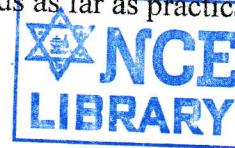


TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
 2080 Baishakh

| Exam. | Back | |
|-------------|--------|---------------------------|
| Level | BE | Full Marks 40 |
| Programme | BCE | Pass Marks 16 |
| Year / Part | II / I | Time 1 $\frac{1}{2}$ hrs. |

Subject: - Civil Engineering Materials (CE 506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



1. What are the factors that affect selection of construction materials? Explain. Define first resistance and permeability. [2+2]
2. What is dressing of stone? Explain roles of building stone in engineering. [2+2]
3. What are bricks extensively used as building material in the construction industry? Explain briefly. Differentiate between earthenware and stoneware. [2+2]
4. Differentiate between fat lime and hydraulic lime. [3]
5. List out the ingredients of Portland cement with their function. [4]
6. Describe the function of mortar. Define surkhi mortar and gauged mortar. [2+1]
7. Write down the different commercial products of timber. Explain various methods of seasoning. [2+3]
8. Explain commercial forms of steel. How quenching differs from annealing? [2+2]
9. Explain the ingredients of paints. What is the function of varnishes? [3+1]
10. Explain in brief about the types of bitumen. Write the requirements of sound insulating materials with examples. [3+2]

TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
 2079 Bhadra

| Exam. | Regular | | |
|-------------|---------|------------|----------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1 ½ hrs. |

Subject: - Civil Engineering Materials (CE 506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



1. Enlist the criteria for selection of suitable engineering materials at a site. Define Hygroscopicity and Fatigue. [1+2]
2. Why is dressing carried out on the quarry site? Write down the factors that damage the stones of structures. [2+2]
3. What are the qualities of good floor tiles? Describe properties of over burnt brick. [2+2]
4. What is pozzolanic material? Explain the manufacture process of lime. [1+2]
5. Explain the manufacturing process of 53 grade OPC cement. What is the 7 and 28 days crushing strength of this cement? [4+2]
6. State stepwise procedure of preparing cement mortar for construction works. Mention the uses of mortar. [2+2]
7. Explain in brief about the defects in timber due to natural forces. Differentiate between natural and artificial seasoning. [2+2]
8. Define quenching and tempering. What is the role of Cobalt, Manganese, Chromium and Nickel in the respective alloy of steel? [2+2]
9. Define ingredients of varnish. How is knot treated for painting in wood works? [2+2]
10. What is insulating materials? Differentiate bitumen and asphalt. [2+2]

TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

| Exam. | Regular | | |
|-------------|---------|------------|----------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1 ½ hrs. |

Subject: - Civil Engineering Materials (CE 506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



1. Explain briefly the properties: Porosity, Creep and Brittleness. State the scope of construction materials in transportation. [3+1]
2. Differentiate between sedimentary and igneous stones. How stone can be preserved? [2+2]
3. Write briefly the brick manufacturing process. How do you classify the brick? Explain. [3+1]
4. What is pozzolanic materials? Why they can be added to a lime? Explain different types of hydraulic lime. [1+1+2]
5. Briefly illustrate the procedure to determine the compressive strength of cement in laboratory. Why hydration of cement takes place? [3+1]
6. State any two merits and demerits of lime mortar. What is a gauged mortar? Describe functions of good mortar. [1+1+2]
7. What are the merits of timber over steel in civil engineering construction works? Explain any four defects in timber caused due to seasoning to it. [2+2]
8. Differentiate between mechanical and heat treatment of steel. How will you define annealing and red shortness of steel? [3+2]
9. What do you understand by distemper? Explain any four defects in paints. [1+2]
10. Why are plastic materials used extensively as construction materials? What is epoxy and adhesive? [2+2]

TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
 2078 Kartik

| Exam. | Back | | |
|-------------|--------|------------|----------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1 ½ hrs. |

