beam 100 mm wide and 300 mm deep,is prestressed by straight wires carriyng an initial force of 150 kN at an eccentricity of 50 mm. Calculate the percentage loss of prestress due to elastic deformation of concrete . Take area of wire= 188 mm^2, Es= 210 GPa and Ec = 35 GPa.

b) A concrete beam of 10 m span, 100 mm wide and 300 mm deep is prestressed by one cable. The area of cable is 200 mm^2 and initial stress in cable is 1200 MPa. Cable is Parabolic with an eccentricity of 50 mm above the centroid at supports and 50 mm below at the centre of span. If the cable is tensioned from one end only, calculate the percentage loss of stress due to friction. Assume μ=0.35.K=0.0015 per m.

c) A rectangular concrete beam of size 200 mm x 300 mm deep is prestressed by means of 15 wires of 5 mm diameter located at 65 mm from the bottom of the beam and 3 wires of 5 mm diameter , 25 mm from the top. Calculate the stresses at the extreme fibres of the mid span section if pre stressing is 840 MPa and live load is 8 kN/m. Take span= 6 m and density of concrete = 24 kN/m^3 . Sketch the stress distribution.

Scheme - I

Sample Test Paper - I

Program Name : **Civil Engineering Program Group**

Program Code : **CE/CR/CS**

Semester : **Fifth**

22508

Course Title : **Precast and Pre-stressed Concrete (Elective)**

Max. Marks : **20** **Time : 1 Hour**

Instructions:

1) All questions are compulsory.
2) Illustrate your answers with neat sketches wherever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data, if necessary.
5) Preferably, write the answers in sequential order.
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Q.1 Attempt Four of the following. **08 Marks**

a) State four materials used for precast concrete elements.

b) Enlist four structural components for which precast elements can be used.

c) Describe any two tests on precast components as per Indian Standard.

d) State four precast structural building components.

e) State any four applications of pre stressed concrete.

f) State two applications of pre stressed concrete .

Q.2 Attempt Three of the following. **12 Marks**

a) State four advantages and four disadvantages of precast concrete members.

b) Describe modular co-ordination and state two design considerations with IS provisions for prefabricated elements.

b) State two requirements of structural joints and their two design considerations for prefabricated elements.

c) Recommend four relevant equipments required for the construction of staircase using precast elements with justifications.

d) State four properties of concrete and four properties steel required in pre stressed concrete design.

Scheme – I

Sample Test Paper - II

Program Name : **Civil Engineering Program Group**

Program Code : **CE/CR/CS**

Semester : **Fifth**

22508

Course Title : **Precast and Pre-stressed Concrete (Elective)**

Max. Marks : **20** **Time : 1 Hour**

Instructions:

1) All questions are compulsory.
2) Illustrate your answers with neat sketches wherever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data, if necessary.
5) Preferably, write the answers in sequential order.
6) Use of non-programmable electronic pocket calculator is permissible.
7) Mobile phone, pager and any other electronic communication devices are not permissible in examination hall.

Q.1 Attempt Four of the following. **12 Marks**

a) Propose the suitable method of pre stressing for bridge girder and electric pole .

b) Define pre tensioning .

c) Explain loss due to friction .

d) State various losses of pre stress in pre tensioning method.

e) Sketch the profiles for eccentric straight and parabolic cables.

f) State the steps involved in design of simply supported rectangular pre tensioned beam .

Q.2 Attempt Three of the following. **12 Marks**

a) Explain Hoyer system of pre stressing with diagram.

b) State the IS recommendations of percentage losses in pre tensioning and post tensioning methods .

c) A post tensioned beam of span 10 m and cross section 200 mm x 300 mm ,is prestressed with a straight cable of area 320 mm^2 located at a constant eccentricity of 50 mm. The initial stress in the cable is 1000 MPa. Calculate the loss due to creep of concrete if creep coefficient is 1.60. Take Es = 210 kPa and Ec = 35 kPa.

d) State any four assumptions in analysis of pre stressed concrete beams.

e) A pre tensioned beam of overall size 300 mm x 600 mm has a pre stress of 1500 kN. The beam carries a udl of 6 kN/m over entire span. Compute the fibre stresses at mid span if eccentricity =150 mm.