


Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: MATERIALS OF CONSTRUCTION		
	Scheme (L:T:P) : 4:0:0	Total Contact Hours: 52	Course Code: 15CE11T
	Type of Course: Lectures, Self Study & Quiz	Credit : 04	Core/ Elective: Core

Prerequisites: Knowledge of basic Science in Secondary Education.

Course Objectives:

1. Understand properties of various materials.
2. Select suitable materials for appropriate engineering applications.

On successful completion of the course, the students will be able to:

Course Outcome	
CO1	Know the properties and uses of construction materials.
CO2	Understand the behaviour of materials and select different market forms of construction materials for appropriate field applications as per IS code requirements.
CO3	Know the requirements of construction materials as per IS codes.
CO4	Engage in independent lifelong learning in identifying advanced construction materials.

 **Mapping Course Outcomes with Program Outcomes**

		Programme Outcome											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Course Outcome	CO1	S	M		M		S	S	M		M	S	
	CO2	S	S	S	S	S	S	S	S	M	S	S	M
	CO3	S	S	S	S	S	S	S	M	M	M	S	
	CO4	S	S		S	M	S	M	M	S	S	S	M

S: Strong Relationship

M: Moderate Relationship

COURSE CONTENT

Unit	Major Topics	Hours Allotted	Weightage of Marks
1	STONES	10	30
2	BRICKS	11	30
3	TIMBER	10	30
4	CEMENT	08	20
5	PAINTS, VARNISH & DISTEMPER	04	10
6	FERROUS, NONFERROUS AND ALLOY	09	25
	Total	52	145

UNIT I-STONES

Classification of rocks, Quarrying of stones by wedging & blasting, Tests on stone (Acid test, Attrition, crushing, impact & water absorption), Characteristics of a good building stone, Deterioration & Preservation of stones

UNIT II-BRICKS

Composition of good brick earth & harmful ingredients, Manufacture of bricks, Burning of bricks by clamps-intermittent (down draught) and continuous kiln (Hoffman's), Classification of bricks as per I S, Test on bricks (Field tests, Crushing strength, absorption, shape & size, efflorescence test), Requirements of good bricks, Substitutes for bricks – Cement concrete blocks (solid), Production process of solid blocks. Fire clay/Refractory bricks, Calcium Silicate Bricks(properties and uses).

UNIT-III-TIMBER

Classification of timber based on mode of growth, Cross- section of an exogenous tree, Properties of good timber, Defects in timber, Preservation of Timber, Seasoning of Timber, Conversion of timber and Market forms(types and uses).

UNIT-IV-CEMENT

Composition of ordinary Portland cement, Functions of ingredient of cement, Manufacture of OPC (Mixing of raw materials by dry process, Burning & Grinding), Storage of cement, Field tests on cement, Types of cement and its uses.

UNIT-V-PAINTS, VARNISH & DISTEMPER

Objects, characteristics & Ingredients of paints, varnishes & distemper

UNIT-VI-FERROUS, NONFERROUS AND ALLOY

FERROUS METALS: Properties & uses of Cast iron, Wrought iron, Mild steel Tor steel, TMT, High tensile steel, Market forms of structural steel NONFERROUS METALS:-

Properties & uses of Copper, Aluminum, Zinc and Tin ALLOY: - Types, properties & uses - aluminum alloy, copper alloy & steel alloy

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TEXT BOOKS

1. Engineering Materials by SC Rangwala
2. Building Materials by S S Bhavikatti

REFERENCES

1. Engineering Materials by GJ Kulkarni
2. Engineering Materials by Sushil Kumar
3. Engineering Materials by Duggal
4. Engineering Materials by Gurucharan Singh
5. Materials of construction by TTTI Publication (Oxford university madras)
6. Building Materials by- P.C.Varghese (Prentice Hall)
7. Materials of construction -I by H.S.Vishwanath- Sapna Publications
8. Civil Engineering handbook by Khanna

Course Delivery: The course will be delivered through lectures and Power point presentations/ Videos

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment civil	CIE *	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1,2,3,4
				Written Quiz (MCQ)	05	Quiz Sheets	1,2,4
	SEE *	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1 & 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4 Effectiveness of Delivery of instructions & Assessment Methods

*CIE – Continuous Internal Evaluation

*SEE – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Any decimals shall be rounded off to the next higher digit.

I- Semester Diploma Examination
MATERIALS OF CONSTRUCTION

Time: **3 Hours**]

[Max Marks: **100**

Note: Answer any SIX from Part A and any SEVEN from Part B

PART-A

6x5=30 marks

1. What are the characteristics of good stone?
2. Write short notes on preservation of stones?
3. Explain the burning of bricks in a clamp with a neat sketch?
4. Give comparison between burning bricks in a kiln & clamp?
5. Explain the Cross- section of an exogenous tree with a neat sketch?
6. List market forms of timber?
7. List the functions of ingredient of cement?
8. Briefly explain the field tests conducted on cement?
9. Write the properties of cast iron?

