

BUILDING MATERIALS, CONSTRUCTION AND PLANNING

Subject Code: **CE304ES**

Regulations: **R17 - JNTUH**

Class : **II Year B.Tech CE I Semester**



Department of Civil Engineering

BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

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**BUILDING MATERIALS, CONSTRUCTION AND PLANNING
(CE304ES)**

COURSE PLANNER

I. COURSE OVERVIEW:

A construction materials course introduces students to materials used in different construction projects from building materials to ground and foundation make-up. Specific materials studied include soil, metals, concrete and wood. This course also covers finishes and materials for the exterior and interior of buildings. Skills are developed to assess the effect materials have on a building projects related to structure, fire safety, building codes as well as market demand.

A large part of construction management has to do with overseeing entire building projects or multiple construction projects. This course helps to develop students' skills in managing projects and people. This course may be taken at different times in a construction management program with an emphasis on residential or commercial construction.

Specific topics may include record keeping, job-site management, use of subcontractors and scheduling. Specific computer software may be used for construction project scheduling. Students typically work on sample projects in order to gain real-world experience in planning and scheduling construction projects.

II. PREREQUISITE(S):

Level	Credits	Periods / Week	Prerequisites
UG	4	5	Building Materials, Construction Process

III. COURSE OBJECTIVES:

To how the wood, cement, admixtures is used for buildings and construction process.

- 1.To develop the building walls and foundations and how they are useful for buildings.
- 2.In these mainly we know about building arches, roofs, doors, windows and ventilators and how they are given for buildings.
- 3.To develop the form work and finishing work which is used for buildings and to solve the defects of building properties which are able to know with material
- 4.Painting is also taken for a beautiful looking structure for the good manner.
- 6.These courses explain about the material which we want to use and how we want to use and how to give a good building for ma using purpose

IV. COURSE OUTCOMES:

After completing this course the students will be able to:

1. Demonstrate the ability to know about different materials such as stones, bricks, Tiles, wood, aluminum, glass & paints and their classification , manufacture and structural requirements
2. Ability to know about the materials used in making of concrete such as cement and admixtures.
3. Ability to know about tests on cement such as field and lab tests and uses of cement and admixtures.
4. Graduates will demonstrate an understanding of various building components such as lintels, arches, types of roofs and joinery such as doors, windows and the materials used in making.
5. Graduates will demonstrate various building services such as plumbing services, sanitary and ventilations.
6. Graduates will demonstrate the various types of ventilations, air conditioning, types of air conditioning, fire protection and classification of fire hazards and fire resistant materials used in construction.

7. Graduates will demonstrate the types of masonry ,finishers and form work ,requirements, standards
8. Graduates should be capable of self-education and clearly understand the value of building planning and principles of building planning, classification of buildings and building bye laws.
9. Graduates will be broadly educated and will have an understanding of the impact of building construction on society and demonstrate awareness of contemporary issues.
10. Graduates will be familiar in applying software methods to analyze civil engineering problems.

V. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes		Level	Proficiency assessed
PO1	An ability to apply knowledge of computing, mathematical foundations, algorithmic principles, and civil engineering theory in design of computer-based systems to real-world problems	H	Assignments, Tutorials , Exams
PO2	The ability to practice civil engineering using up-to- date techniques, skills, and tools as a result of life – long learning ability to design and conduct experiments, as well as to analyze and interpret data.	N	--
PO3	An ability to design , implement, and evaluate a field program to meet desired needs, within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability, and sustainability.	H	Assignments, Tutorials , Exams
PO4	An ability to design a system or component to satisfy stated or code requirements of Civil Engineering	N	--
PO5	An ability to analyze a problem, identify, formulate and use the appropriate computing and Civil engineering requirements for obtaining its solution.	H	Assignments, Tutorials , Exams
PO6	An understanding of professional, ethical, legal, security and social issues and responsibilities.	N	--
PO7	An ability to communicate effectively, both in writing and orally	N	--
PO8	The broad education necessary to analyze the local and global impact of computing and engineering solutions on individuals, organizations, and society	N	--
PO9	Recognition of the need for, and an ability to engage in continuing professional development and life-long learning	N	--

PO10	Knowledge of contemporary issues as they affect the professional and ethical practice of engineering.	N	--
PO11	An ability to use current techniques, skills, and tools necessary for computing and engineering practice	H	Assignments and Tutorials, Exams
Po12	An ability to design and development principles in the construction of Civil Engineering of varying complexity.	N	--
PO13	An ability to recognize the importance of civil Engineering professional development by pursuing post graduate studies or face competitive examinations that offer challenging and rewarding careers in computing.	N	--

VI. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program specific outcomes		Level	Proficiency Assessed
PSO 1	An ability to apply knowledge of computing, mathematical foundations, algorithmic principles, and civil engineering theory in design of computer-based systems to real-world problems	H	Lectures, Exercises and Assignments
PSO 2	An ability to design , implement, and evaluate a field program to meet desired needs, within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability, and sustainability.	H	Project
PSO 3	An ability to use current techniques, skills, and tools necessary for computing and engineering practice	S	Guest lectures

N - None

S - Supportive

H - Highly Related

VII. SYLLABUS:

UNIT - I

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing.