Subject: - Civil Engineering Materials (CE 506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



1. What are the factors to be considered for selecting appropriate material for construction works? Define the terms: Creep and Permeability. [2+1]
2. Write down the characteristics of good building stones. What do you mean by dressing of stone? [2+2]
3. Explain briefly the operations involved in preparation of clay for manufacturing process of brick? What is function of glazing in clay product? [3+1]
4. Define pozzolanic materials and illustrate different types of lime with their uses. [1+2]
5. Write down the main constituents of cement. Draw the flow chart of manufacturing of cement by dry process. [1+4]
6. State stepwise procedure of preparing cement mortar for construction works. Mention the types of mortar. [2+1]
7. What do you mean by seasoning of timber and why need to do seasoning? List out the commercial product of timber available in market. [2+2]
8. Differentiate between cast iron and wrought iron. What are the purposes of heat treatment process of metal? [3+2]
9. What is the significance of paint in construction works? Mention the process of applying distemper. [1+3]
10. Write down different types of glass and their uses in construction field. Define Bitumen, tar and Asphat. [3+2]

TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
 2076 Chaitra

| Exam. | Regular | | |
|-------------|---------|------------|----------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1 ½ hrs. |

Subject: - Civil Engineering Materials (CE 506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



1. Explain the factors affecting the selection of civil engineering materials. [3]
2. Write down the requirements of stone to be used for the structural purpose. What are the causes of deterioration of stones? [2+2]
3. What are the essential constituents of good brick earth? Write with their percentage composition. Define glazing of ceramic materials with its objectives. [1+1+2]
4. Explain different types of lime with its properties and suitable uses. [3]
5. Draw a flow chart for wet process of cement manufacture. Explain different constituents of cement clinker with their function. [2+3]
6. State stepwise procedure of preparing cement mortar for construction works. Also, mention the functions of mortar used in building construction. [2+1]
7. Why seasoning of timber is important prior to use? Explain different methods of preserving the timber. [2+2]
8. Explain various ferrous and non-ferrous products used in construction and explain their merits and demerits. What are the purposes of heat treatment process of steel? [3+2]
9. Compare paints and varnishes. Write the steps of preparing the older surface for painting. [2+2]
10. Define asphalt. Write down the properties and uses of asphalt. Why tar is preferred in parking lot construction. [2+2+1]

TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
 2076 Ashwin

| Exam. | Back | | |
|-------------|--------|------------|---------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1½ hrs. |

Subject: - Civil Engineering Material (CE 506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Describe importance of study of Civil Engineering Materials for engineers. Define the terms: creep, hygroscopicity, specific heat capacity and tenacity. [1+2]
2. Describe briefly the characteristics of good building stones. How the stones are deteriorate and pressured? [2+2]
3. What is efflorescence in brick? Explain briefly the manufacturing process of bricks. [1+3]
4. Define pozzolanic materials. Differentiate between fat lime and hydraulic lime. [1+2]
5. Explain functions of compounds present in cement clinker. Explain any three types of cement. [3+2]
6. Define mortar and explain its engineering characteristics. Differentiate between cement and lime mortar. [2+1]
7. What are the uses of Timber? Why it is essential seasoning before using and also highlights the new modified timber. Which are extensively used in our building? [1+3]
8. What are the types of metal that are used in modern Civil Engineering works? Why they are popular in using in the form of Alloys? [5]
9. What are the ingredients of paints, explain? Describe types of paints with their uses. [2+2]
10. Why are plastic materials used extensively as building material nowadays? Differentiate between asphalt and tar with respect of their properties and uses. [3+2]



04 TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
2075 Ashwin

| Exam. | | Back | |
|-------------|--------|------------|----------------------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1 $\frac{1}{2}$ hrs. |