PART-B

7x10=70 marks

10. Explain the process of quarrying by wedging?
11. Briefly explain the physical & chemical classification of rocks?
12. Explain the Crushing strength test & absorption test conducted on brick?
13. Explain burning of bricks in Hoffman's kiln with a neat sketch?
14. Explain classification of timber based on mode of growth?
15. Explain the defects in timber due to natural forces?
16. Explain the burning process of ordinary Portland cement?
17. What are the characteristics of paints & varnish?
18. a) List the properties & uses of TMT bars?
b) List the properties & uses of Zinc?
19. Explain the alloy of copper & aluminium?



MODEL QUESTION BANK

Diploma in civil Engineering

1st Semester

Course title: Materials of Construction, Course Code:15CE11T

1. Briefly explain the classification of stones? 10m
2. Discuss the geological classification of rocks? 5m
3. Briefly explain the physical & chemical classification of rocks? 10m
4. Explain the method of quarrying by blasting? 10m
5. Explain the process of quarrying by wedging? 10m
6. What are the characteristics of good stone? 5m
7. Write short notes on deterioration of stones? 5m
8. Write short notes on preservation of stones? 5m
9. Explain acid test & attrition test conducted on stone? 10m
10. Explain crushing strength & water absorption test conducted on stones? 10m
11. List the useful & harmful ingredients of good brick earth? 10m
12. Explain the process of manufacture of bricks 10m
13. Explain the burning of bricks in a clamp with a neat sketch? 5m
14. Explain burning of bricks in intermittent down draught kiln with neat sketch? 10m
15. Explain burning of bricks in Hoffman's kiln with a neat sketch? 10m
16. Explain with a neat sketch any method of burning bricks in continuous kiln? 10m
17. Give comparison between burning bricks in a kiln & clamp? 5m
18. List the properties of good building bricks? 5m
19. Explain the classification of bricks? 5m
20. Explain the field test conducted on bricks? 5m
21. List any five different Substitutes for bricks ? 5m
22. Write a short note on cement concrete blocks? 5m
23. Explain production process of cement concrete blocks? 5m
24. Explain the Crushing strength test & absorption test conducted on brick? 10m
25. Explain shape & size test & efflorescence test conducted on brick? 10m
26. Explain classification of timber based on mode of growth? 10m
27. Explain the Cross- section of an exogenous tree with a neat sketch? 5m
28. List the properties of good timber? 5m
29. Explain the defects in timber due to natural forces? 10m
30. Explain the defects in timber due to Fungi? 10m
31. Explain the defects in timber due to Seasoning? 10m
32. Explain the defects in timber due to conversion? 10m
33. Explain the defects in timber due to Insects? 10m
34. Write short notes on preservation of Timber? 5m
35. Write short notes on Seasoning of Timber? 5m
36. Explain conversion of timber? 5m
37. List the market forms of timber? 5m
38. Explain the composition on of ordinary Portland cement? 5m

39. List the functions of ingredient of cement?	5m
40. Explain the manufacture of ordinary Portland cement?	10m
41. Explain the mixing of raw materials of cement by dry process?	10m
42. Explain the manufacturing of ordinary Portland cement by burning?	10m
43. Explain the grinding process of cement?	5m
44. Write a short note on varieties of cement?	5m
45. List the precautions to be taken in storing of cement?	5m
46. What are the objects of paints?	5m
47. Write the characteristics of good paint?	5m
48. What are the ingredients of paint?	5m
49. What are the objects of varnish?	5m
50. Write the characteristics of varnish?	5m
51. What are the ingredients of varnish?	5m
52. What are the objects of distemper?	5m
53. Write the characteristics of distemper?	5m
54. What are the ingredients of distemper?	5m
55. Write the types of cast iron?	5m
56. Write the types of wrought iron?	5m
57. Write the types of mild steel?	5m
58. Write the properties & uses of cast iron?	5m
59. Write the properties & uses of wrought iron?	5m
60. Write the properties & uses of mild steel?	5m
61. Write the properties & uses of Tor steel?	5m
62. Write the properties & uses of Tiscon steel?	5m
63. Write the properties & uses of Tor steel & Tiscon steel	10m
64. List the properties & uses of deformed bars?	5m
65. List the properties & uses of TMT bars?	5m
66. Write the properties & uses of High tensile steel?	5m
67. List the properties & uses of copper?	5m
68. Write the properties & uses of aluminium?	5m
69. List the properties & uses of zinc?	5m
70. Write the properties & uses of tin?	5m
71. Write the types of aluminium alloy?	5m
72. Write the types of copper alloy?	5m
73. Write the types of steel alloy?	5m
74. Write the properties & uses of aluminium alloy?	5m
75. Write the properties & uses of copper alloy?	5m
76. Write the properties & uses of steel alloy?	5m