

M.C.E 2nd SEMESTER EXAMINATION 2017

SUBJECT: Advanced Concrete Science and Technology

Time : 3 hours

ref: EX/PG/CE/T/128B/6/2017

Full marks : 100

Draw neat sketches wherever necessary.

Answer question no 1 and three from rest.

I.S codes and Handbooks are not allowed in the examination hall

1. a) What is viscosity modifying agent? Where is it normally used in concrete construction?
 - b) What are the main differences between the fracture surfaces of normal strength and high strength concrete? Draw stress- strain diagram of normal strength and high strength concrete?
 - c) Why slump test is not considered as an appropriate test for evaluating the workability of fibre reinforced concrete?
 - d) What is the role of fibre size in fibre reinforced concrete?
 - e) How does the rate of loading affect the compressive strength of concrete?
 - f) The consultant of a particular site at Delhi decided to stop the important concreting work during summer months as the day time temperature is quite high – Explain the reason and provide some solutions to resume the work.
 - g) What type of chemical admixture would you recommend for concreting in a) hot weather b) cold weather?
 - h) Name the tests that are generally used for the microstructure study of the concrete?
 $3+3+3+3+3+3+4+3 = 25$
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- 2 a) Describe the Rapid chloride permeability test of concrete with diagram. Also discuss the limitation of the test.
 - b) What is recycled concrete aggregate? How can you test the quality of recycled concrete aggregate ?
 - c) What is the difference between alkali silicate reaction and alkali carbonate reaction in concrete? How can we prevent this?
 $15+5+5=25$
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- 3 a) Describe about the sample preparation for the SEM and XRD test of concrete?

b) What is recycled concrete aggregate? How can you test the quality of recycled concrete aggregate ?

c) What is recycled aggregate concrete ? Compare the recycled aggregate concrete and conventional concrete in terms of properties fresh state and hardened state.

d) The average depth of carbonation of columns noticed at a site was 15 mm in 15 years. Calculate the time so that it reaches the reinforcement level.

10 +5+5+5

4 a) Write short notes on :

- Cold weather concreting
- Compatibility of admixture and cement
- Balling in fibre reinforced concrete
- Air entraining Admixture
- Loss of workability

b) Describe a suitable test method for passing ability of self compacting concrete mentioning its acceptance criteria.

5X3+10

5 a) What is geo-polymer concrete? Name the ingredients normally used in geo-polymer concrete? What are the advantages and disadvantages of geopolymers over conventional concrete?

b) What are the main characteristics of ITZ in concrete? How can you improve the microstructure of ITZ?

c) Describe the test method for flexural toughness of fibre reinforced concrete. Define toughness.

d) What is silica fume and rice husk ash? Describe their influences in hardened concrete?

5+5+10+5