Bricks – Composition of Brick earth – manufacture and structural requirements, Fly ash, Ceramics.

Timber, Aluminum, Glass, Paints and Plastics: Wood - structure – types and properties – seasoning – defects; alternate materials for Timber – GI / fibre – reinforced glass bricks, steel & aluminum, Plastics.

UNIT - II

Cement & Admixtures: Ingredients of cement – manufacture – Chemical composition –

Hydration - field & lab tests.

Admixtures – mineral & chemical admixtures – uses.

UNIT - III

Building Components : Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed ; foundations – types ; Damp Proof Course ; Joinery – doors – windows – materials – types.

Building Services: Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics – characteristic – absorption – Acoustic design; Fire protection – Fire Hazards – Classification of fire resistant materials and constructions.

UNIT - IV

Mortars, Masonry and Finishing's

Mortars: Lime and Cement Mortars

Brick masonry – types – bonds; Stone masonry – types; Composite masonry – Brick-stone composite; Concrete, Reinforced brick.

Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP.

Form work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

UNIT – V

Building Planning: Principles of Building Planning, Classification of buildings and Building by laws.

SUGGESTED BOOKS:

TEXT BOOKS

1. Building Materials and construction – Arora & Bindra, Dhanpat Roy Publications.
2. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain (2005), Building Construction, Laxmi Publications (P) ltd., New Delhi, India.
3. Building materials , construction and planning by S .MAHABOOB BASHA

REFERENCES BOOKS

1. Building materials by Duggal, New age Internations.
2. Building construction by PC verghese PHI.
3. Construction technology –vol -1 &2 by R. chuddy, Longman UK.
4. Basics of civil Engg by Subhash chander; Jain brothers

NPTEL WEB COURSE:

<http://nptel.ac.in/courses/105102088/>

NPTEL VIDEO COURSE:

<http://nptel.ac.in/courses/105102088/#>

GATE SYLLABUS:

Not Applicable

RELEVANT SYLLABUS FOR IES

- 1) **Timber:** Different types and species of structural timber, density-moisture relationship, strength in different directions, defects, influence of defects on permissible stress, preservation, dry and wet rots, codal provisions for design, Plywood.
- 2) **Bricks:** Types, Indian Standard classification, absorption, saturation factor, strength in masonry, influence of mortar strength on masonry strength.
- 3) **Cement:** Compounds of, different types, setting times, strength.

- 4) **Cement Mortar:** Ingredients, proportions, water demand, mortars for plastering and masonry.
- 5) **Concrete:** Importance of W/C Ratio, Strength, ingredients including admixtures, workability, testing for strength, elasticity, non-destructive testing, mix design methods.

VIII. COURSE PLAN:

S.No.	Week	Unit	Topics to be covered	Learning Objective	References
1.	1	1	STONES, BRICKS AND TILES:- Properties of building stones	To understand about building stones and their relations in structures	T1,T3
2.	1	1	STONES, BRICKS AND TILES:- Properties of building stones.	To understand about building stones and their relations in structures	T1,T3
3.	1	1	Classification of stones	To understand about types of stones	T1,T3
4.	1	1	Classification of stones	To understand about types of stones	T1,T3
5.	2	1	Stone quarrying – structural requirements And dressing.	To understand how the quarrying is done and its precautions	T1,T3
6.	2	1	Stone quarrying – structural requirements And dressing.	To understand how the quarrying is done and its precautions	T1,T3
7.	2	1	Composition of brick earth, manufacture and structural requirements.	To know about brick earth	T1,T3
8.	2	1	Composition of brick earth, manufacture and structural requirements.	To know about brick earth	T1,T3
9.	3	1	Composition of brick earth, manufacture and structural requirements.	To know about brick earth	T1,T3
10.	3	1	Qualities of a good brick, Characteristics of good tile	To understand the quality of brick, To know about good tile	T1,T3

11.	3	1	Qualities of a good brick, Characteristics of good tile	To understand the quality of brick, To know about good tile	T1,T3
12.	3	1	WOOD , ALUMINUM ,GLASS AND PAINTS: Structure – properties – Seasoning of Wood , types of wood and defects	To understand about the structure and properties of wood	T1,T3
13.	4	1	Structure – properties – Seasoning of Wood , types of wood and defects	To understand about the structure and properties of wood	T1,T3
14.	4	1	Structure – properties – Seasoning of Wood , types of wood and defects	To understand about the structure and properties of wood	T1,T3
15.	4	1	Use of Alternative materials for wood like , Galvanized Iron, Fiber-reinforced Glass bricks, steel & aluminum.	To understand about the alternate materials for wood.	T1,T3
16.	4	1	Use of Alternative materials for wood like , Galvanized Iron, Fiber-reinforced Glass bricks, steel & aluminum.	To understand about the alternate materials for wood.	T1,T3
17.	5	2	CEMENT & ADMIXTURES Various types of cement and their Properties	To understand about the cements and its properties	T1,T3
18.	5	2	Various ingredients of Cement Concrete and their importance, manufacture and chemical composition and hydration.	To know about the materials used in cements and concrete	T1,T3
19.	5	2	Various ingredients of Cement Concrete and their importance, manufacture and chemical composition and hydration.	To know about the materials used in cements and concrete	T1,T3
20.	5	2	Various field and laboratory tests for Cement	To understand how the cement is used	T1,T3
21.	6	2	Various field and laboratory	To understand how	T1,T3

