No. of Printed Pages : 4

BME-021

B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING) / B.Tech. (AEROSPACE ENGINEERING) (BTAE)

00237

Term-End Examination

June, 2017

BME-021 : PRINCIPLES OF ELECTRICAL AND ELECTRONICS SCIENCE

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any* ***five*** *questions. Use of scientific calculator is allowed. Assume any data, if missing.*

1. (a) Discuss the behaviour of a p-n junction, both when forward biased and reverse biased, with suitable diagrams. *6*

(b) Give the comparison of full wave rectifier and half wave rectifier. *6*

(c) Write the important application of Zener diode. *2*

2. (a) Draw and explain the output characteristics of a transistor in CE configuration and label all the parameters. *6*

(b) Draw and explain the R-C coupled transistor amplifier. Also give its advantages and disadvantages. *6*

(c) Explain the following : 2

(i) Reluctance

(ii) Permeance

3. (a) What is magnetic hysteresis ? Explain residual magnestism and retentivity with the help of a diagram. 6

(b) Two coils A and B of 600 and 1000 turns respectively are connected in series on the same magnetic circuit of reluctance 2×10^6 At/Wb. Assume that there is no flux leakage. Calculate

(i) Self inductance of each coil.

(ii) Mutual inductance between the two coils. What would be the mutual inductance if the coefficient of coupling is 75% ? 3+3=6

(c) Explain what do you mean by eddy currents. 2

4. (a) A coil of resistance 10 Ω, inductance 0·1 H is connected in series with a condenser of capacitance 150 μF across a 200 V, 50 Hz supply. Calculate 6

(i) Impedance

(ii) Power factor

(iii) Voltage across the coil

(iv) Voltage across condenser

(b) What is power factor ? Discuss its practical importance. *2+4=6*

(c) State Faraday's law of electromagnetic induction. *2*

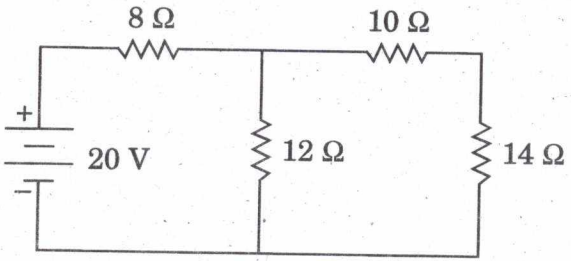
5. (a) Explain open-circuit and short circuit test of a single phase transformer with a suitable circuit diagram. *3+3=6*

(b) Power to a induction motor in supplied by a 12-pole, 3-phase, 500 r.p.m alternator. The full load speed of the motor is 1440 r.p.m. Find the % slip and the number of poles in the motor. *3+3=6*

(c) Draw the torque slip curve of a 3-phase induction motor. *2*

6. (a) State the maximum power transfer theorem. Show that for maximum power transfer $R_L = R_{th}$. *2+4=6*

(b) Using the Norton's theorem, determine the current in a 12 Ω resistor in the network. *6*



(c) Give symbol and truth table of NOR logic gate. *2*

7. (a) Show how the amplifier is used as (i) integrator (ii) differentiator. *3+3=6*

(b) Draw a circuit diagram of analog to digital convertor (ADC) and digital to analog convertor (DAC) with brief explanation. *3+3=6*

(c) What is the difference between volatile and non-volatile memory ? *2*
