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Question Paper Code: ACE010



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER

B.Tech V Semester End Examinations (Regular), November- 2019

Regulations: R16

CONCRETE TECHNOLOGY

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT– I

1.
 - a) What is Alkali-aggregate reaction? Explain factors promoting Alkali-aggregate reaction? [7M]
 - b) If 25 kg of coarse aggregate is sieved through 80 mm, 40 mm, 20 mm, 10 mm, 4.75 mm, 2.36 mm, 1.18 mm, 600 micron, 300 micron and 150 micron standard sieves and the weights retained are 0 kg, 2 kg, 8 kg, 6 kg, 4 kg respectively, what is the fineness modulus of the aggregate? [7M]
2.
 - a) What is Soundness of cement? How it can be determined? [7M]
 - b) What is the percentage of water required, if 400 g of water is required to have a cement paste of 1700 g of normal consistency? [7M]

UNIT – II

3.
 - a) How does gel space ratio affect the properties of hardened concrete? [7M]
 - b) Explain in detail segregation and Bleeding of fresh concrete and their effect on properties of concrete in fresh and hardened state? [7M]
4.
 - a) What is importance of vibration? Explain various methods of Vibration? [7M]
 - b) What are the various steps involved in the manufacturing process of concrete? [7M]

UNIT – III

5.
 - a) Explain the factors affecting Water/Cement ratio? [7M]
 - b) Calculate the gel/space ratio and theoretical strength of a sample of concrete made with 500 g of cement with 0.5 water/cement ratio, on full hydration and 60 percent hydration? [7M]
6.
 - a) What is the difference between destructive, Non-destructive and Semi-destructive testing methods in hardened concrete? [7M]
 - b) What is Shrinkage? Explain various types of Shrinkage? [7M]

UNIT– IV

7. a) Explain in detail about the statistical quality control and acceptance criteria of concrete. [7M]
b) Design the concrete mix for the following data: characteristic compressive strength = 35MPa, maximum size of aggregate = 20mm (angular), Degree of workability = 0.9 CF, Degree of quality control = good and type of exposure = severe. Water absorption by CA = 1% and moisture content in FA = 2.0%. Assume any suitable missing data. [7M]
8. a) What is Mix design and what are the parameters to be considered in the process of Mix-design? [7M]
b) Design the concrete mix for the following data: characteristic compressive strength= 20MPa, maximum size of aggregate = 20mm (angular), Degree of workability = 0.8 CF, Degree of quality control = good and type of exposure = severe. Water absorption by CA = 0.5% and moisture content in FA = 2.0%. Assume any suitable missing data. [7M]

UNIT – V

9. a) What are the basic properties of fibre – reinforced concrete which can be advantageously made use of in the design of structural elements? [7M]
b) What are the different types fibres used in Fibre Reinforced Concrete and how do they affect the properties of concrete? [7M]
10. a) Explain the importance of polymer concrete and what are the various methods used in the manufacture of Polymer concrete. [7M]
b) Distinguish between self-consolidating concrete and conventional concrete? What are the benefits of Self Compacting concrete? [7M]



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COURSE OBJECTIVES:

The course should enable the students to:

I	Discuss the physical and chemical properties of cement and admixtures.
II	Understand the workability of concrete, manufacturing processes of concrete and the behaviour of the hardened concrete.
III	Identify, formulate and solve problems in concrete mix design.
IV	Enrich the practical knowledge on mix design principles, concepts and methods

COURSE OUTCOMES (COs):

CO 1	Understand the basic physical and chemical properties of cement, admixtures and aggregates
CO 2	Describe the properties and factors influencing the workability of fresh concrete
CO 3	Determine the affect of water/cement ratio on the strength of hardened concrete and also the strength of concrete by using NDT testing methods
CO 4	Analyse the mix design of concrete
CO 5	Understand the basic concepts and applications of special concretes at various situations

COURSE LEARNING OUTCOMES (CLOs):

ACE010.01	Explain the different types of cement, grades of cement and hydration process.
ACE010.02	Classify different types of admixture and their usage.
ACE010.03	Understand aggregates and classification of aggregate depending upon shape, size, texture etc.
ACE010.04	Understand the Alkali Aggregate Reaction.
ACE010.05	Understand Sieve Analysis and grading of aggregate.
ACE010.06	Understand the concept of workability of concrete and factors affecting workability.
ACE010.07	Explain the measurement of workability by different test.
ACE010.08	Understand the concept of segregation and bleeding in concrete.
ACE010.09	Explain the various steps involved in the manufacturing process of concrete.
ACE010.10	Understand the importance of quality of mixing water.
ACE010.11	Understand hardened concrete and its properties.
ACE010.12	Explain the importance of water cement ratio, maturity concept in hardened concrete
ACE010.13	Understand the various methods of curing of concrete.
ACE010.14	Explain the different tests involved in testing of hardened concrete.
ACE010.15	Understand the concept of creep and how it effects hardened concrete.
ACE010.16	Explain shrinkage and its effect on concrete.
ACE010.17	Understand the importance of Mix proportions.
ACE010.18	Understand durability and quality control of concrete.

ACE010.19	Explain Acceptance criteria involved in concrete mix proportioning.
ACE010.20	Explain proportioning of concrete method by different methods.
ACE010.21	Design the concrete mix by BIS method.
ACE010.22	Explain the different types of special concrete.
ACE010.23	Explain the effect of fiber in the concrete.
ACE010.24	Explain applications of special concrete in various situations.

MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES

SEE Question No		Course Learning Outcomes		Course Outcomes	Blooms Taxonomy Level
1	a	ACE010.01	Explain the different types of cement, grades of cement and hydration process.	CO 1	Understand
	b	ACE010.02	Classify different types of admixture and their usage.	CO 1	Remember
2	a	ACE010.03	Understand aggregates and classification of aggregate depending upon shape, size, texture etc.	CO 1	Understand
	b	ACE010.04	Understand the Alkali Aggregate Reaction.	CO 1	Understand
3	a	ACE010.07	Explain the measurement of workability by different test.	CO 2	Remember
	b	ACE010.08	Understand the concept of segregation and bleeding in concrete.	CO 2	Understand
4	a	ACE010.09	Explain the various steps involved in the manufacturing process of concrete.	CO 2	Remember
	b	ACE010.10	Understand the importance of quality of mixing water.	CO 2	Understand
5	a	ACE010.11	Understand hardened concrete and its properties.	CO 3	Understand
	b	ACE010.12	Explain the importance of water cement ratio, maturity concept in hardened concrete	CO 3	Understand
6	a	ACE010.13	Understand the various methods of curing of concrete.	CO 3	Understand
	b	ACE010.14	Explain the different tests involved in testing of hardened concrete.	CO 3	Understand
7	a	ACE010.17	Understand the importance of Mix proportions.	CO 4	Understand
	b	ACE010.18	Understand durability and quality control of concrete.	CO 4	Understand
8	a	ACE010.18	Understand durability and quality control of concrete.	CO 4	Understand
	b	ACE010.19	Explain Acceptance criteria involved in concrete mix proportioning.	CO 4	Understand
9	a	ACE010.21	Explain the different types of special concrete.	CO 5	Understand
	b	ACE010.24	Explain applications of special concrete in various situations.	CO 5	Remember
10	a	ACE010.23	Explain the effect of fibre in the concrete.	CO 5	Remember
	b	ACE010.24	Explain applications of special concrete in various situations.	CO 5	Understand

Signature of Course Coordinator

HOD, CE