

# 22305

**12223**

**3 Hours / 70 Marks**

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.  
(2) Answer each next main Question on a new page.  
(3) Illustrate your answer with neat sketches wherever necessary.  
(4) Figures to the right indicate full marks.  
(5) Assume suitable data, if necessary.  
(6) Use of Non-programmable Electronic Pocket Calculator is permissible.  
(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

- 1. Attempt any FIVE of the following:** **10**
- a) Define :-
    - i) Initial setting time (IST)
    - ii) Final setting time (FST) of cement.
  - b) Enlist four Bogue's compounds with their formula.
  - c) Define :-
    - i) Flakiness Index
    - ii) Elongation Index
  - d) State Duff Abraham's law for water cement ratio.
  - e) State two purposes of using retarding admixtures in concrete.
  - f) Give the two points of comparison between volume batching and weight batching.
  - g) State the principle of Rebound Hammer test.

P.T.O.

**2. Attempt any THREE of the following:****12**

- a) Explain the experimental procedure for the determination of standard consistency of cement.
- b) Explain the procedure to determine the crushing value of aggregate.
- c) Explain in detail classification of the aggregate based on its size and shape.
- d) Sieve analysis test was conducted on sand and following observation are taken. Determine fineness modulus (FM) of sand.

Sieve size (mm)	4.75	2.36	1.18	0.6	0.3	0.15	pan
Weight retained on sieve (gm)	22	115	225	240	280	105	13

**3. Attempt any THREE of the following:****12**

- a) Explain the slump cone test in details for the determination of workability of fresh concrete.
- b) Illustrate the effect of following properties of coarse aggregate on compressive strength of concrete :-
  - i) Size of aggregate
  - ii) Shape of aggregate
- c) State the necessity of supervision of concreting operations and precautions to be taken to avoid the wastage of material.
- d) Define workability of concrete. Also state the factors affecting workability.

- 4. Attempt any THREE of the following:** **12**
- a) Enlist the various concrete operations in sequence and explain any one in detail.
  - b) Define concrete mix design. Write four objectives of concrete mix design.
  - c) Write two advantages and two disadvantages of vacuum dewatered concrete floor.
  - d) Enlist any four precautions to be taken during cold weather concreting.
  - e) Explain fibre reinforced concrete.
- 5. Attempt any TWO of the following:** **12**
- a) Explain the laboratory procedure to determine the compressive strength of concrete cubes as per IS 516-1959 w.r.to following points :-
    - i) Preparation of test specimen
    - ii) Procedure of testing
    - iii) Interpretation of results.
  - b) Explain in details the ultrasonic pulse velocity test and technique of measuring pulse velocity through concrete.
  - c) Discuss the Non-destructive testing of concrete. List the various methods of NDT and explain any one in brief.
- 6. Attempt any TWO of the following:** **12**
- a) Write four requirements of a good form work and draw a sketch showing c/s of form work for R.C.C. beam.
  - b) Enlist the types of joints provided with neat sketch. Also state their necessity.
  - c) Illustrate the curing of concrete. Explain the different methods of curing of concrete.
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