			tests for Cement	the cement is used	
22.	6	2	Types of Admixtures- mineral & chemical & its uses	To know about the admixtures and chemicals	T1,T3
23.	6	3	BUILDING COMPONENTS:- Lintels, Arches, and Vaults- stair cases – Types	To know various building structural components	T1,T3
24.	6	3	Lintels, Arches, and Vaults- stair cases – Types	To know various building structural components	T1,T3
25.	7	3	Lintels, Arches, and Vaults- stair cases – Types	To know various building structural components	T1,T3
26.	7	3	Different types of floors- Concrete, Mosaic, Terrazzo floors	To know about the floors and different types used in buildings	T1,T3
27.	7	3	Different types of floors- Concrete, Mosaic, Terrazzo floors	To know about the floors and different types used in buildings	T1,T3
28.	7	3	pitched, flat and curved Roofs Lean-to-Roof, Coupled Roofs	To learn about roofs and types of roofs	T1,T3
29.	8	3	pitched, flat and curved Roofs Lean-to-Roof, Coupled Roofs	To learn about roofs and types of roofs	T1,T3
30.	8	3	Doors , windows and the materials used and types	To understand about Joinery	T1,T3
31.	8	3	BUILDING SERVICES :- Plumbing services: water distribution, sanitary –lines and fittings.	To know about various building services	T1,T3
32.	8	3	Plumbing services: water distribution, sanitary –lines and fittings.	To know about various building services	T1,T3
33.	9	3	Plumbing services: water distribution, sanitary –lines and fittings.	To know about various building services	T1,T3
34.	9	3	Types of ventilations used for building and functional requirements and systems of ventilation.	To know about Ventilations used for buildings	T1,T3
35.	9	3	Types of ventilations used for building and functional	To know about Ventilations used	T1,T3

			requirements and systems of ventilation.	for buildings	
36.	9	3	Types of ventilations used for building and functional requirements and systems of ventilation.	To know about Ventilations used for buildings	T1,T3
37.	10	3	Essentials of air conditioning and types of air conditioning	To know about air conditionings	T1,T3
38.	10	3	Essentials of air conditioning and types of air conditioning	To know about air conditionings	T1,T3
39.	10	3	Essentials of air conditioning and types of air conditioning	To know about air conditionings	T1,T3
40.	10	3	Characteristic absorption of acoustics and acoustic design.	To know about Acoustics	T1,T3
41.	11	3	Characteristic absorption of acoustics and acoustic design.	To know about Acoustics	T1,T3
42.	11	3	Fire hazards and classification of fire resistant materials used in construction	To know about fire protection	T1,T3
43.	11	3	Fire hazards and classification of fire resistant materials used in construction	To know about fire protection	T1,T3
44.	11	3	Fire hazards and classification of fire resistant materials used in construction	To know about fire protection	T1,T3
45.	12	4	MASONRY AND FINISHING'S :- masonry	To know about masonry	T1,T3
46.	12	4	masonry	To know about masonry	T1,T3
47.	12	4	Types and bonds used in brick masonry	To know about brick masonry	T1,T3
48.	12	4	Types and bonds used in brick masonry	To know about brick masonry	T1,T3
49.	13	4	Types of stone masonry	To know about stone masonry	T1,T3
50.	13	4	Types of stone masonry	To know about stone masonry	T1,T3
51.	13	4	Brick –stone composite	To know about	T1,T3

			,concrete and reinforced brick	composite masonry	
52.	13	4	Types of finishers :plastering , pointing , painting cladding s	To know about finishers	T1,T3
53.	14	4	Types of finishers :plastering , pointing , painting cladding s	To know about finishers	T1,T3
54.	14	4	Uses of tiles and ACP	To know about tiles	T1,T3
55.	14	4	Uses of tiles and ACP	To know about tiles	T1,T3
56.	14	4	FORM WORK - Form work	To know about form work	T1,T3
57.	15	4	Form work	To know about form work	T1,T3
58.	15	4	Scaffolding - standards and requirements	To know about the scaffolding	T1,T3
59.	15	4	Scaffolding - standards and requirements	To know about the scaffolding	T1,T3
60.	15	4	Under Pinning	To know how the Under Pinning is done in building works	T1,T3
61.	16	5	BUILDING PLANNING: planning	To know how planning is done	T1,T3
62.	16	5	planning	To know how planning is done	T1,T3
63.	16	5	Principles of planning	To know about planning	T1,T3
64.	16	5	Building by laws	To know about types of buildings and laws	T1,T3

IX. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Objectives	Program Outcomes										Program Specific				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
I	H	H										S	H	S	

