Reg.No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University, Manipal – 576 104

VII SEM. B.E. (INDUSTRIAL & PRODUCTION ENGG) DEGREE END SEMESTER EXAMINATIONS NOV/DEC 2015

SUBJECT: PRODUCT DESIGN & MANUFACTURING (MME- 411)
REVISED CREDIT SYSTEM
(26/11/2015)

Time: 3 Hours. MAX.MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data, if any, may be suitably assumed.
- Draw neat sketches wherever necessary.
- Use of machine design data hand book is permitted.

1A) Explain the importance of aesthetics and ergonomics in product design (05)

1B) Explain the following phases of design process (05)
i) Planning for distribution ii) Feasibility study iii) Preliminary design iv) Planning the production process v) Planning for consumption

2A) Mention at least 20 factors to be taken into account while designing a product. Discuss as how any three of these factors will influence the design of a chair, and car. (05)

2B) Mention different concept generation methods and explain 6-3-5 method (05)

3A) Elaborate the basic guidelines of design for assembly(DFA) (05)

3B) Explain failure mode effect analysis and its application (05)

4A) With advantages explain the standardization (05)

4B) Explain quality assurance and quality control. Correlate the relation. (05)

5A) Mention the conditional safety standards for products and explain Legal aspects of safety (05)

5B) Recommend the optimum material and dimensions for a machine shaft subjected to twisting moment of 3 kN-m and desiring a torsional stiffness of 100 N-m/degree, so as to have a minimum weight of the shaft. Following materials are available- (05)

Sl. No	Material	Mass Density, ρ (kg/m)	Yield strength, σ_y (MPa)	Modulus of rigidity (GPa)
1	Mg-Alloy	1760	225	16
2	Plastic	1200	55	2
3	Ti-Alloy	3600	910	42
4	Steel	7650	1380	84

6) A gearbox is required to transmit 30 kW. The driving shaft runs at 1500 rpm and driven shaft is to have two speeds of 375 rpm and 500 rpm. Design the following elements of gear box assuming same material and module for all the gears. Use spur gears only and assume the centre distance as equal to 400 mm. design (05+05)
i)Gears
ii) driver output shaft

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