

Code: ME4T6

II B.Tech - II Semester – Regular Examinations - JUNE 2015

**BASIC ELECTRICAL AND ELECTRONICS
ENGINEERING
(MECHANICAL ENGINEERING)**

Duration: 3 hours

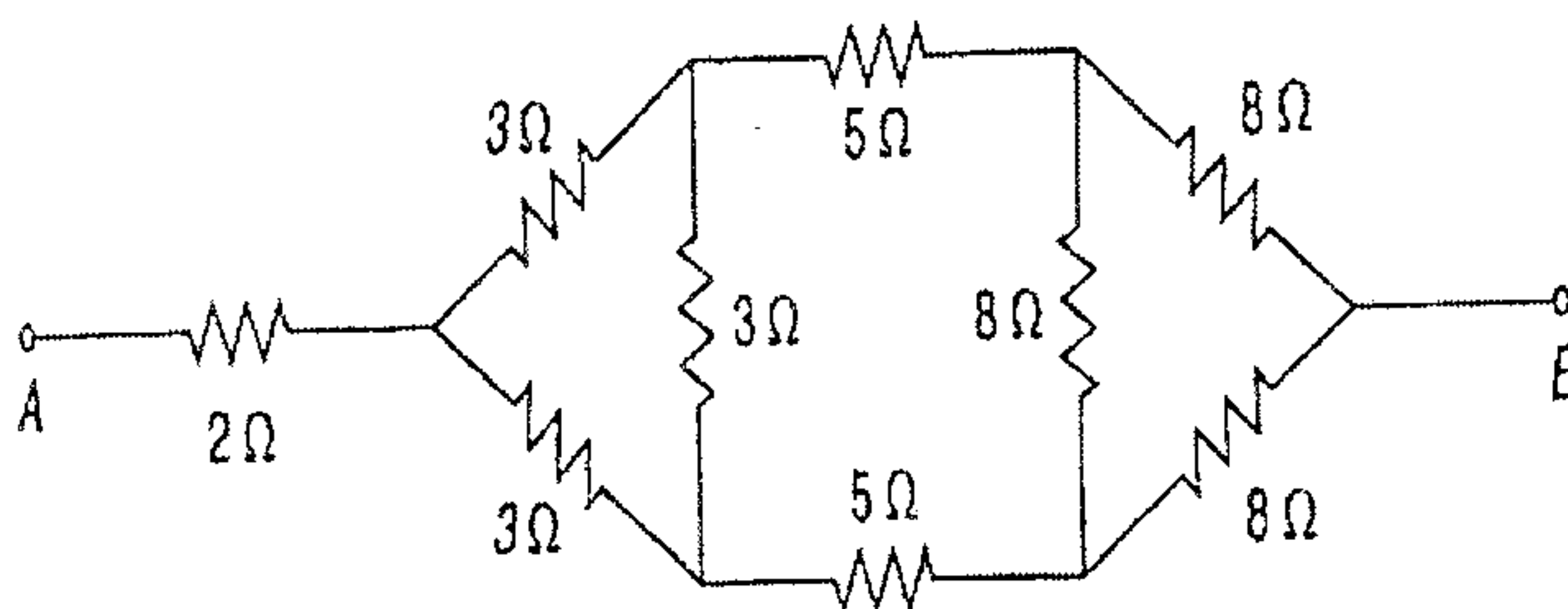
Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

- 1. a) Derive Star-Delta transformation for a resistive network. 5 M

- b) State and explain Kirchoff's laws with examples. 4 M

- c) Find the equivalent resistance between the terminals A and B for the given network. 5 M



- 2. a) The voltage and current in a circuit element are $V=100 \cos(314t + 25^\circ)$ v and $I=100 \cos(314t - 25^\circ)$ A. Identify the elements and find their values. 4 M

- b) When a resistor and coil in series are connected to a 240V supply. A current of 5A lagging 60 degrees behind the supply voltage and voltage across the coil is 220V. Find the resistance of the resistor and reactance of coil. 6 M
- c) Define RMS value and average value of an alternating quantity. 4 M
3. a) Explain the construction and operating principle of a D.C. Generator with a neat diagram. 7 M
- b) With neat diagram explain the operating principle of a synchronous generator. 7 M
4. a) Explain the operating principle of a 1- Φ transformer and derive its EMF equation. 4 M
- b) A 50 KVA, 4400/220V 1- Φ transformer has $R_1=3.45\Omega$, $R_2=0.009 \Omega$. The values of reactances are $X_1=5.2 \Omega$ and $X_2=0.015 \Omega$. Calculate 7 M
- i) Eq. resistance when referred to primary,
 - ii) Eq. resistance when referred to secondary
 - iii) Eq. impedance when referred to primary
 - iv) Eq. impedance when referred to secondary
 - v) total copper losses.
- c) Derive the condition for maximum efficiency of a single phase transformer. 3 M

5. a) With the help of neat diagram, explain the functioning of a full-wave rectifier. Clearly explain the importance of Capacitor filter in the context of a full-wave rectifier with centre tapped transformer. 7 M
- b) What is a PN junction? Draw its circuit symbol. What is the convention followed in writing its symbol? Illustrate its characteristic and make it self explanatory. 7 M
6. a) What are the three modes in which a transistor can operate? Explain the meaning of each mode of operation. 7 M
- b) Draw the circuits of an NPN and a PNP transistor in CE configuration. Define the following: 7 M
i) CE dc current gain ii) CE ac current gain.
7. a) Explain the theory of dielectric heating and specify any two of its applications. 7 M
- b) Specify various types of resistance welding and indicate the electrical equipment required for resistance welding. 7 M
8. a) Briefly explain the operating principles of MI and MC instruments and differentiate between them. 7 M
- b) With neat diagram, explain the operating principle of a single phase dynamometer type wattmeter. 7 M