

**BACHELOR OF TECHNOLOGY IN
MECHANICAL ENGINEERING
(COMPUTER INTEGRATED
MANUFACTURING)
B.Tech. (Aerospace Engineering)**

Term-End Examination

June, 2013

**BME-021 : PRINCIPLES OF ELECTRICAL AND
ELECTRONICS SCIENCE**

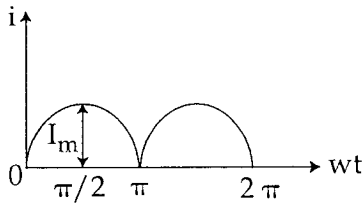
Time : 3 hours

Maximum Marks : 70

Note : Answer *any 5 questions.*

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1. (a) Give the concepts of magnetic flux, self and mutual inductance. Discuss energy stored in an inductor and a capacitor. 7
- (b) A coil is wound uniformly with 300 turns over a steel ring of relative permeability of 900, having a mean circumference of 40 mm and cross section area of 50 mm^2 . If a current of 25A is passed through the coil, find 7
- (i) mmf.
- (ii) reluctance of the ring
- (iii) flux

2. (a) For the output of full wave rectifier, determine 6



- (i) RMS value
- (ii) Average value
- (iii) Form factor and
- (iv) Peale factor
- (b) State Norton's theorem. Where is it used generally ? 6
- (c) What is an Alternator ? 2
3. (a) A balanced star connected load is supplied from a symmetrical 3 phase, 440 volt system. The current in each phase is 40 Amp and lags 30° behind the phase voltage find 6
- (i) phase voltage
- (ii) power
- (iii) reactive power drawn by a load, and
- (iv) phase impedance

- (b) Draw a typical sinusoidal waveform and explain the following terms. 6
- (i) Instantaneous value
 - (ii) Amplitude
 - (iii) Time period
 - (iv) Frequency
 - (v) Form factor
- (c) Define power factor. 2
4. (a) Explain the principle of operation of a three phase induction motor. Give relationship between synchronous speed and slip. 6
- (b) List the main component of a transformer and draw its equivalent circuit. 6
- (c) Draw the symbol and equivalent circuit of SCR. 2
5. (a) Explain the operation of a JFET. 6
- (b) Draw the I-V characteristics of a diode illustrating the different regions of operations. How to create Zener effects ? 6
- (c) What type of different mathematical operations can be performed by operational amplifier ? 2
6. (a) Draw a circuit diagram of DAC and ADC. 6
- (b) What is ROM and RAM ? 6
- (c) Write short note on IGBT and SCR. 2

7. (a) What are pair, quads and octets in K- Maps ? How many variables will get eliminated for each pair, quad and octet in K-Maps ? 6
- (b) What is differential amplifier ? Draw its circuit diagram. 6
- (c) Draw the symbol of an NPN BJT transistor 2
Give relation between I_B , I_C and I_E .
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