No. of Printed Pages : 4

BME-021

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

Term-End Examination

00102

December, 2017

BME-021 : PRINCIPLES OF ELECTRICAL AND ELECTRONICS SCIENCE

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **seven** questions in all. Question no. 1 is **compulsory**. Answer any **three** questions from Section A and any **three** questions from Section B.*

1. State whether the following statements are *True* or *False* : *10×1=10*

   (a) The unit of specific resistance of a conductor is ohm-cm.

   (b) To reduce eddy current loss in the core of a magnetic material, the core is laminated and the material should have high resistivity.

   (c) A flip-flop can store more than one bit of information.

(d) The current in a resonance parallel L-C circuit will be very small.

(e) The induced e.m.f. in the transformer secondary will depend on the frequency only.

(f) The condition for maximum torque in an induction motor is $X_2 = SR_2$.

(g) In p-type semiconductors, the majority carriers are electrons.

(h) A bridge rectifier is not suitable for low voltage rectification.

(i) Boolean algebra is essentially based on 2-valued logic.

(j) 8085 microprocessor has 32-bit address.

SECTION A

*Answer any **three** questions from this section.*

2. (a) State and explain Thevenin's theorem with suitable example. *5*

(b) Calculate the capacitance and energy stored in a parallel plate capacitor which consists of two metal plates each 60 cm^2 separated by a dielectric of 1·5 mm thickness and ε_r = 3·5, if the potential difference of 1000 V is applied across it. *5*

3. (a) The inductance of two coils is 25 mH when connected in series and 6 mH when connected in parallel. Calculate the inductance of each coil. *5*

(b) State and explain Kirchhoff's current and voltage laws. *5*

4. (a) What do you understand by Real power, Reactive power and Apparent power ? *5*

(b) Show that the form factor of the sinusoidal waveform is 1·11. *5*

5. (a) Show that $(E_1/E_2) = (I_2/I_1) = (N_1/N_2)$ in a transformer. *5*

(b) Draw the torque – slip curve of a 3-phase induction motor and mark on it the starting torque, maximum torque and full load torque. *5*

6. (a) Compare Intrinsic and Extrinsic semiconductor materials with examples. *5*

(b) Draw and explain the V – I characteristic of a zener diode. *5*

SECTION B

*Answer any **three** questions from this section.*

7. (a) Show how the amplifier is used as (i) an inverting amplifier, and (ii) as a non-inverting amplifier. Give respective gain equations. *5*

(b) Discuss in brief, the operation of SCR. *5*

8. (a) Explain the use of 555 timer I.C. as a monostable multivibrator. *5*

(b) Explain the function of tristate inverter and buffer with the help of switches. *5*

9. Discuss in detail, the architecture of 8085 microprocessor with diagram. *10*

10. (a) What is the difference between volatile and non-volatile memory ? *5*

(b) What are Shift Registers ? What are the different types of shift registers ? *5*

11. Write short notes on any ***two*** of the following : *2×5=10*

(a) Counters

(b) DeMorgan's Theorem

(c) 2051 Microcontroller

(d) TRIAC