II	H	H	S											H	S	
III	H	H	S	S										S	H	
IV	H	S												H	S	
V		H			S									H		

X. QUESTION BANK: (JNTUH)
DESCRIPTIVE QUESTIONS
UNIT 1: STONES AND BRICKS, TILES
SHORT QUESTIONS:

S.No	Question	Blooms Taxonomy Level	Course Outcome
1	Define Seasoning of timber	Remembering	1,2,3
2	List out the defects in timber	Analyzing	1,2,3
3	Write down the characteristic properties of good stone?	Remembering	1,2,3
4	Describe properties of mild steel	Remembering	1,2,3
5	What are the uses of mild steel	Remembering	1,2,3
6	What are the paints commonly used in building construction?	Remembering	1,2,3
7	What are the different types of paints?	Remembering	1,2,3
8	What are the constituents of glass?	Understanding	1,2,3
9	What role does aluminum play in building construction?	Understanding	1,2,3
10	Write any four properties of clay products?	Remembering	1,2,3
11	What are the properties of glass?	Remembering	1,2,3

LONG QUESTIONS:

S.No	Question	Blooms Taxonomy Level	Course Outcome
1	What are the operations involved in manufacturing of bricks?	Creating	1,2,3
2	Differentiate between exogenous trees and endogenous trees	Understanding	1,2,3
3	Explain the manufacturing process of aluminum.	Creating	1,2,3
4	Explain the classification of bricks With neat sketch.	Remembering	1,2,3
5	What do you Understand about the dressing of stones and explain the	Analyzing	1,2,3
6	Explain in brief about the alternative materials for wood.	Understanding	1,2,3
7	Describe the geological classification of rocks. Give example of each	Remembering	1,2,3
8	Describe various types of paints and their suitability or use?	Creating	1,2,3
9	What are the various methods of quarrying of stones? Explain each method briefly.	Remembering	1,2,3
10	Explain in detail the process of manufacturing of glass?	Understanding	1,2,3
11	Explain classification of bricks based on field practice	Understanding	1,2,3

12	What test are to be made on bricks explain any three of them	Creating	1,2,3
13	Explain about characteristics of good bricks	Understanding	1,2,3

UNIT 2: CEMENT & ADMIXTURES

SHORT QUESTIONS:

S.No	Question	Blooms Taxonomy Level	Course Outcome
1	List out the ingredients of cement.	Remembering	5,6
2	List out the various grades of cement in India.	Analyzing	5,6
3	What do you mean by setting time of cement	Remembering	5,6
4	Enumerate various types of cement?	Understanding	5,6
5	What are admixtures?	Remembering	5,6
6	What are different types of admixtures	Remembering	5,6
7	State the need of soundness of cement.	Remembering	4
8	What are the properties of OPC	Remembering	4
9	Describe the role of admixtures.	Remembering	4
10	List harmful constituents in cement.	Remembering	4
11	State 4 important uses of rapid hardening cement.	Understanding	4
12	What is chemical admixtures	Remembering	4
13	What are the different types of chemical admixture?	Remembering	4
14	What are mineral admixtures?	Remembering	4

LONG QUESTIONS:

S.No	Question	Blooms Taxonomy Level	Course Outcome
1	Explain briefly about the tests conducted on cement to find its properties	Remembering	4
2	Describe in briefly any type of manufacture of cement with the help of flow diagram.	Remembering	4
3	Explain about different mineral admixtures	Remembering	4
4	Explain the field tests on cement? Write the chemical composition of ordinary Portland cement.	Creating	4
5	Explain why gypsum is added during the manufacture of cement?	Understanding	4
6	What are air entraining agents? How these air entraining agents help in improving performance of cement?	Remembering	4
7	Differentiate between the following: a) Initial setting time and final setting time b) Clinker and nodules	Understanding	4
8	What do you Understand by the term setting and hardening of cement? What chemical reaction takes place during the process of setting?	Remembering	4

9	Explain about different chemical admixtures	Remembering	4
10	Write short notes on:	Remembering	4

UNIT 3: BUILDING COMPONENTS

SHORT QUESTIONS:

S.No	Question	Blooms Taxonomy Level	Course Outcome
1	Define arch .	Remembering	5,6
2	What are the components of an arch?	Analyzing	5,6
3	Define Span of an arch	Remembering	5,6
4	Define Rise of an arch.	Understanding	5,6
5	Define lintel.	Remembering	5,6
6	Write the classification of lintels .	Remembering	5,6
7	Explain about the types of roofs.	Remembering	5,6
8	What is damp proof coursing?	Understanding	5,6
9	What are the advantages of damp proof	Understanding	5,6
10	Define water distribution system	Analyzing	5,6
11	Define acoustic design.	Analyzing	5,6
12	Explain about the characteristics of acoustic	Remembering	5,6
13	Classify among fire resistant materials	Remembering	5,6

LONG QUESTIONS:

S.No	Question	Blooms Taxonomy Level	Course Outcome
1	What are different types of arches that are used for engineering construction? Describe any three types in	Understanding	5,6
2	a) How are new foundations constructed near old existing structures? b) Discuss about the combined footings?	Remembering	5,6
3	a) State briefly the requirement of good stair. b) State the various types of stairs through flow diagrams.	Remembering	5,6
4	Define roof covering? What are various types in roof covering commonly, used in India? Explain in detail.	Remembering	5,6
5	Define the term foundation? Explain in detail various types of building foundations.	Remembering	5,6
6	a) State briefly the requirement of good stair. b) State the various types of stairs through flow diagrams.	Remembering	5,6
7	Write a short note on: a) Storage tanks b) Water requirements of building c) Materials for service pipe	Apply, Create	5,6
8	What is acoustics? State various types of sound absorbing materials according to mode of their performance.	Apply, Create	5,6
9	Explain the various types of fire protection systems in	Understanding	5,6

