

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)

June 2017 End Semester Examinations
B. Tech (Marine Engineering – First Semester)

Basic Electrical & Electronics Engineering
UG11T 2104/UG11T 1104

Date: 04.07.2017
Time: 3 Hrs

Maximum Marks : 100
Pass Marks : 50

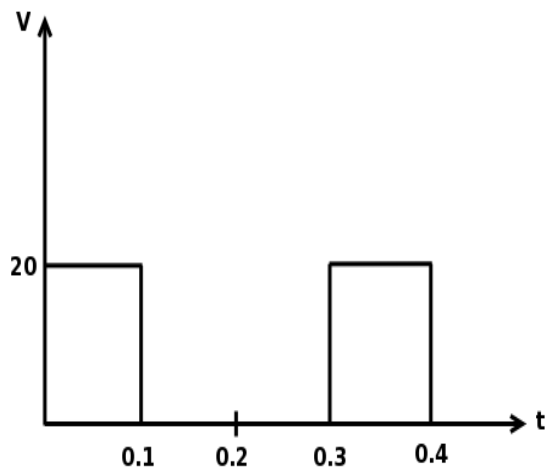
PART – A

10X3=30 Marks

(All questions are compulsory)

1)

- a) Compute the average and effective values of the square voltage wave as shown in the diagram.



- b) In Maxwell's inductance bridge, Arm AB consists of unknown R_1 and L_1 . Arm BC and Arm CD are non-reactive resistors of 105Ω and 125Ω . Arm DA consists of standard variable inductor of 55mH with internal resistance 0.4Ω in series with a standard resistor of 45Ω . Find R_1 and L_1 .
- c) What is a transducer? Differentiate between active and passive transducers.
- d) What is called magnet? How it is classified.

- e) Explain Mutually Induced emf with neat sketch.
- f) Draw the hysteresis loop for a magnetic material and explain following terms: (i) Magnetic Hysteresis (ii) Residual magnetism
- (g) A tungsten wire of unknown composition emits 0.1 amp/cm^2 at a temperature of 1900 K . Find the work function of tungsten filament. Determine whether the tungsten is pure or contaminated with substance of lower work function. Given that $A = 60.2 \text{ amp/cm}^2/\text{K}^2$.
- (h) What is non-linear resistance? Give its examples? Explain working of any one non-linear resistance?
- (i) Why filter is used in the output of rectifier? What are its types? Explain working of capacitor filter and its impact on voltage output produced by full wave rectifier?
- (j) What is principle of signal generation? Explain working of LC tank circuit used for generating signal? Draw basic block diagram of oscillator.

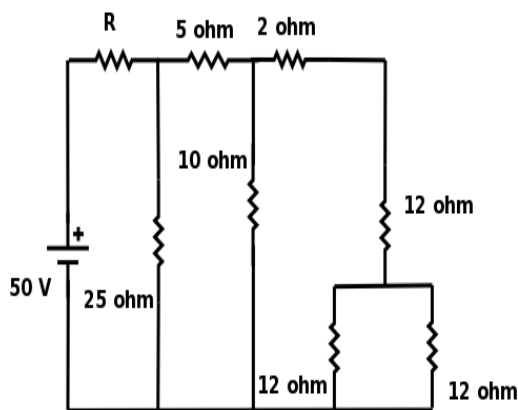
PART – B

5X14=70 Marks

(Answer any 5 of the following)

Q.1 a) For the given circuit the power consumed by 25Ω is 25 W . Find R .

(7 Marks)



- b) Derive expression for maximum power transferred in ac circuit, assuming appropriate parameters.

(7 Marks)

- Q.2 a) In a three phase star connected balanced system of voltage generation differentiate between Line voltage and phase voltage. Establish a relation between the line voltage and phase voltage that is, line voltage = $\sqrt{3}$ phase voltage. (7 Marks)
- b) A voltage $e(t) = 100 \sin 314t$ is applied to a series circuit consisting of 10Ω resistance, $0.0318H$ inductance and a capacitance of $63.6 \mu F$, calculate - (7 Marks)
1. expression for current I ,
 2. phase angle between voltage & current
 3. power factor
 4. active power consumed.
4. a) Compare electric and magnetic circuits stating clearly similarities and dissimilarities between them. (8 Marks)
- b) Explain with neat sketch the phenomenon of Magnetic Leakage and Fringing. (6 Marks)
5. a) Discuss with a neat sketch, the working of a Dynamometer type of Wattmeter. (7 Marks)
- b) How power is measured by two wattmeter's in a 3-phase balanced load? Explain with neat circuit and phasor diagram. (7 Marks)
- 6.a) What is electron emission? Explain concept of photoelectric emission and electric field emission with example? (7 Marks)
- b) What is Extrinsic Semiconductor? Explain working of p-type and n-type semiconductor with reference to its energy band diagram and crystal structure? (7 Marks)
7. a) What is rectifier? What are different types of rectifier? Draw circuit diagram and explain working of single phase centre tap full wave rectifier with reference to input and output waveforms? (7 Marks)

(b) A half-wave rectifier using silicon diode has a secondary emf of 14.14 V (rms) with a resistance of 0.2Ω . The diode has a forward resistance of 0.05Ω and a threshold voltage of 0.7 V. If load resistance is 10Ω , determine (i) dc load current (ii) dc load voltage (iii) voltage regulation and (iv) efficiency (7 Marks)

8 a) What is Transistor? Draw symbols and semiconducting structure of PNP and NPN transistor and show battery connections and current directions? Draw neat sketch and explain working of NPN transistor? (7 Marks)

b) How transistor acts as an Amplifier? Draw and explain working of common emitter configuration with reference to its input and output characteristics? (7 Marks)
