Code No:**R32015** **R10** **Set No. 1**

III B.Tech II Semester Supplementary Examinations, November - 2017

DESIGN & DRAWING OF CONCRETE STRUCTURES -II

(Civil Engineering)

Time: 3 Hours **Max. Marks:75**

Note: Answer any ONE question from PART-A and THREE questions from PART-B
(IS Code books are permitted)

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PART-A

1 The $T-$beam floor consists of $12cm$ thick R.C. slab monolithic with $30cm$ wide beams. The beams are spaced at $3.5m$ center to center and their effective span is $8m$. [30M]
Design an intermediate beam and an end beam if the superimposed load on the slab is $6.5\frac{kN}{m^2}$. Use $M20$ mix and TMT 415 grade steel.

2 Design and draw reinforcement details of a combined footing for two reinforced concrete columns using the following data: [30M]
Size of column = $300mm\times300mm$
Spacing of column = $4m$
Load transmitted by each column = $500kN$
SBC of soil = $150MPa$
Adopt $M20$ grade concrete and $Fe-415$ grade steel.

PART-B 3x15=45

3 a) What is the necessity of using high-strength steel and high-strength concrete in pre-stressed concrete? [7M]
b) What are the advantages of pre-stressed concrete members over R.C.C. members? [8M]

4 a) Explain with neat sketch Magnel-Blaton system of pre-stressing. [9M]
b) Discuss length and curvature effect in case of curved cables. [6M]

5 A straight post-tensioned concrete member is $15m$ long with a cross-section of $400mm\times400mm$ is pre-stressed with $900mm^2$ of steel wires. This steel is made of four tendons with $225mm^2$ *per tendon*. The tendons are tensioned to a stress of $1050\frac{N}{mm^2}$. [15M]
(i) Determine the loss of pre-stress in each tendon due to elastic shortening of concrete.
(ii) Find the average percentage loss of pre-stress.
(iii)Compute the actual stresses to which the individual tendons should be tightened if it is desired that after the last tendon is tightened a stress of $1050\frac{N}{mm^2}$ be maintained in each tendon.
Take modular ratio $=6$.

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6 A pre-stressed concrete beam of rectangular section $400mm \times 600mm$ is provided with a parabolic tendon with zero eccentricity at supports and an eccentricity of $100mm$ at the centre of span. The span of the beam is $6m$. The total external load on the beam is $35\frac{kN}{m}$ on the whole span. The tendon carries a pre-stressing force of $1000kN$. [15M]

Calculate the extreme stresses for the mid span section using the following methods:
(i) Load balancing method, (ii) Stress concept method and (iii) Strength concept method.

7 A pre-stressed concrete beam $250mm$ wide and $600mm$ deep is subjected to an axialpre-stressing force of $1500kN$. Using Guyon's method, design the end block. [15M]

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