10	Describe briefly the functional requirements of a ventilation system.	Understanding	5,6
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UNIT 4: MASONRY AND FINISHING'S

SHORT QUESTIONS:

S.No	Question	Blooms Taxonomy Level	Course Outcome
1	Write down the general requirements of mortars?	Remembering	7,8
2	What is brick masonry?	Remembering	7,8
3	What is stone masonry?	Remembering	7,8
4	What is concrete Block masonry	Remembering	7,8
5	Explain about the types of bonds in brick work	Remembering	7,8
6	Explain about tools used in brick masonry	Remembering	7,8
7	Define form work	Remembering	7,8
8	List any three reasons why concrete is used as a building material.	Remembering	7,8
9	State the principles of form work design	Understanding	7,8
10	Explain plastering	Remembering	7,8
11	What is the purpose of plastering	Remembering	7,8
12	Define pointing.	Remembering	7,8

LONG QUESTIONS:

S.No	Question	Blooms Taxonomy Level	Course Outcome
1	What is brick masonry? State and explain briefly the	Understanding	7,8
2	Describe the ashlar stone masonry and state its uses in construction of structures.	Remembering	7,8
3	Define the terms in masonry: 1) Header, 2) Stretcher, 3) Course, 4) Quion, 5) Facing, 6) queen closer, 7) King closer, 8) Jams	Understanding	7,8
4	What is Reinforced concrete cement (R.C.C) and explain its importance in construction of structures.	Remembering	7,8
5	State and explain briefly the various types of plastering along with their suitability in the building works.	Understanding	7,8
6	What is scaffolding. State different types of scaffolding. Explain briefly with neat sketches.	Remembering	7,8
7	What is form work? What are the stages involved in construction of form work? Explain briefly.	Understanding	7,8
8	What is underpinning of structure .explain the methods of underpinning?	Remembering	7,8
9	State and explain the methods of determining the bearing capacity of soils?	Understanding	7,8

10	Mention the objectives of providing painting and plastering to the proposed surface.	Remembering	7,8
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UNIT 5: BUILDING PLANNING
SHORT QUESTIONS

S.No	Question	Blooms Taxonomy Level	Course Outcome
1	Define building planning. State its significance.	Remembering	9,10
2	Write briefly the factors affecting building planning.	Analyzing	9,10
3	Write any four basic principles of building planning?	Understanding	9,10
4	What is orientation?	Remembering	9,10
5	state the factors affecting orientation	Remembering	9,10
6	What is a local authority?	Remembering	9,10
7	State the functions of local authority.	Remembering	9,10
8	Define floor area ratio	Remembering	9,10
9	Classify the building based on their occupancy	Remembering	9,10
10	Classify the building based on type on construction.	Remembering	9,10
11	Define open space	Analyzing	9,10
12	What are the points to be considered while selecting a site for any particular building?	Understanding	9,10

LONG QUESTIONS:

S.No	Question	Blooms Taxonomy Level	Course Outcome
1	State and explain the various basic principles of building planning?	Understanding	9,10
2	What is meant by orientation and state the factors affecting the orientation of building?	Understanding	9,10
3	Explain briefly the practical considerations in building planning?	Understanding	9,10
4	What are the factors to be considered while selecting site	Applying	9,10
5	Explain the significance of building planning and scope of building	Applying	9,10
6	Explain the various types of classification of building.	Understanding	9,10
7	Explain various principles underlying building bye-laws.	Understanding	9,10
8	Explain briefly the following principles in planning the building:	Applying	9,10
9	Explain briefly the factors affecting building planning	Applying	9,10
10	Explain the following terms :	Applying	9,10
11	What are the principles of plastering of building explain any four of them.	Understanding	9,10

12	What are the classification of buildings based upon	Remembering	9,10
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XI. OBJECTIVE QUESTIONS: JNTUH

UNIT-I

- Timber can be made reasonably fire resistant by
 - By soaking it in ammonium sulphate
 - By applying tar paint
 - By pumping creosote oil in to timber under high pressure
 - None
- Most economical of the methods of sawing wood is
 - Radial sawing
 - tangential sawing
 - quarter sawing
 - flat sawing
- Ply wood can be identified by
 - Volume
 - weight
 - thickness
 - area
- Outer most portion of the wood is known as
 - Core
 - bark
 - ark
 - dark
- The proportions of the lime and in the mortar normally used in bricks construction should be
 - 1:2
 - 1:4
 - 1:6
 - 1:8
- Expansion joint in the masonry wall are provided in wall length greater than
 - 10m
 - 20m
 - 30m
 - 40m

Which of the following is not a type of brick bond?

