Hall Ticket No | | | | | | | | | | |

Question Paper Code:ACEC10

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal-500043, Hyderabad

B.Tech IV SEMESTER END EXAMINATIONS (REGULAR) - JULY 2022
Regulation:UG20

CONCRETE TECHNOLOGY

Time: 3 Hours **(CIVIL ENGINEERING)** **Max Marks: 70**

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
(NOTE: Provision is given to answer TWO questions from among one of the Modules III / IV / V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) What is hydration of cement? Explain the hydration of calcium silicates with chemical equations. [BL: Understand| CO: 1|Marks: 7]

   (b) List the factors affecting bleeding and what are its control measures? Explain the method of determining setting times of cement. Determine the fineness modulus of following aggregate sample of 5 kg given in Table 1. [BL: Apply| CO: 1|Marks: 7]

Table 1

S.No.	Sieve size	Weigh retained in grams
1	40 mm	0
2	20 mm	1500
3	10 mm	3000
4	4.75 mm	500
5	2.36mm	0

MODULE – II

2. (a) Describe the significant variables affecting workability of concrete. Explain about the effect of time and temperature on the workability of concrete. [BL: Understand| CO: 2|Marks: 7]

   (b) Enlist the factors affecting bleeding and what are its control measures. Explain the method of determining setting time of fresh concrete. [BL: Understand| CO: 2|Marks: 7]

MODULE – III

3. (a) Interpret the maturity concept of concrete. What is the effect of water/cement ratio on the strength of the concrete? [BL: Understand| CO: 3|Marks: 7]

   (b) Calculate the gel/space ratio and estimate the strength at 28 days for one bag of cement with 0.6 water/cement ratio on complete hydration and 75% hydration? [BL: Apply| CO: 3|Marks: 7]

4. (a) Why are creep and shrinkage treated together? List the factors affecting creep and shrinkage of concrete. [BL: Remember| CO: 4|Marks: 7]

   (b) Calculate the maturity of M30 grade concrete at 14 days and 28 days when it is cured for 12 hours at 14^0C and 25^0C for the rest of a day. Plowman's constants A=21; B=61.0.
   [BL: Apply| CO: 4|Marks: 7]

MODULE – IV

5. (a) List out the data required for mix proportioning. Outline the effect of moisture present in sand while concrete mix- proportioning. [BL: Understand| CO: 5|Marks: 7]

   (b) Design the concrete mix for the following date: characteristic compressive strength=40mpa, maximum size of aggregate =20mm (angular), degree of workability=0.9CF, degree of quality control =good and type of exposure=severe. Water absorption by CA=1% and moisture content in FA =1.5%. Assume any suitable missing data. [BL: Apply| CO: 5|Marks: 7]

6. (a) Describe in detail the acceptance criteria and sampling criteria as per IS 456-2000.
   [BL: Understand| CO: 5|Marks: 7]

   (b) Design a M35 grade pumpable concrete mix as per IS: 10262-2009 with OPC 53 grade. CA is 20mm crushed and FA is river sand. Workability required is 110mm slump. Maximum W/C ratio: 0.45 Structure is RCC exposed to moderate condition. Use of 2% super plasticizer permitted. Sp. Gravitie of cement: 3.32; CA and FA: 2.75. Fine Aggregate confirms to Zone II. Water absorption by CA: 0.5% and FA: 1.0%. (SP Gravity of SP.:1.145).
   [BL: Apply| CO: 5|Marks: 7]

MODULE – V

7. (a) Explain about the use of various types of light weight aggregates in making of light weight concrete.
   [BL: Understand| CO: 6|Marks: 7]

   (b) Describe in detail about different types of concrete made with polymers. List the property and applications of light weight concrete. [BL: Understand| CO: 6|Marks: 7]

8. (a) Write a brief note on 'fibre reinforced concrete' and its applications. List the factors affecting the fiber reinforced concrete. [BL: Understand| CO: 6|Marks: 7]

   (b) What is high strength concrete? Discuss uses and advantage of high strength concrete.
   [BL: Understand| CO: 6|Marks: 7]

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