Subject: - Civil Engineering Materials (CE506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. As a civil engineer, what are the major factors which you consider most for the selection of material in civil engineering project in Nepal? Write short notes on significant mechanical properties of civil engineering materials. [2+2]
2. Write down the purposes of dressing of stones. What are the methods to preserve the stone from deterioration? [2+2]
3. Why bricks are commonly used material in construction work? Elaborate briefly the properties of harmful ingredient in bricks. [2+2]
4. Classify the lime on the basis of purity and functions with their suitability in engineering field. [4]
5. Sketch out the graph related to the contribution of clinker compound to strength with respect to time of cement compound. Define Admixtures and cement water proofers. [3+2]
6. State stepwise procedure of preparing cement mortar for construction works. Also, mention the functions of mortar used in building construction. [2+2]
7. Define timber and its seasoning. Elaborate macrostructure and microstructure study of exogenous timber. [1+3]
8. What is the prime importance of carbon present in steel? Distinguish between Plain carbon steel and Alloy steel. [1+3]
9. What are the functions of paint? Explain in detail anti-termite treatment procedure to be applied in foundation? [1+2]
10. Why are plastic materials used extensively as building material nowadays? Write down gypsum products available in market and their applications. [2+2]

| Exam. | Regular | | |
|-------------|---------|------------|----------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1 ½ hrs. |

Subject: - Civil Engineering Materials (CE506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. How is civil engineering materials classified? Define the terms: fatigue and resilience. [2+4]
2. What are the selection critaria of good building stone? Explain about importance of natural bed of stone. [2+2]
3. Why the drying of brick is extremely important steps in manufacturing brick? Describe about standard test of brick. [1+3]
4. Define pozzolanic agents used as admixtures and explain manufacturing process of lime. [1+2]
5. Explain about manufacture flow diagram of cement. Briefly illustrate the procedure to determine the compressive strength of cement in laboratory. [1+3]
6. Write down the properties of mortar? Write down the steps of applying cement mortar? [1+2]
7. What are the commercial forms of timber which are being widely used in the market? Draw a clear sketch of cross section of timber log and show the each components of growth. [1+3]
8. What are the commercial Product of Metal? What are the purposes of heat treatment process of metal? [2+2]
9. What do you understand about distemper? State the basic ingredients of paints. [2+2]
10. Distinguish the tar with bitumen? Define borosilicate glass and thermoplastic. [2+2]

| Exam. | New Back (2066 & Later Batch) | | |
|-------------|-------------------------------|------------|----------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1 ½ hrs. |

Subject: - Civil Engineering Materials (CE506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Describe briefly the factors which influence the selection of civil engineering material?
 What are the significant properties to be considered while using engineering materials? [2+1]
2. Define cataclastic metamorphism and plutonic metamorphism of rock formation. Explain about importance of natural bed stone. [2+1]
3. What are the qualities of good bricks? Why we should be careful about the harmful ingredients in brick earth? [2+2]
4. Differentiate quick lime with hydraulic lime. What do you mean by calcination and slaking of lime? [2+2]
5. Describe the manufacturing process of 53 Grade OPC with the help of flow diagram. [5]
6. Write down the functions of mortar in civil engineering units? What are the precautions to be observed while applying cement mortar? [1+2]
7. Why seasoning of timber is important prior to use? Explain the macrostructure elements of exogenous tree with neat sketch. [1+4]
8. What is the difference between Ferrous and Non Ferrous materials? Why the modern engineering world is very much willing to use the composite materials? [2+3]
9. Write down, in brief, the procedure of using emulsion on the wall surface. [4]
10. Distinguish Asphalt with Tar. Nowadays use of composite materials are predominant compare to conventional natural building material in engineering. Why? Give reasons. [2+2]

| Exam. | Regular | | |
|-------------|---------|------------|----------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1 ½ hrs. |