 - English bond
 - Flemish bond
 - French bond
 - both 1 and 2
- Swelling of brick is known as
 - Bulking
 - bladdening
 - bloting
 - none
- High quality bricks are produced in
 - Clamps
 - fumes
 - bulls trench kilns
 - Hoffman kilns
- The length of the bar beyond theretical cut off point shall be
 - Anchored length
 - development length
 - bond length
 - dowel length
- For bar in tension, standard book has an anchorage value equivalent to a straight length 8 dia. The expansion of the cement paste usually caused by
 - Free lime
 - free silica
 - iron oxide
 - voids

UNIT II

- In a mortar, the binding material is
 - cement
 - B. sand
 - C. surkhi
 - D. cinder.
- Bitumen felt
 - is used as water proofing material
 - B. is used as damp proofing material
 - is made from bitumen and hessian fibres
 - D. all the above.
- In the cement the compound quickest to react with water, is
 - Tricalcium aluminate
 - B. Tetra-calcium alumino-ferrite
 - Tricalcium silicate
 - BD)D. Dicalcium silicate.
- For preparing porcelains, the clay should be
 - sufficiently pure
 - B. of high degree of tanacity
 - of good plasticity
 - D. All the above.
- For the manufacture of Portland cement, the proportions of raw materials used, are
 - lime 63% ; silica 22% ; other ingredients 15%
 - B) lime 22% ; silica 63% ; other ingredients 15%
 - C. silica 40% ; lime 40% ; other ingredients 20%
 - D. silica 70% ; lime 20% ; other ingredients 10%.

6. Asbestos cement
 - A. is brittle B)B. warps due to changes in humidity
 - C. strength is lowered when saturated by water D)D. all the above.
7. The moisture content in structural timber should be
 - a) Less than 5%
8. 5 to 10% B)10 to 50% C)15 to 25% D)8.Seasoning of timber is required to
 - A)Soften the timber B)harden the timber
 - C)straighten the timber D)remove sap from the timber
9. For one cubic meter of brick masonry, the number of modular bricks needed is
 - a)400 or less B)b)400 to 450 c)c)500 to 550 d) d)600 to 650
10. Due to attack of dry rots, the timber
 - a) Dries out b)Cracks c)Shrinks d)Becomes powder

UNIT III

1. In case of Raymond pile
 - A. lengths vary from 6 m to 12 m B)
 - B. diameter of top of piles varies from 40 cm to 60 cm
 - C. diameter of pile at bottom varies from 20 cm to 28 cm
 - D. thickness of outer shell depends upon pile diameter
 - E. all the above.
2. The foundation in which a cantilever beam is provided to join two footings, is known as
 - A. strip footing B) B. strap footing C)combined footing
 - D. raft footing E) E. none of these.
3. In jack arch floor, the rise is kept
 - A.1/6th of the span B)1/8th of the span
 - C.1/10th of the span D)1/12th of the span E)1/15th of the span.
4. While designing a stair, the product of rise and going is approximately kept equal to
 - A.350 B)420 C)450 D)500 E) 600.
5. 5.The variety of pig iron used for the manufacture of steel by Bessemer process, is
 - A.Bessemer pig B. Grey pig C.White forge pig D.Mottled pig.
6. 6 .For melting one tonne of cast iron
 - A. 700 m³ air is required B)20 kg limestone is required
 - C)one quintal coke is required D)all the above.
7. Varnish is a transparent or semi-transparent solution of resinuous substances in
 - A. Alcohol B)linseed C)turpentine D)all the above.
8. Initial setting time of cement for asbestos cement products should be not less than
 - A. 30 minutes B)50 minutes C)75 minutes D)90 minutes.
9. Pick up the correct statement from the following:

Roasting is not necessary if iron ore is an oxide

 - A. Impurities float on the molten iron as slag
 - B. The slag contains lime about 45%
 - C. The molten iron is made to run, in a long channel formed in sand called 'sow'
 - D. All the above.
10. The tendency of a stone is, to split along:
 - A. Texture B)fracture C)cleavage D)structure E)all the above.

UNIT IV

1. Dado is usually provided in

- A. dining halls B. bath rooms C. living rooms D. verandah E. roofs.
2. Queen closer may be placed
 - A. in header course B. in stretcher course C. in header course next to first brick
 - D. in stretcher course next to first brick E. in any position.
 3. Lacquer paints
 - A. are generally applied on structural steel
 - B. are less durable as compared to enamel paints
 - C. consist of resin and nitro-cellulose
 - D. contain alcohol as thinner E. all the above.
 4. Pick up the correct statement from the following:
 - A. For thin structures subjected to wetting and drying, the water cement ratio should be 0.45
 - B. For mass concrete structures subjected to wetting and drying, the water ratio should be 0.55
 - C. For thin structures which remain continuously under water, the water-cement ratio by weight should be 0.55
 - A. For massive concrete structures which remain continuously under water, the water cement ratio by weight should be 0.65
 - B. All the above.
 5. Good quality cement contains higher percentage of
 - A. Tricalcium silicate B)Di-calcium silicate C)Tri-calcium aluminate
 - D)Tetra calcium alumino ferrite E)all the above.
 6. Soundness of cement is tested by
 - A. Vicat's apparatus B)Le-chatelier apparatus
 - B. compressive strength testing apparatus D)none of the these.
 7. The PVC doors and windows are preferred as they are
 - A. rust proof B)rot proof C)termile proof D)water proof E)all of these.
 8. Based on its dry weight, a freshly felled tree may contain water
 - A. 25% B)50% C)75% D)100%.
 9. Forge pig may be converted to wrought iron by
 - A. Rolling B)pudding C)shingling D)refining.
 10. Pig iron made from hematite ores free from sulphur, phosphorus and copper, is known as
 - A. Bessemer pig B)Grey or foundry pig C)White or forge pig
 - D)Mottled pig E)All the above.

