III B. Tech I Semester Supplementary Examinations, August - 2021
DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Answer any **ONE Question from Part–A** and any **THREE** Questions **from Part–B**
Use of IS: 456-2000 and design charts from SP-16 is allowed.
For all designs adopt Limit State Method
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PART –A　　　　　　　　　　　　　　　　　　　　　　**(28 Marks)**

1.　Design a two way R.C.C slab for a room of size 4.5m x 6.5m is　[28M]
　　supported at the edges. Assume a live load of 4 kNm^2. Concrete of
　　M-20 grade and Fe 415 HYSD bars are available for use. Sketch the
　　details of reinforcement in the slab.

2.　Design a reinforced concrete footing for a rectangular column of section　[28M]
　　400mm x 600mm supporting an axial factored load of 2000 kN. The
　　safe bearing capacity of the soil is 300　kN/m^2. Adopt M20 grade of
　　concrete and Fe-415 YHSD bars. Sketch the details.

PART –B　　　　　　　　　　　　　　　　　　　　　　**(42 Marks)**

3. a)　A doubly reinforced concrete beam of rectangular section 400mm wide　[7M]
　　　and　600mm deep is reinforced with 4 bars of 16mm diameter on the
　　　tension and compression side respectively at an effective cover of
　　　60mm. Adopt M20 grade concrete and Fe 415 HYSD bars and estimate
　　　the safe moment of resistance of the section.

　 b)　Discuss about the stress-block parameters–limiting moment of　[7M]
　　　resistance.

4. a)　A Tee beam has the following dimensions:　　　　　　　　　　　　[8M]
　　　　　　Effective width of flange = 1800mm
　　　　　　Thickness of flange　　　= 150mm
　　　　　　Width of rib　　　　　　= 250mm
　　　　　　Effective depth　　　　　= 1000mm
　　　　　　M20 grade concrete and Fe415 HYSD bars
　　　Compute the limiting moment capacity of the section and
　　　corresponding area of tension reinforcement.

　 b)　Determine the area of reinforcement required for a singly reinforced　[6M]
　　　concrete section having a breadth of 350mm and effective depth of
　　　650mm to resist a factored moment of 400kN-m. Adopt f_{ck} =20N/mm^2
　　　and f_y =415 N/mm^2.

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5. a) Design suitable shear reinforcements in a beam of rectangular section [7M]
with a width 200mm and effective depth 400mm. The factored shear
force is at the section is 90kN. The beam is reinforced with 4 bars of
16mm diameter on the tension side.
Adopt M 20grade concrete and Fe 415 HYSD bars.

b) What are the general aspects for limit state design of reinforced [7M]
concrete structures?

6. Discuss in detail about the design of short and long columns. [14M]

7 a) Discuss about working stress method of design of singly and doubly [10M]
reinforced beams.

b) Write about yield line analysis of slabs. [4M]

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