

Hall Ticket No.

Question Paper Code: ACEB08



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER-I

B.Tech IV Semester End Examinations, April - 2019

Regulations: R18

MATERIALS, TESTING AND EVALUATION

(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

MODULE – I

1. a) What are the ingredients of Portland cement? State the function and limits of each of them. [7M]
- b) Write short notes on [7M]
 - a. Light weight concrete
 - b. Fibre reinforced concrete
2. a) What are the ceramic materials? Explain about the properties of ceramic materials. [7M]
- b) Describe briefly the following materials. [7M]
 - i. Asbestos
 - ii. Geosynthetics

MODULE – II

3. a) Write a short note on [7M]
 - a. Elasticity
 - b. Elastic limit
 - c. Plasticity
- b) With the help of stress-strain diagram, explain strain hardening. [7M]
4. a) Write in detail the tensile test procedure of mild steel. [7M]
- b) Illustrate important mechanical properties that influence the selection of materials. [7M]

MODULE – III

5. a) Define ferrous metals and non-ferrous metals with examples? Explain about ferrous metals. [7M]
- b) Describe briefly the fracture toughness of different materials. [7M]

6. a) What do you mean by non-ferrous metal? Explain manufacturing process of aluminium. [7M]
b) Why is fracture toughness important? Explain in detail. [7M]

MODULE – IV

7. a) Explain about the test conducted to determine the bulk density of fine aggregate. [7M]
b) Discuss the significance of following tests [7M]
i. Ring and ball test
ii. Ductility test
iii. Viscosity test
8. a) Write a short note on [7M]
i. Water absorption test
ii. Efflorescence test
b) Explain the test procedure of flash and fire point test. [7M]

MODULE – V

9. a) Give details of the properties of blast furnace slag cement. What are the advantages and disadvantages of blast furnace slag cement? [7M]
b) What do you mean by composite material? Explain about the composition of composite materials. [7M]
10. a) What is fly ash? Explain about the chemical composition of fly ash? [7M]
b) Discuss briefly about the test conducted to determine the hardness of metal. [7M]



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COURSE OBJECTIVES:

The course should enable the students to:

I	Make measurements of behaviour of various materials used in Civil Engineering.
II	Provide physical observations to complement concepts learnt.
III	Introduce experimental procedures and common measurement instruments, equipment, devices.
IV	Disclose the variety of established material testing procedures and techniques.

COURSE OUTCOMES (COs):

CO 1	Identify the different engineering materials, properties, manufacturing process of materials.
CO 2	Describe the mechanical behaviour and characteristics, elastic and plastic deformation of metals, strength properties and background of fracture mechanics.
CO 3	Conduct mechanical testing of various metals like iron, steel and various non-ferrous metals, impact testing, background of fracture toughness of different materials, creep, fatigue.
CO 4	Understand the standard testing procedure of bricks, sand, concrete, soils, bitumen and bitumen mixes.
CO 5	Describe the properties, mechanical behaviour of polymers, metals, composites, cementitious materials and special materials.

COURSE LEARNING OUTCOMES (CLOs):

ACEB08.01	Identify the properties of engineering materials like cement, sand, concrete, ceramics, bitumen, structural steel etc.
ACEB08.02	Explain the classification of engineering materials and uses of materials.
ACEB08.03	Understand the manufacturing process of cement, concrete, bitumen, glass, plastics, metals, paints and other engineering materials.
ACEB08.04	Classify the steel, glass, varnishes, adhesives, carbon composites.
ACEB08.05	Explain the mechanical behaviour and characteristics of different metals.
ACEB08.06	Understand the importance of elasticity principle, characteristics and plastic deformation of metals.
ACEB08.07	Explain standards for different materials, stress-strain interpretation.
ACEB08.08	Describe the fundamentals of internal friction, creep, brittle fracture of steel.
ACEB08.09	Understand the concept of fatigue of materials, structural integrity assessment procedure.
ACEB08.10	Perform the mechanical testing of various metals like iron, steel and non-ferrous metals.
ACEB08.11	Explain elastic deformation and plastic deformation of metals.
ACEB08.12	Understand the impact testing, fatigue and creep of materials.
ACEB08.13	Explain fracture toughness of different materials like steel and non-ferrous metals.
ACEB08.14	Explain the testing procedures of bricks and sand.
ACEB08.15	Describe the testing procedures of fresh and hardened concrete.

ACEB08.16	Understand the properties of soil by conducting the different tests.
ACEB08.17	Explicate the procedures of testing bitumen and bitumen mixes.
ACEB08.18	Understand the testing procedures of polymers and polymer based materials.
ACEB08.19	Explain the behaviour of metals under various loads.
ACEB08.20	Describe the mechanical behaviour of composite materials.
ACEB08.21	Discuss the properties of cementitious materials like fly ash, blast furnace slag.

MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES

SEE Question No		Course Learning Outcomes	Course Outcomes	Bloom's Taxonomy Level	
1	a	ACEB08.01	Identify the properties of engineering materials like cement, sand, concrete, ceramics, bitumen, Steel.	CO 1	Understand
	b	ACEB08.02	Explain the classification of engineering materials and uses of materials.	CO 1	Understand
2	a	ACEB08.02	Explain the classification of engineering materials and uses of materials.	CO 1	Understand
	b	ACEB08.04	Classify the steel, glass, varnishes, adhesives, carbon composites.	CO 1	Understand
3	a	ACEB08.05	Explain the mechanical behaviour and characteristics of different metals.	CO 2	Remember
	b	ACEB08.06	Understand the importance of elasticity principle, characteristics and plastic deformation of metals.	CO 2	Understand
4	a	ACEB08.05	Explain the mechanical behaviour and characteristics of different metals.	CO 2	Remember
	b	ACEB08.06	Understand the importance of elasticity principle, characteristics and plastic deformation of metals.	CO 2	Understand
5	a	ACEB08.07	Explain standards for different materials, stress-strain interpretation.	CO 3	Remember
	b	ACEB08.09	Understand the concept of fatigue of materials, structural integrity assessment procedure.	CO 3	Remember
6	a	ACEB08.07	Explain standards for different materials, stress-strain interpretation.	CO 3	Understand
	b	ACEB08.09	Understand the concept of fatigue of materials, structural integrity assessment procedure.	CO 3	Understand
7	a	ACEB08.15	Describe the testing procedures of fresh and hardened concrete.	CO 4	Remember
	b	ACEB08.13	Explain fracture toughness of different materials like steel and non-ferrous metals.	CO 4	Understand
8	a	ACEB08.12	Understand the impact testing, fatigue and creep of materials.	CO 4	Understand
	b	ACEB08.13	Explain fracture toughness of different materials like steel and non-ferrous metals.	CO 4	Remember
9	a	ACEB08.16	Understand the properties of soil by conducting the different tests.	CO 5	Understand
	b	ACEB08.17	Explicate the procedures of testing bitumen and bitumen mixes.	CO 5	Remember
10	a	ACEB08.20	Describe the mechanical behaviour of composite materials.	CO 5	Understand
	b	ACEB08.21	Discuss the properties of cementitious materials like fly ash, blast furnace slag.	CO 5	Understand

Signature of Course Coordinator

HOD, CE