

**DEPARTMENT OF METALLURGICAL ENGINEERING
A.U.COLLEGE OF ENGINEERING (A)**

SYLLABUS

QUALIFYING EXAMINATION OF Ph.D (Full Time and Part Time) SUBMISSION

MECHANICAL BEHAVIOUR OF MATERIALS

Hardness test: Introduction, Brinell, Vickers and Rockwell hardness, Micro hardness.

Tension test: Engineering stress strain curve. True stress and true strain diagram. Ductility measurements. Typical stress strain diagrams. Yield point phenomenon.

Compression Test: Fundamentals of testing, applications.

Impact testing Charpy and Izod tests

Fracture: Introduction, types of fracture in metals. Brittle fracture and impact testing: The problems of brittle fracture. Notched bar impact tests, significance of transition temperature.

Creep and stress rupture: The creep curve. Stress rupture test. High temperature alloys.

Fatigue: Introduction, Stress cycles. The S-N diagram.

Text books:

1. *Mechanical Metallurgy, George E Dieter , Mc Grawhill.*
2. *Testing of Materials, A.V.K.Suryanarayana, Prentice Hall of India.*

Reference Books:

1. *Testing of Engineering Materials, Donald et.al., McGraw Hills.*
2. *Metals hand book*

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Qualifying Examination For PhD Submission
MODEL QUESTION PAPER
MECHANICAL BEHAVIOUR OF MATERIALS

Time: 3Hours
Answer Any Five Questions

Total Marks: 100
Each Question carries 20 Marks

1. (a). Classify types of testing methods. State criteria for selection of testing methods and give examples for selection of the method?
(b). Describe in detail about basic properties of materials.
2. (a). List types of hardness tests. Write application of each of this test for different metals and alloys?
(b). Compare between Rockwell and Vickers hardness tester? What are the advantages and limitations?
3. (a). Draw Engineering and true stress strain curves?
(b). Explain the significance of typical of stress strain diagram.
4. (a). What is a compression test? Explain the modes of deformation in compression testing.
(b). What are the typical materials subjected to compression testing?
5. (a). Explain the significance of Impact Testing? What are the different types?
(b). Describe Izod impact test. What are the factors that affect impact strength?
6. (a). Explain the types of fracture in metals? Brief on the problems of brittle fracture.
(b). With sketch explain ductile-brittle transition? How is it important in design based on service conditions?
7. (a). What is creep? Explain the creep curve and factors affecting creep strength.
(b). Describe the creep testing procedure for high temperature alloys?
8. (a). What is fatigue? Explain the S-N curve. Define Endurance limit?
(b). Explain the variables and its effects on fatigue strength.