M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)
BANGALORE – 560 054

SEMESTER END EXAMINATIONS – JANUARY 2016

Course & Branch : **B.E.- Civil Engineering**   Semester : **V**

Subject   : **Design of RC Elements**   Max. Marks : **100**

Subject Code   : **CV506**   Duration : **3 Hrs**
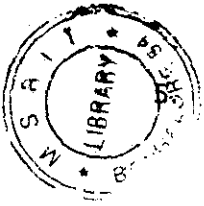
Instructions to the Candidates:
- Answer *one* full question from each unit.
- Assume missing data suitably.
- IS 456:2000 and SP 16 charts are allowed.

UNIT – I

1. a) Discuss the necessity of doubly reinforced beam in practice.   CO1 (05)

   b) A rectangular beam of cross section 325mm×700mm. It is provided with 6-20∅ as tension reinforcement and use 2L#10∅ @ 175 c/c as stirrup reinforcement. Calculate Moment of Resistance at collapse, Compression and Tensile forces and Lever arm. The beam is SS over a effective span of the beam is 10m. Calculate the safe concentrated load acts at 1/3rd span from either supports. Use M$_{35}$ grade concrete and Fe550. Assume severe exposure condition.   CO1 (15)

2. a) Why steel is considered as the best material for reinforcement in RCC.   CO1 (05)

   b) The cross sectional dimension of a doubly reinforced beam is 300mm×700mm. The tension and compression reinforcement is 4#25∅ and 2#25∅ respectively. Determine the ultimate moment of resistance at collapse. Assume M$_{20}$ grade concrete and CWD bars with mild exposure. use 2L#8∅ @ 150 c/c as stirrup reinforcement.   CO1 (15)

UNIT – II

3. A simply supported beam of dimensions 300 × 600 mm is carrying a dead load of 20kN/m and Live load of 10kN/m over an effective span of 8.3m. The beam is reinforced with 5 numbers of 20mm dia. HYSD bars on tension side. The grade of concrete is M$_{25}$. Exposure is Moderate. Assume 8mm ∅ stirrups. Calculate the short term deflection and also find the approximate long term deflection.   CO2 (20)

4. A rectangular SS beam is of effective span 6m and of overall size 325mm×675mm. It is reinforced with 5#25∅ on the tension side. Superimposed load on the beam is 24kN/m (Including Self Wt.) and central concentrated load of 21kN is acting on the beam. Determine the surface crack widths at the following points.   CO2 (20)

   i.   Bottom corner of the beam

   ii. Below the centre of intermediate reinforcement

   iii. Below the centre between two bars
   Grade of concrete = M$_{35}$
   Grade of steel = Fe 500 & Assume Effective cover = 75mm.