Subject: - Civil Engineering Materials (CE506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Why a subject Civil Engineering Materials is supposed to be essential part of the science and technology? Define materials properties; hydroscopicity, soundness, hardness and creep. [1+2]
2. What is the deterioration of stone and how it is preserved? [4]
3. What are the different types of field test of brick? Explain the role of clay and alumina in brick production. [2+2]
4. Why the uses of lime could not be neglected in this modern age? Highlight the properties and uses of lime. [1+2]
5. Define clinker. What are the chemical compounds present in the clinker? Explain the functions of any two compounds present in clinker. [1+2+2]
6. How mortar can be formed? How do you select mortar according to civil engineering construction? [1+2]
7. Why and how the timber is being widely used in all engineering works? Describe briefly the method of seasoning the timber. [4]
8. What do you mean by quenching of steel? Distinguish between Cast iron and Mild steel. [2+2]
9. What do you mean by paint and Varnishes? What is the purpose of using it? [4]

OR

Give the reasons of using anti-termite treatment.

10. Define asphalt, bitumen and tar with their best applications in civil engineering field. [2+2+2]

Examination Control Division
2074 Ashwin

| Exam. | Back | | |
|-------------|--------|------------|----------------------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1 $\frac{1}{2}$ hrs. |

Subject: - Civil Engineering Materials (CE506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Explain briefly the following properties of civil engineering materials: Creep, Malleability and Hardness. [3]
2. Explain the characteristics of good building stone. Explain the factors which deteriorate the stone. [2+2]
3. What is efflorescence in brick? Explain the manufacturing process of bricks. What is glazing? [1+2+1]
4. Explain the properties and uses of lime. [2]
5. Describe the manufacturing process of cement with the help of suitable flow diagrams. What is cement water proofer? Explain. [1+4]
6. List the function of mortar. Also describe the characteristics of good cement mortar to be used in different civil engineering works. [1+2]
7. Describe with the help of sketches, growth and structure of tree. Also describe the suitability of timber in the design of civil engineering structures. List the engineering properties of timber. [3+2+1]
8. Describe the importance of steel as a civil engineering material according to their composition and properties. Write down the properties and uses of non-ferrous metals. [3+2]
9. Write down, in brief, the procedure of using emulsion on the wall surface. [3]
10. What are the specific uses of asphalt, bitumen and tar? Explain briefly about insulating materials used in construction. [3+2]

| Exam. | | Regular | |
|-------------|--------|------------|----------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1 ½ hrs. |

Subject: - Civil Engineering Materials (CE506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. What are the properties of civil engineering materials? Highlight the importance of the subject. [1+2]
2. What is natural bed of stone? What are the different technical parameters for selecting good building stones? [1+3]
3. Explain briefly the harmful ingredients in good brick earth, stating their effects on the properties of the brick. Write down characteristics of good brick. [2+2]
4. What do you mean by calcination and hydration of lime? Explain Hydraulic lime and fat lime with its properties. [1+2]
5. Define initial and final setting time of cement. What are the ingredients of cement, explain its functions in cement. [1+4]
6. What is mortar? How is an appropriate type of mortar selected? [1+2]
7. What are the characteristics of good timber? Write down the defects of timbers. [2+2]
8. Define heat treatment. Explain its objective. How will you define annealing, Explain it. [1+2+2]
9. Distinguish between the paint and varnishes. Write down the uses of antitermite treatment. [2+2]
10. Define bitumen and tar. Explain different types of glasses and its uses. [2+3]

| Exam. | Old Back (2065 & Earlier Batch) | | |
|-------------|---------------------------------|------------|--------|
| Level | BE | Full Marks | 80 |
| Programme | BCE | Pass Marks | 32 |
| Year / Part | I / I | Time | 3 hrs. |

