

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

June 2016 End Semester Examinations
B.Sc. (Nautical Science) - 2013 batch onwards
Semester III
Nautical Electronics – II
(UG21T2305)

Date : 09.07.2016/F.N

Time: 3 Hrs

Maximum Marks: 70

Pass Marks : 28

NOTE: Attempt any SEVEN questions. All questions carry equal marks

7x10=70

Use of Non-programmable scientific calculator is allowed.

1. (a) What do you mean by transistor biasing? Explain with the help of DC load line concept.
In a certain transistor amplifier $R_1 = 10\text{K}\Omega$, $R_2 = 5\text{K}\Omega$, $R_c = 1\text{K}\Omega$, $R_E = 2\text{K}\Omega$ and $R_L = 1\text{K}\Omega$ and $V_{CC} = 15\text{V}$.
(i) Draw d.c load line, (ii) Determine the operating point. $V_{BE} = 0.7$
2. Show the circuit of CE amplifier in detail and explain the function of each component. Develop D.C and A.C equivalent circuit and show both of them.
3. (a) Certain CE amplifier has following data. $R_1 = 10\text{K}\Omega$, $R_2 = 5\text{K}\Omega$, $R_c = 3\text{K}\Omega$, $R_E = 3\text{K}\Omega$, $R_L = 6\text{K}\Omega$ current gain $\beta = 50$. Find the output voltage if input resistance $R_{in} = 0.5\text{K}\Omega$ and input voltage $V_{in} = 1\text{mV}$. Also show the complete circuit diagram.
(b) Explain the Base bias, emitter bias and voltage divider bias in detail.
4. (a) Explain frequency response curve of CE amplifier. Indicate Lower cutoff, higher cutoff and mid band frequencies.
(b) If $R_1 = 16\text{K}\Omega$, $R_2 = 22\text{K}\Omega$, $R_E = 900\Omega$ and $V_{CC} = 18\text{V}$ determine the values of V_E and I_E for emitter follower circuit. Also draw a D.C load line.
5. (a) Explain in detail the positive and negative feed back circuits.
(b) Define oscillator circuit. Explain the working of transistor Wein Bridge Oscillator. In A Wein bridge oscillator having $R_1 = R_2 = 220\text{K}\Omega$ and $C_1 = C_2 = 250\text{pF}$. Determine the frequency of oscillation.
6. Show the circuit of Hartley Oscillator and determine the operating frequency and feed back fraction if $L_1 = 1000\mu\text{H}$, $L_2 = 100\mu\text{H}$ and $C = 20\text{pF}$.
7. Draw a circuit of RC phase shift oscillator and explain. A phase shift oscillator circuit uses 5pF capacitor. Find the value of R to produce frequency of 800KHz .
8. (a) Show the circuits of Operational amplifier as Inverting and non-inverting amplifier. Derive the formula for voltage gain in both the cases.
(b) Determine the output voltage for inverting and non-inverting amplifier circuit having $R_{in} = 2.4\text{K}\Omega$, $R_f = 240\text{K}\Omega$, and input voltage $120\mu\text{V}$. Show the circuits as well.
9. Write a short note on the following.

(a) Emitter follower circuit (b) Darlington Amplifier Circuit.