

22305

21819

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 answers 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) List four major compounds of cement with their percentage in ordinary portland cement.
 - b) State four requirements of good aggregate.
 - c) State Duff Abraham's water cements ratio law.
 - d) Define concrete mix design.
 - e) List four materials used for filling joints in concrete.
 - f) State two disadvantages of air entraining admixtures.
 - g) Define hydration of cement.

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2. Attempt any THREE of the following: 12

- a) Explain the procedure to determine fineness of cement by dry sieving method. State its IS requirement.
- b) List four substances in water having deleterious effects. State their effects on concrete.
- c) Calculate the fineness modulus of a sample using following data. Total weight of sample is 1kg.

Sieve	4.75	2.36	1.18	600	300	150	Pan
Size	mm	mm	mm	μ	μ	μ	–
Weight Retained (gm)	100	150	300	200	120	90	40

- d) Explain determination of bulking of fine aggregate with neat sketch.

3. Attempt any THREE of the following: 12

- a) Suggest the degree of workability in terms of slump for the following:
 - (i) Pavements using pavers.
 - (ii) Canal lining.
 - (iii) Heavily reinforced sections
 - (iv) In-situ piling
- b) Explain two causes of each
 - (i) Segregation
 - (ii) Bleeding of concrete.
- c) Write the significance of water- cement ratio and its effect on hydration of cement.
- d) Explain two factors affecting properties of hardened concrete.

- 4. Attempt any THREE of the following:** **12**
- a) List eight factors affecting workability of concrete.
 - b) Write the procedure (steps) of mix-design of concrete with reference to the provisions laid in IS: 10262-2009.
 - c) Write two effects and two precautions of cold weather and hot weather concreting.
 - d) Differentiate between retarding and accelerating admixtures with following points.
 - (i) Hydration process.
 - (ii) Setting time
 - (iii) Weather condition
 - (iv) Use.
 - e) Define the following special types of concretes with its one use.
 - (i) Vacuum concrete
 - (ii) Fiber reinforced concrete.
 - (iii) High performance concrete
 - (iv) Self compacting concrete.
- 5. Attempt any TWO of the following:** **12**
- a) Draw a neat and labelled sketch of rebound hammer and write two limitations of it.
 - b) Write one suitability of each different six non- destructive tests.
 - c) Explain the technique and ways of measuring ultrasonic pulse velocity through concrete. Draw sketches.

6. Attempt any TWO of the following:**12**

- a) Explain the significance of batching, compaction and curing of concrete.
 - b) Draw neat and labelled sketches of following:
 - (i) Plan of column formwork.
 - (ii) Expansion joint with load transfer device.
 - c) (i) Suggest the relevant method of water - proofing used for following construction.
 - 1) Basements of buildings.
 - 2) Swimming pool.
 - 3) Water tank.
 - (ii) Suggest the relevant method of transportation of concrete used for construction in following situation.
 - 1) Concreting in hilly areas.
 - 2) Concreting of highrise building.
 - 3) Concreting under water.
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