Subject: - Civil Engineering Material (EG463CE)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any **Five** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. a) Define hardness, Resilience and Malleability. Explain in brief the study objectives of "Civil Engineering Material". [3+5]
- b) Define yield and strain hardening related to tensile strength test for steel. How the yield point of brittle material is found out from stress/strain diagram? Draw stress/strain diagram for ductile and brittle materials. [3+2+3]
2. a) Differentiate between mechanical treatment and heat treatment of steel. Explain isothermal annealing and tempering process of heat treatment with neat sketch. [3+5]
- b) Define true stress and engineering stress. In a steel, percentage of carbon content is 0.80%; then find out the percentage of ferrite, cementite and pearlite. [4+4]
3. a) What are the different types of wood? Explain in brief strength along and perpendicular to the grain of wood. [4+4]
- b) A mild steel specimen of 10 mm diameter and 300 mm long, which resist the maximum tensile load of 250 KN at 2 mm diameter. If the material resist 120 KN yield load by elongating 8 mm then what is the modulus of roughness and resilience. [8]
4. a) List out the different composition of OPC. Explain the role of different compounds present in cement clinker. [3+5]
- b) Define plastic material. Differentiate between asphalt and bitumen. [2+6]
5. a) Describe the composition of good brick earth. Explain the properties of good quality of brick. [3+5]
- b) Define Microstructure examination of steel and describe the different micro structure of steel. [2+6]
6. Write short notes on: (any four) [4×4]
 - i) Chemical bond
 - ii) Types of glass
 - iii) Properties of steel
 - iv) Rapid hardening cement
 - v) Setting action of lime

01 TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
 2069 Chaitra

| Exam. | Regular | | |
|-------------|---------|------------|---------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1½ hrs. |

Subject: - Civil Engineering Material (CE506)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. What are the basic physical properties of Civil Engineering Materials? Write down the importance of subject. [2+1]
2. Define natural bed of stone. Write down the methods of preservation of stone. [1+3]
3. What are the constituents of brick Earth? Write down their functions. [2+2]
4. Define pozzolanic material. Enumerate the properties of pozzolanic material. [1+2]
5. What are the different ingredients of cement? Draw the flowchart showing the manufacturing process of cement. [3+2]
6. What is mortar? How can the appropriate type of mortar be selected? [3]
7. What is seasoning of timber? Explain about its preservation method. [2+2]
8. What are the differences between steel properties and cast iron? List out the commercial products of metal. [3+3]
9. Distinguish between the paint and varnishes. Also highlight the use of Antitermite treatment. [2+2]
10. Give the various properties and use of glass. Why are the use of composite materials so high? [4]

| Exam. | | Regular | |
|-------------|--------|------------|---------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1½ hrs. |

Subject: - Civil Engineering Material (***CE506***)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. Explain briefly the following properties of the civil engineering materials: Porosity, Creep and Brittleness. [3]
2. What is the natural bed of stone? Enumerate the characteristics of a good building stones? [4]
3. What are the essential constituents of good brick earth? Write the characteristics of good brick earth. [1+3]
4. Define terms Quick lime and Hydraulic lime. How will you determine the slaking nature of lime? [1+2]
5. What are the different constituents of cement clinker? Explain the significance of testing the initial and final setting time of cement. How is it done? [1+2+2]
6. What is mortar? Explain the functions of mortar. [1+2]
7. What are the characteristics of good timber? State the various defects in timber. [3+1]
8. Explain principle of heat treatment. Describe surface hardening. [2+3]
9. Explain briefly about post construction antitermite treatment. [4]
10. Define 'asphalt'. Give the properties and uses of different types of asphalt. [5]

OR

Give the comparison between asphalt, bitumen and tar.

07 TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
 2068 Baishakh

| Exam. | Regular / Back | | |
|-------------|----------------|------------|---------|
| Level | BE | Full Marks | 40 |
| Programme | BCE | Pass Marks | 16 |
| Year / Part | II / I | Time | 1½ hrs. |

