INDIAN MARITIME UNIVERSITY
Time Bound Assignment September/October 2020
B Sc (NS) Arrear Examinations
Nautical Electronics
UG21T3203

Date: 10/10/2020 Maximum Marks: 70
Time: 3 Hrs Pass Marks: 35

Part – A
All questions are compulsory
(5 x 2 = 10 Marks)

1.
(a) Define the term peak inverse voltage?
(b) Draw the symbol of NPN and PNP type transistors.
(c) What is Bark-hausen criteria for sustained oscillation?
(d) What are Universal Gates? Why they are called universal gate?
(e) What are the need of modulation?

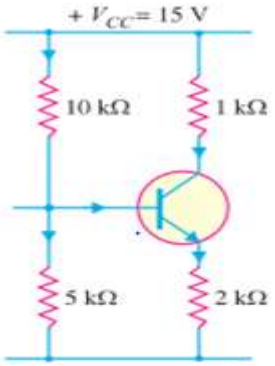
Part –B
Attempt any 6 questions from 2 to 9
(6 x 10 = 60 Marks)

2. (a) Draw and describe the circuit of Half wave rectifier in detail. **(5 Marks)**

(b) An a.c supply of 230 V is applied to a half wave rectifier circuit through a transformer of turn ratio 10:1. Find (i) the output d.c. voltage and (ii) the peak inverse voltage. Assume ideal diode.
(5 Marks)

3. (a) Explain how the Transistor acts like an Amplifier. **(5 Marks)**

(b) Figure below shows the voltage divider bias method. Draw the D.C. load line and determine the operating point. Assume the transistor to be of silicon. **(5 Marks)**



4. (a) Explain the classification of amplifiers **(5 Marks)**

(b) A phase shift oscillator uses 5 pF capacitors. Find the value of R to produce a frequency of 800 kHz. **(5 Marks)**

5. (a) Define logic gate circuit. Explain OR and XOR logic gates with logical symbol, logical expression and truth table. **(5 Marks)**

(b) Using Boolean techniques,
Simplify Y = AB + A (B + C) + B (B + C) **(5 Marks)**

6. (a) Derive an expression for AM **(5 Marks)**

(b) A frequency modulated voltage wave is given by the equation:

$$e = 12 \cos (6 \times 10^8 t + 5 \sin 1250\ t)$$

Find (i) carrier frequency (ii) signal frequency (iii) modulation index (iv) maximum frequency deviation (v) power dissipated by the FM wave in 10-ohm resistor. **(5 Marks)**

7. a) The maximum peak to peak voltage of an A.M. wave is 16mV and minimum peak to peak voltage is 4mV. Calculate the modulation factor. **(5 Marks)**

b) Explain with neat diagram the working of a linear diode Modulator. List its advantages and disadvantages **(5 Marks)**

8. a) Explain the concept of Straight radio receiver. **(5 Marks)**

b) Draw and explain the block diagram of super heterodyne receiver and its advantages **(5 Marks)**

9. Write a note on any TWO of the following questions

(a) What is RADAR? Draw block schematic and explain working of components of RADAR system? **(5 Marks)**

(b) Domestic Satellite **(5 Marks)**

(c) Sketch the circuit of Wein Bridge Oscillator. If R1= R2=220KΩ and C1= C2=250 pF Determine the frequency of oscillator. **(5 Marks)**

(d) Using Boolean algebraic techniques, simplify the following expression:

$$Y = A \cdot B \cdot \overline{C} \cdot \overline{D} + \overline{A} \cdot B \cdot \overline{C} \cdot \overline{D} + \overline{A} \cdot B \cdot C \cdot \overline{D} + A \cdot B \cdot C \cdot \overline{D}$$ **(5 Marks)**

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