UNIT -V

1. The size of mould for bricks, is generally kept
 - A. a little large to specified size B)a little small to specified size
 - C)equal to specified size D)10% larger than specified size E)20% larger than specified size.
2. Most commonly used solvent in oil paints, is
 - A. Petroleum B)spirit C)coaltar D)turpentine.
3. Acrylic sheets
 - A. possess 10 to 17 times greater breakage resistance than that of glass of equivalent thickness
 - B. are generally unaffected by most household detergents C)

- C. possess the light transmission rate of 93%
 - D. are available in various shapes E)all the above.
4. With storage, strength of cement
 - A. Increases B)decreases C)remains the same D)none to these.
 5. The commonly used raw material in the manufacture of cement, is
 - A. Slate B)sand stone C)lime stone D)basalt.
 6. Plywood is normally available
 - A. 1 mm thick B)2 mm thick C)2 to 3 mm thick D)3 mm to 4 mm thick.
 7. French polish is
 - A. oil paint B)distemper C)spirit varnish D)none to these.
 8. In stone masonry, if stones are so placed that their layers are parallel to the direction of load, they split easily
 - A. are affected by moisture B)both (a) and (b) C)none of these.
 9. A bull nose brick is not used for
 - A. rounding off sharp corners B)pillars C)decoration purpose D)arches.
 10. Red short iron cracks when bent due to the presence of
 - A. Sulphur B)carbon C)phosphorus D)silicon.

XII. GATE QUESTIONS:

1. The type of tool in brick masonry used for getting horizontal surface and leveling
 - a) brick hammer b) trowel c) spirit level d) plumb rule
2. Due to the following defects, in brick increase in volume of mortar occurs
 - a) crystallization b) sulphate attack c) corrosion d) shrinkage
3. The cement mortar for plastering works vary from
 - a) 1:4 – 1:6 b) 1:5 – 1:7 c) 1:2 – 1: 10 d) none
4. The type of pointing in which the face of it is kept inclined with its upper edge pressed inside
 - a) Flush pointing b) v- pointing c) tuck pointing d) recessed pointing
5. The liquid substances which holds different ingredients of a paint in suspension
 - a) base b) drier c) pigment d) vehicle
6. The type of shore used to give horizontal support to adjacent parallel party walls is
 - a) raking shore b) flying shore c) dead shore d) none
7. The process of placing new foundation under existing one is
 - a) underpinning b) shoring c) form work d) all
8. The type of air conditioning which is established in hotels, halls and factories is
 - a) chilled water system b) central directexpansion system c) both d) none
9. As per vastushastra, the recommended location for pooja room should be
 - a) S-E b) N-E c) both d) none
10. As per building principles, the stairs should have pitch of
 - a)10-20 b) 20 -40 c) 30 -40 d) 40 -50
11. Couple close roof is suitable for maximum span of
 - a) 2.5 m b) 3.5 m c) 4.5 m d) 5.5 m
12. In a colar beam roof
 - a) there is no horizontal tie beam b) there is a horizontal tie at the feet of rafters only
 - c) there is a horizontal tie at almost the middle of rafters only
 - d) there are two horizontal ties, one at the feet and other at the middle of the rafters

13. The function of king post in a king post roof truss is
 - a) to support the frame work of the roof
 - b) to receive the ends of principal rafter
 - c) to prevent the walls from spreading outward
 - d) to prevent the tie beam from sagging at its centre
14. The function of cleats in a roof truss is
 - a) to support the common rafter
 - b) to support purlins
 - c) to prevent the purlins from tilting
 - d) all of the above
15. The term string is used for
 - a) the underside of a stair
 - b) outer projecting edge of a tread
 - c) a sloping member which supports the steps in a stair
 - d) a vertical member between two treads
16. The vertical posts placed at the top and bottom ends of a flight supporting the hand rail are known as
 - a) balusters
 - b) newal posts
 - c) balustrades
 - d) railings
17. The maximum number of steps in a flight should generally be restricted to
 - a) 10
 - b) 12
 - c) 15
 - d) no limit
18. The number of steps in a flight generally should not be less than
 - a) 2
 - b) 3
 - c) 5
 - d) no limit
19. Sum of tread and rise must lie between
 - a) 300 to 350 mm
 - b) 400 to 450 mm
 - c) 500 to 550 mm
 - d) 600 to 650 mm
20. Minimum width of landing should be
 - a) equal to width of stairs
 - b) half the width of stairs
 - c) twice the width of stairs
 - d) one fourth the width of stairs