Subject: - Civil Engineering Materials

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. What are the field tests to find the suitability of bricks for construction? What is the compressive strength of the common and machine made bricks that are available in Nepal? Describe briefly the test for efflorescence for bricks. [2+1+2]
2. What is meant by grade C - 43 cement? Describe, with necessary sketches, the properties of compounds present in the clinker of cement. [1+4]
3. Define admixture and explain in brief about its engineering application. [3]
4. Define seasoning of timber. Why is it required for the good timber? Describe the methods of seasoning. [5]
5. What do you mean by heat treatment process? List out the objectives of heat treatment. Explain isothermal annealing with sketch. [5]
6. What are distempers? In what form they are commercially available? How do you prepare the commercial product in the field for painting? [1+1+2]
7. What is stone? Define its natural bed? What may be the technical parameters for selecting good building stones? [4]
8. a) Describe different types of bitumen? What is the specification of grade of bitumen? [5]
 b) Explain briefly Toughness, fatigue and malleability. [4]

OR

9. a) Distinguish between two major classifications of plastics. Name two popular plastics of each type and indicate their uses. [3+1+1]
 b) Explain the importance of study of material of construction. How civil engineering materials are classified? [3+1]

01 TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
 2065 Shrawan

| Exam. | Regular/Back | | |
|-------------|--------------|------------|--------|
| Level | BE | Full Marks | 80 |
| Programme | BCE | Pass Marks | 32 |
| Year / Part | I / I | Time | 3 hrs. |

Subject: - Civil Engineering Material

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any **Five** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. a) Mention various mechanical properties of civil engineering material? [8]
- b) What are the properties and uses of asphalt? [8]
2. a) The following observations were made during a tensile test on a mild steel. Specimen 40mm diameter and 200mm long. [12]

Given,

2mm elongation with 40KN load (within limit of proportionality)
 Yield load = 160KN
 Maximum load = 240KN
 Length of specimen at fracture = 250mm
 Determine modulus of toughness and resilience.

- b) List the uses of plate glass. [4]
3. a) Describe briefly manufacture process and properties of cast iron. [8]
- b) Explain the role of C_3S , C_2S , C_3A in setting and hardening process of cement. [8]
4. a) Describe briefly about growth of timber. [6]
- b) Why soundness test of cement is carried out? [6]
- c) What is the percentage of ferrite and pearlite in high strengthen steel? [4]
5. a) What are the principle and importance of heat treatment and also describe about tempering and quenching process. [10]
- b) What are the different type of field test of brick clay. [6]
6. Differentiate between: [4x4]
 - a) Polymer and Polymerization
 - b) Metalic and Covalent Bond
 - c) Hydrated and Hydraulic Lime
 - d) Hard Wood and Soft Wood

| Exam. | | Regular / Back | |
|-------------|-------|----------------|--------|
| Level | BE | Full Marks | 80 |
| Programme | BCE | Pass Marks | 32 |
| Year / Part | I / I | Time | 3 hrs. |

Subject: - Civil Engineering Materials

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any **Five** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. a) Define the following properties of materials with sketches wherever necessary. [8]
 Resilience, Toughness, Creep, Thermal Conductivity
- b) Define 'yield' and 'strain hardening' related to tensile strength test for steel. How the yield point of brittle material is found out from stress/strain diagram? Draw stress/strain diagram for ductile and brittle materials. [3+2+3]
2. a) Describe the composition of brick earth. What is the engineering application of different class of bricks? [3+5]
- b) In steel, percentage of carbon is found to be 0.33% in the form of iron carbide. What will be the percentage of cementite, ferrite and pearlite? [4]
- c) Illustrate the 'Charpy Impact Test' with figures. [4]
3. a) What is clinker? Describe briefly about the different ingredients present in clinker of cement with necessary sketches. [2+8]
- b) What are the defects of wood? List out different types of physical and mechanical properties of wood. [2+4]
4. a) Define polymer and polymerization. Differentiate between thermoplastics and thermosetting plastics. [2+6]
- b) What do you understand by heat treatment of steel? Explain briefly with neat sketches – Isothermal annealing and quenching. [2+6]
5. a) Describe the major differences between asphalt, bitumen and tar. [8]
- b) A mild steel specimen of 10mm diameter and 400mm long, which resist the maximum tensile load of 300 KN at 2mm diameter. If the material resist 150 KN yield load by elongating 10mm then what is the modulus of roughness and resilience. [8]
6. Write short notes on: [4×4]
 - a) Properties of glass
 - b) Hydraulic lime
 - c) Metallic bond
 - d) Alloys of steel

