

# Mechanical engineering syllabus

## Mechanical engineering examinations

### Group A - Compulsory examinations (six required, A1-A5 and one of A6 & a7)

#### 16-Mec-A1 Applied Thermodynamics and Heat Transfer

**Thermodynamics:** Review of the fundamental laws of thermodynamics, introductory psychrometry and analysis of the ideal gas compressor cycle, Rankine cycle, Otto cycle, Diesel cycle, Brayton cycle and the vapour compression refrigeration cycle.

**Heat Transfer:** Application of the principles of steady and transient conduction heat transfer, natural and forced convection heat transfer and radiation heat transfer. Thermal analysis of heat exchangers.

*Textbooks (most recent edition is recommended):*

- Moran, M.J., H.N. Shapiro, B.R. Munson and D.P. DeWitt, Introduction to Thermal Systems Engineering: Thermodynamics, Fluid Mechanics, and Heat Transfer. John Wiley and Sons.

#### 16-Mec-A2 Kinematics and Dynamics of Machines

**Kinematic and Dynamic Analysis:** Graphical and analytical methods for kinematic analysis of planar and spatial mechanisms and elementary body motion in space, static and dynamic force analyses of mechanisms, gyroscopic forces, dynamics of rotating machinery, cam and gear mechanisms and specifications.

**Vibration Analysis:** Free and forced vibration of undamped and damped lumped single and multi degrees of freedom systems with, analytical and numerical techniques of solution, viscous damping, vibrational isolation, vibration measurement and control.

*Textbooks (most recent edition is recommended):*

- Inman, D.J., Engineering Vibrations, latest edition, Prentice-Hall.
- Waldron, K.J., and Kinzel, G.L., Kinematics, Dynamics and Design of Machinery. John Wiley & Sons.

#### 16-Mec-A3 System Analysis and Control

**Open-loop and feedback control.** Laws governing mechanical, electrical, fluid, and thermal control components. Mathematical models of mechanical, hydraulic, pneumatic, electrical and control devices. Block diagrams, transfer functions, response of servomechanisms to typical input signals (step function, impulse, harmonic), frequency response, Bode diagram, stability analysis, and stability criteria.

**Improvement of system response by introduction of simple elements in the control circuit.** Regulation of physical process: proportional, integral, and derivative control. Theory of linear controller design.

*Textbooks (most recent edition is recommended):*

- Bissell, C.C., Control Engineering, latest edition, Taylor & Francis.
- Franklin, Feedback Control of Dynamic Systems.

#### 16-Mec-A4 Design and Manufacture of Machine Elements

**Theory and methodology related to conceptual design;** review of the methods used in stress analysis; simple design factor approach; variable loads; stress concentrations; bolts and bolted joints; welded joints; springs; shaft and bearing design; clutches, brakes, and braking systems.

# Net Exam Syllabus For Mechanical Engineering

**University of Edinburgh**

The logo of the University of Edinburgh, featuring a red circular emblem with a white cross inside, positioned to the right of the university name.

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,1927 *Pyrometers* Ezer Griffiths,1926 **Banking & SSC November 2020 eBook** Jagranjosh,2020-11-04 General knowledge has immense importance in various competitive exams like UPSC State Services SSC Banking Railway NDA MBA entrance exams and various service exams in private as well as public sectors This edition contains detailed discussion and analysis of the current GK topics and MCQs with for further practice about the latest and most important happenings in political economic social sports and entertainment fields all over the world All the topics are presented with facts and a brief description so that the reader gets full knowledge and understanding in all the key areas of exams Some maps tables etc are also included for further clarity *British Books* ,1918 **The Sanitary Record and Journal of Municipal Engineering** ,1912 **The Publishers' Circular and Booksellers' Record** ,1918 **The Builder** ,1893

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