

Roll No.

--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CE) (2012 to 2017) (Sem.-4)
DESIGN OF CONCRETE STRUCTURE-I
Subject Code : BTCE-403
M.Code : 56085

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A**Answer briefly :**

- 1) What do you understand by all-in-aggregate?
- 2) Give the function C^2S and C^3A in cement.
- 3) What is water cement ratio?
- 4) Explain the term segregation.
- 5) As per IS: 456-2000 in how many grades concrete is designated? What do you mean by M20 concrete?
- 6) "Span/depth ratio can be used to control deflection in beams". Justify.
- 7) What is the difference between lap length and anchorage length?
- 8) Enumerate at least three situations in which doubly reinforced beams becomes necessary.
- 9) "Shear stress carrying capacity of slab is more than beams". Justify.
- 10) What is the maximum diameter and spacing of reinforcement in two-way RCC slab?

SECTION-B

- 11) A 250mm wide and 600mm deep R.C beam is reinforced with 2 legged 10mm inclined stirrups at 250mm c/c with $\alpha = 60^\circ$. Longitudinal steel consist of 4 bars of 20mm with a cover of 40mm. If concrete grade is M25 and grade of steel is Fe 415, determine the strength of the section in shear.
- 12) An isolated T- beam has flange of 2400mm wide and 120mm deep. The effective width and depth of web are 300mm and 580mm respectively. The tension reinforcement consists of eight bars of 20mm diameter. The effective span of the simply supported T-beam is 3.6m. Determine the moment of resistance of the beam. The grade of concrete and steel are M20 and Fe 415 respectively.
- 13) Describe the merits of limit state design method over working stress method. Mention the assumptions made in design based on limit state.
- 14) Describe the various characteristics of aggregates which affect the properties of concrete both in its fresh and hardened state.
- 15) Design a one way slab having a span of 3m for a factored superimposed load is 6KN/m^2 .

SECTION-C

- 16) Design a continuous R.C slab for a class room 7m wide and 14m long. The roof is to be supported on R.C.C beams spaced at 3.5m intervals. The width of beam should be kept 230mm. The superimposed load is 3 Kn/m^2 and finishing load expected is 1 Kn/m^2 , use M20 concrete and Fe 415 steel.
- 17) An overhanging beam has 6m span from support to support and an overhang of 2m. It carries a design load of 40kN/m throughout. The cross section of the beam selected is $250\text{mm} \times 450\text{mm}$. To carry the cantilever moment 4 bars of 20mm plain bars are provided with 50mm effective cover. What is the maximum bond stress developed? Determine anchorage length required for cantilever reinforcement
 - (a) If hooks are not provided.
 - (b) If standard hooks are provided.
- 18) A T- beam floor consists of 15 cm thick R C slab monolithic with 30 cm wide beams. The beams are spaced at 3.5m centre to centre and their effective span is 6m. If the superimposed load on the slab is 6 kN/m^2 , design an intermediate beam use M-25 mix and Fe 415 grade steel.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.