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**S.E. (Civil) (Second Semester) EXAMINATION, 2019**

**CONCRETE TECHNOLOGY**

**(2015 PATTERN)**

**Time : 2 Hours**

**Maximum Marks : 50**

Instructions: 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8

2) Neat Sketches must be drawn wherever necessary.

3) Figures to the right indicate full marks.

4) Assume suitable data, if necessary.

5) Use of electronic pocket calculator is allowed.

6) Use of cell phone is prohibited in the examination hall.

1a) What are the Bogue's Compounds? State the significance of each compound. [06]

b) Define workability of concrete. How is the workability measured in laboratory? Explain any one method. [06]

OR

2a) Explain "Grading of fine & coarse aggregate. How do you determine the "fineness modulus" of aggregate? [06]

b) Explain the causes of bleeding and effect of bleeding & prevention of bleeding. [06]

3a) Explain in detail factors affecting strength of concrete. Describe any one in detail. [06]

b) Write short notes on:

[07]

i) Concrete Pumps

ii) Concrete Vibrators

OR

4 a) Explain the principal of Rebound Hammer and Draw a neat sketch & limitations of Rebound Hammer [06]

P.T.O.

b) Write short notes on :

[07]

- i) Ready mixed concrete
- ii) Ferrocement.

[06]

5a) Explain the importance of mix design of concrete.

b) Explain DOE method of mix design in brief.

[07]

OR

6a) Design a concrete mix for grade M35 and severe exposure condition using IS Code Method for the following requirements:

[13]

a) Design situations:

i) Maximum size of aggregate-20mm

ii) Degree of workability-Medium(100mm slump)

iii) Degree of quality control -Good

iv) Cement -OPC 53 grade (Specific gravity=3.15)

v) Aggregates-

(1) Course aggregate -Crushed stone (specific gravity=2.7)

(2) Fine aggregate -Natural and conforming to zone III(specific gravity=2.7)

vi) Assume standard deviation=4.0

Minimum Cement content and Maximum W/C ratio different exposures.

Exposure	Minimum Cement Content kg/cu.m	Maximum W/C ratio
Mild	300	0.55
Moderate	300	0.5
Severe	320	0.45

b) Characteristics of material:

Cement:i) Type of cement-OPC 43 grade

ii) Specific gravity- 3.15

iii) Bulk density-1450 kg/m

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Aggregates:

		Fine aggregates	Coarse aggregates
(i)	Specific gravity	2.6	2.65
(ii)	Bulk density(kg/m)	1750	1800
(iii)	Free surface moisture(%)	105	NIL
(iv)	Water absorption(%)	0.6	1

c. Mix design considerations

- (i)  $t=1.65$
- (ii) For moderate exposure conditions with normal weight aggregates of 20mm nominal maximum size and for RC work.
- (iii) Minimum cement content-300 kg/m
- (iv) Maximum free water cement ratio -0.5

7a) Explain in details permeability and factors affecting permeability of the concrete [06]

b) Write short note on [06]

i) Corrosion monitoring techniques and preventive measures

ii) Explain in detail permeability and factors affecting permeability of the concrete

OR

8a) Explain in details common types of repairs [06]

b) write short note on : [06]

i) Attack by sea water

ii) Carbonation of concrete and its determination.