

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech -V semester CE

COURSE CODE (CREDITS): 18B11CE515 (3)

MAX. MARKS: 35

COURSE NAME: Design of Concrete Structures

COURSE INSTRUCTORS: Dr. Tanmay Gupta

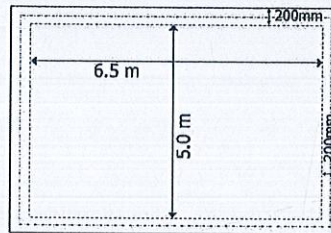
MAX. TIME: 2 Hours

**Note:** (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems. IS 456:2000 is allowed.

Q.1 Design a RCC slab for a room measuring 6.5m x 5 m. The slab is to be cast monolithically over the beams with corners held down. The width of the supporting beams is 200mm. The slab carries a superimposed load of  $3\text{kN/m}^2$ . Use M20 grade of concrete and Fe415 steel. [6] [CO2]



Q.2 Explain short- and long-term deflections and the respective influencing factors of them.

[3] [CO1]

Q.3 State the salient points of the stipulations of IS 456 regarding anchoring reinforcing bars in tension, compression and shear, respectively.

[3] [CO3]

Q.4 Design a rectangular reinforced concrete column of size 300\*600 subjected to a factored load of 1400 kN and a factored moment of 280 kNm with respect to the major axis. Assume M 20 concrete and Fe 415 steel.

[6] [CO2]

Q.5 Explain the situations when torsional moments remain present in beams and frames.

[2] [CO5]

Q.6 Give four reasons to justify the design of structures by limit state method.

[2] [CO1]

Q.7 A RC beam of rectangular section 230mm wide and 400 mm deep is reinforced with 4 bars of 12mm diameter provided with a clear cover of 25mm. Calculate the ultimate moment of resistance of the section and the maximum uniformly distributed super-imposed load this beam

can carry if it is simply supported over a span of 3.5m. The materials used are concrete grade M20 and steel grade Fe415. [5] [CO2]

Q.8 Design the waist-slab type of the staircase, Landing slab A is supported on beams along JK and PQ, while the waist-slab and landing slab B are spanning longitudinally as shown in Fig below. The finish loads and live loads are  $1 \text{ kN/m}^2$  and  $5 \text{ kN/m}^2$ , respectively. Use riser  $R = 160 \text{ mm}$ , trade  $T = 270 \text{ mm}$ , concrete grade = M 20 and steel grade = Fe 415. [8] [CO4]

