Practice Book For

MECHANICAL ENGINEERING

2000 *New Questions With Complete Explanations*

GATE : 2016

MADE EASY Publications

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Practice Book for Mechanical Engineering : GATE-2016

1st Edition : 2012
2nd Edition : 2013
3rd Re-Print: 2014
4th Re-print: 2015

ISBN: 978-93-5147-099-1

Director's Message

B. Singh (Ex. IES)

During the current age of international competition in Science and Technology, the Indian participation through skilled technical professionals have been challenging to the world. Constant efforts and desire to achieve top positions are still required.

I feel every candidate has ability to succeed but competitive environment and quality guidance is required to achieve high level goals. At MADE EASY, we help you to discover your hidden talent and success quotient to achieve your ultimate goals. In my opinion IAS, IES, GATE & PSU's exams are tool to enter in to main stream of Nation serving. The real application of knowledge and talent starts, after you enter in to the working system. Here in MADE EASY you are also trained to become winner in your life and achieve job satisfaction.

MADE EASY aluminae have shared their winning stories of success and expressed their gratitude towards quality guidance of MADE EASY. Our students have not only secured All India First Ranks in IES, GATE and PSU entrance examinations but also secured top positions in their career profiles. Now, I invite you to become aluminae of MADE EASY to explore and achieve ultimate goal of your life. I promise to provide you quality guidance with competitive environment which is far advanced and ahead than the reach of other institutions. You will get the guidance, support and inspiration that you need to reach the peak of your career.

I have true desire to serve Society and Nation by way of making easy path of the education for the people of India.

After a long experience of teaching in Mechanical Engineering over the period of time MADE EASY team realised that there is a need of good *Practice Book* which can provide thorough Practice of Mechanical Engineering in a limited time frame. This *Practice Book* contains newly framed 2000 questions with complete solutions and explanations. It has been kept in consideration that the book should fulfill the need of GATE examination standard and syllabus.

B. Singh (Ex. IES)

Founder & Director, MADE EASY Group

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1 Strength of Materials

Simple Stress, Strain and Elastic Constants

1 CHAPTER

Q.1 If the ratio G/K = 0.3, then what is the value of the Poisson's ratio

(a) 0.2 (b) 0.36

(c) 0.3 (d) 0.33

Q.2 A round bar of length 'L' elastic modulus 'E' and Poisson's ratio 'μ' is subjected to an axial pull P. What would be the change in the volume of the bar.

(a) $\frac{PL}{(1-2\mu)E}$ (b) $\frac{PL(1-2\mu)}{E}$

(c) $\frac{PL\mu}{E}$ (d) $\frac{PL}{\mu E}$

Q.3 A metal bar of length 100 mm is inserted between two rigid supports and its temperature is increased by 10°C. If the coefficient of thermal expansion is 12×10^{-6}/°C and E = 2×10^{-5} MPa. The stress in the bar is

(a) Zero (b) 12 MPa

(c) 24 MPa (d) 2400 MPa

Q.4 A solid uniform metal bar of diameter D and length L is hanging vertically from it is upper end. The elongation of bar due to self weight is

(a) Proportional to L and inversely proportional to D2

(b) Proportional to L^2 and inversely proportional to D2

(c) Proportional to L but independent of D

(d) Proportional to L^2 but independent of D

Q.5 A vertical rod PQ of length L is fixed at its top end P and has a flange to the bottom Q. A weight W is dropped vertically from a height h(< L) on the flange. The axial stress in the rod can be reduced by

(a) Increasing the length of rod

(b) Decreasing the length of rod

(c) Decreasing the area of cross-section of rod

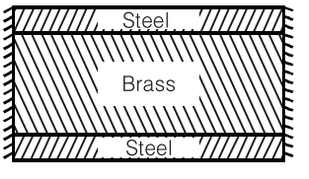
(d) Increasing the modulus of elasticity of material

Q.6 A square plate (a × a) rigidly held at three edges is free to move along the fourth edge. If temperature of the plate is raised by temperature 't', then the free expansion at the fourth edge will be (coefficient of thermal expansion of the material = α, modulus of elasticity of the material = E and its Poisson's ratio = μ)

(a) $a\alpha t\mu$ (b) $a\alpha t(1+\mu)$

(c) $a\left(\alpha t + \frac{\alpha t\mu}{E}\right)$ (d) $a\alpha t(1-\mu)$

Q.7 A brass rod of solid section is inserted in a steel tube as shown below



The coefficient of expansion of steel is 11.2×10^{-6}/°C and coefficient of