06A/9-26 TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
 2059 Poush

| Exam. | Back | | |
|-------------|-------|------------|--------|
| Level | B.E. | Full Marks | 80 |
| Programme | BCE | Pass Marks | 32 |
| Year / Part | I / I | Time | 3 hrs. |

Subject: - Civil Engineering Materials

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any Five questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Why civil engineering materials is necessary for civil engineer? Explain the important properties of civil engineering materials? [3+9]
- b) A mild steel rod 3m long having a cross-sectional area 4 sq.cm. is subjected to an axial pull of 1500 kg. If E for steel is 2.1×10^6 kg/cm². Find stress, strain and elongation of the rod. [4]
2. a) What do you understand by heat treatment of steel? Why heat treatment is necessary? Explain any three methods of heat treatment? [2+2+6]
- b) Define bitumen? Write the properties and uses of bitumen? [2+4]
3. a) What are the important ingredients of OPC? Explain the function of each ingredients? What are the harmful ingredients of OPC? [2+6+2]
- b) Compare the properties and uses of cast iron, steel and aluminium? [6]
4. a) Define bonding? Explain metallic bonding with example? Write the important characteristics of metallic materials? [2+4+3]
- b) Draw neat stress-strain curve for ductile material and explain the significant points in the curve? [3+4]
5. a) Explain the structure of exogenous tree with neat sketches? [7]
- b) Define polymers? Write properties and uses of polymers in building construction? [2+4]
- c) What are the defects of timber? [3]
6. Write short notes on (any four) [4×4]
 - a) Glass and its types
 - b) Elastic and plastic behaviours
 - c) Fat and hydraulic lime
 - d) Characteristics of good bricks
 - e) Mechanical treatment of steel

(A)

07B/1-5 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2057 Chaitra

| Exam. | Regular / Back | | |
|-------------|----------------|------------|--------|
| Level | B.E. | Full Marks | 80 |
| Programme | BCE | Pass Marks | 32 |
| Year / Part | I / I | Time | 3 hrs. |

Subject: - Civil Engineering Materials

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any Five questions.
- ✓ The figures in the margin indicate Full Marks.

1. a) Explain the important properties of civil engineering materials? Why it is necessary to study these properties? [9+3]
- b) Yield stress of a medium carbon steel is found to be 415 N/mm^2 . Its ultimate stress is 20% more than the yield stress. If the steel fractures at 2% of strain, find the modulus of toughness of the steel. [4]
2. a) Define true stress-strain? Draw a typical stress strain curve for structural steel and explain the significant points in the curve. [2+3+5]
- b) Why mechanical treatment is done in steel? Explain different methods of mechanical treatment? [2+4]
3. a) Define corrosion? Explain the various types of corrosion in metals and methods of prevention? [2+5+5]
- b) If a steel contains 0.35% of carbon in the form of Iron Carbide, what are the percentages of ferrite, cementite and pearlite present in the steel? [4]
4. a) How do you define the seasoning of timber? Explain various methods of seasoning giving necessary sketches? [2+8]
- b) Describe the properties and uses of asphalt? [6]
5. a) Explain the functions of ingredients present in an ordinary portland cement? What are harmful constituents of cement? [6+2]
- b) What is polymer? Explain the properties and uses of three thermoplastic materials which are important from civil engineering view point? [2+6]
6. Write short notes on (any four): [4x4]
 - a) Properties and uses of glass
 - b) Fracture mode of materials
 - c) Use of polymer in building construction
 - d) Griffith theory
 - e) Scope of Civil Engineering Materials
