ADVANCED CONCRETE TECHNOLOGY

Durability of concrete and concrete construction: Durability concept, pore structure and transport processes, reinforcement corrosion, fire resistance, frost damage, sulphate attack, alkali silica reaction, delayed ettringite formation, methods of providing durable concrete, short-term tests to assess long-term behaviour.

Mix design: Review of methods and philosophies of IS, BS and ACI methods, mix design for special purposes. Acceptance criteria for compressive strength of concrete

Special concretes: Lightweight concrete, autoclaved aerated concrete, no-fines concrete, lightweight aggregate concrete and foamed concrete, High strength concrete, polymer impregnated concrete, fibre-reinforced concrete, Self Compacting Concrete, Geopolymer concrete, Alkali activated slag concrete

Test methods: Analysis of fresh concrete, Accelerated testing methods, Tests on hardened concrete, Non-destructive testing of concrete

Analysis of the microstructure of the concrete specimen by various methods like X-ray diffraction method (XRD), Scanning Electron Microscope (SEM), Energy Dispersive Spectroscopy (EDS)

Text Book

1. *Properties of Concrete, A.M.Neville, Longman 1995.*
2. *Concrete Technology Theory and Practice, M.S.Shetty, S.Chand & Company Ltd, New Delhi.*

Reference

1. *Concrete micro-structure, Properties and Materials, P.K.Mehta, J.M.Monteiro, Printice Hall INC & McGraw Hill, USA.*

ANDHRA UNIVERSITY
TRANS-DISCIPLINARY RESEARCH HUB

Model Paper

ADVANCED CONCRETE TECHNOLOGY

(Civil Engineering)

Time: 3 hours | Max. Marks: 100

Answer any FIVE questions.All questions carry EQUAL marks

1.	a	Explain the factors that affect durability of concrete.	10
	b	Explain the sulphate attack and alkali silica reaction phenomena.	10
2.	a	What do you mean by non-destructive evaluation? Mention the conditions that force to go for non-destructive evaluation.	10
	b	Explain the factors that affect pulse velocity of concrete.	10
3.	a	What are the reasons for corrosion of reinforcement? Explain the mechanism. Also suggest preventive measures for the same problem.	10
	b	What do you mean by light weight concrete? Explain its applications.	10
4.	a	Explain different tests conducted on fresh concrete.	10
	b	Explain the method of determining the modulus of rupture of concrete and derive the relevant equations used.	10
5.	a	Explain the mechanical properties of fiber reinforced concrete and applications of fibre reinforced concrete.	10
	b	Explain the concept of no-fines-concrete and its applications.	10
6.	a	Explain the properties of steel fibers that affect compressive strength of fiber reinforced concrete.	10
	b	What are the requirements of high performance concrete? Explain.	10
7.	a	What are the factors that influence the micro-structure of concrete? Explain.	10
	b	Explain the importance of XRD test.	10
8.		Using IS code method, design a mix for M60 grade concrete by using the standard properties of all the ingredients.	20

Maximum size of aggregates : 20 mm
Degree of workability : 80 mm (slump)
Degree of quality control : Very Good
Type of exposure : Severe