

**BTCVSS801 A Characterisation of Construction Materials
Question Bank**

MODULE 1

1. Explain the characteristics of cement.
2. What is the need for characterisation?
3. Explain various characterisation techniques.
4. Elaborate multi-pronged approach.
5. Explain the characterisation of concrete.
6. Explain the challenges in sampling concrete.
7. Explain the hydration of cement in brief.
8. What is an Interfacial transition zone?
9. What are the common durability problems in concrete?
10. Explain asphalt concrete.
11. Explain asphalt properties.
12. Explain the structure of steel.
13. What is TTT curve?
14. Elaborate heat treatments on steel.
15. What are the different types of structural steel?

MODULE 2

1. Define calorimetry and explain its evolution.
2. What are the various applications of calorimetry?
3. Explain the calculation of heat of hydration of cement.
4. Explain the types of calorimeters.
5. Explain the process of sample preparation for calorimetry.
6. What are the practical applications of calorimetry?
7. Explain the estimation of activation energy?
8. Explain the production of X rays.
9. Explain crystalline material and crystal system.
10. Explain crystal structure in detail.
11. Explain the discovery of X ray diffraction.
12. Explain a diffractogram in detail.
13. Explain in detail the X ray diffractometer.
14. How to calculate the phase by XRD?
15. What is Qualitative phase analysis?

MODULE 3

1. Explain thermal analysis technique.
2. Explain Differential thermal analysis.
3. Elaborate factors influencing DTA curve.
4. Explain differential scanning calorimetry.
5. Compare DTA and DSC.

6. Explain DSC curve.
7. What is thermogravimetry?
8. How to use thermal analysis techniques for studying construction materials?
9. Explain the significance of using thermal analysis in studying cement.
10. Explain the influence of Sample preparation on Thermogravimetry.
11. What is the need to study surface area measurements?
12. Explain the techniques of surface area measurement.
13. Explain the Blaine air permeability technique.
14. What are the various assumptions of BET theory?
15. Explain how to select the best adsorbate.

MODULE 4

1. Explain the significance of microscopy in characterisation of materials.
2. Explain the specimen preparation for microscopy.
3. Enlist various techniques for microscopy.
4. What is Environmental scanning electron microscopy?
5. What is optical microscopy?
6. Explain the depth of Field (DOF).
7. Explain the resolution capability of the human eye.
8. Elaborate factors affecting the resolution.
9. Explain the modes of optical microscopy.
10. Explain the optical microscopy image for Alkali silica reaction.
11. Explain operation and principle of SEM.
12. What are the secondary electrons?
13. What are the outcomes of SEM?
14. Explain analysis of cementitious materials using SEM.

MODULE 5

1. Explain Image analysis.
2. Define: Morphometry, Stereology, Image processing.
3. Elaborate the steps in Image analysis.
4. Explain Image resolution.
5. Explain smoothing and give examples of it.
6. Explain Image segmentation in detail.
7. Explain spectroscopy and enlist techniques involved.
8. Explain Atomic Absorption spectroscopy in detail.
9. Elaborate applications of AAS in material research.
10. Explain UV-Vis absorption spectroscopy.
11. Explain Infrared spectroscopy.
12. Explain porosity and pore structure of Construction materials.
13. Explain Mercury Intrusion Porosimetry.
14. Explain the output of the MIP experiment.
15. Elaborate the pore structure of lightweight aggregates.