IES

1. Gypsum is a
 - a) mechanically formed sedimentary rock
 - b) igneous rock
 - c) chemically precipitated sedimentary rock
 - d) metamorphic rock
2. Which of the following sedimentary rocks changes into quartzite by metamorphic action ?
 - a) sand stone
 - b) lime stone
 - c) shale
 - d) gypsum
3. Which of the following represents a metamorphic rock?
 - i) slate
 - ii) shale
 - iii) quartzite
 The correct answer is
 - a) only (iii)
 - b) both (i) and (iii)
 - c) both (ii) and (iii)
 - d) all (i), (ii) and (iii)
4. Quartzite is a
 - a) silicious rock
 - b) argillaceous rock
 - c) calcareous rock
 - d) aqueous rock
5. Which of the following is a mineral ?
 - a) basalt
 - b) granite
 - c) quartz
 - d) syenite
6. Slate is formed by metamorphic action on
 - a) shale
 - b) lime stone
 - c) sand stone
 - d) granite
7. Sandstone is a
 - i) sedimentary rock
 - ii) aqueous rock
 - iii) silicious rock
 The correct answer is
 - a) only (i)
 - b) both (i) and (ii)
 - c) both (i) and (iii)
 - d) all (i), (ii) and (iii)
8. Which of the following is a rock ?
 - a) quartz
 - b) mica
 - c) gypsum
 - d) none of the above

9. Based on the following rocks and minerals, select the correct statement, quartz, shale, basalt, granite, marble, gypsum, mica
 - a) basalt and marble are the only metamorphic rocks
 - b) there is no sedimentary rock
 - c) granite is the only igneous rock
 - d) quartz and mica are minerals
10. A heavy stone is suitable for
 - a) arches
 - b) rubble masonry
 - c) roads
 - d) retaining walls
11. The stone suitable for rubble masonry should be.
 - a) hard
 - b) tough
 - c) heavy
 - d) light
12. Which of the following metamorphic rocks has the most weather resisting characteristics?
 - a) marble
 - b) quartzite
 - c) slate
 - d) lime stone
13. A good building stone should not absorb water more than
 - a) 5%
 - b) 10%
 - c) 15%
 - d) 20%
14. Which of the following has more fire resisting characteristics ?
 - a) marble
 - b) lime stone
 - c) compact sand stone
 - d) granite
15. Jumper is a tool used for
 - a) testing of stones
 - b) quarrying of stones
 - c) dressing of stones
 - d) none of the above
16. The important test to be conducted on a stone used in docks and harbours is-
 - a) hardness test
 - b) workability test
 - c) weight test
 - d) toughness test
17. The predominant constituent which is responsible for strength in granite is
 - a) quartz
 - b) feldspar
 - c) mica
 - d) none of the above
18. Granite is not suitable for ordinary building purpose because
 - a) it can not be polished
 - b) it is not a fire proof material
 - c) it is costly
 - d) it has less crushing strength
19. Which of the following stone is best suited for construction of piers and abutments of a railway bridge ?
 - a) granite
 - b) sand stone
 - c) lime stone
 - d) quartzite
20. The preparation of surface of stone to obtain plain edges or to obtain stones of required size and shape is known as
 - a) quarrying of stones
 - b) blasting of stones
 - c) seasoning of stones
 - d) dressing of stones
21. Crushing strength of a good building stone should be more than
 - a) 50 MPa
 - b) 100 MPa
 - c) 150 MPa
 - d) 200 MPa
22. Specific gravity for most of the building stones lies between
 - a) 1.5 to 2.0
 - b) 2.0 to 2.5
 - c) 2.5 to 3.0
 - d) 3.0 to 3.5

XIII. WEBSITES:

- a. http://books.google.co.in/books/about/Building_Construction.html?id=_kAvTMzKGhAC&redir_esc=y
- b. <http://bieap.gov.in/BuildingMaterialsConstruction.pdf>
- c. <http://www.bookdepository.com/category/1823/Building-Construction-Materials/>
- d. <http://www.gobookee.org/building-materials-and-construction-by-rangwala/>

XIV. EXPERT DETAILS:

- a. <http://www.woodardcurran.com/CmsTemplates/PersonDetail.aspx?id=384>
- b. <http://eco.umass.edu/people/faculty/fisette-paul/>

XV. JOURNALS:

- a. <http://www.journals.elsevier.com/construction-and-building-materials/>
- b. <http://www.sciencedirect.com/science/journal/09500618>
- c. <http://www.scimagojr.com/journalsearch.php?q=24443&tip=sid>
- d. http://www.researchgate.net/journal/0950-0618_Construction_and_Building_Materials

XVI. LIST OF TOPICS FOR STUDENT SEMINARS:

- a. Cement and building materials.
- b. Natural and Artificial building materials.
- c. Building Components.
- d. Form work.
- e. Masonry and Finishing
- f. Building Planning.
- g. Building Servicing.

XVII. CASE STUDIES / SMALL PROJECTS:

Case study on the building materials used in BIET construction building.

Projects

- a. Binders used in construction
- b. Admixtures used in the construction and purpose.
- c. Types of building materials.
- d. Planning methods in construction
- e. Tests on building materials.