

7. Draw the circuit of Colpitt's oscillator. Explain its working. Give the necessary condition for sustained oscillations. What are its advantages over other oscillators? 9

8. Draw the circuit diagram and frequency response curve of R-C coupled amplifier. Why does the gain falls in the low and high frequency range of an amplifier? 9

Roll No.

21192

B. Sc. (Pass Course) 2nd Semester
Examination – May, 2019

(ELECTRO-MAGNETIC INDUCTION AND ELECTRONIC
DEVICES

Paper : Phy-202

Time : Three hours] [Maximum Marks : 45

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

UNIT – I

1. (a) Derive and expression for impedance of a series LCR circuit. Discuss the resonance condition and then find the resonance frequency. 6

(4)

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- (b) A coil of inductance 4 mH and resistance 10Ω is connected in parallel with a capacitor of $0.001 \mu\text{F}$.

Calculate : 3

- (i) the frequency at which the current from an a.c. supply to this circuit is minimum.
 (ii) r.m.s. value of current.
 (iii) the current magnification.

2. (a) Derive and expression for admittance of a parallel LCR circuit. Discuss the resonance condition and then find the resonance frequency. 5
 (b) Discuss the phenomenon of growth and decay of current in R-C circuit. Find its time constant. 4

UNIT - II

3. (a) Show that the conductivity of a semiconductor is minimum when it is lightly doped with p-type impurity such that

$$p = n_i \left(\frac{\mu_n}{\mu_p} \right)^{1/2}$$

Also show that the minimum conductivity is $2n_i(\mu_n \mu_p)^{1/2} q$. 5

(2)

- (b) Draw the input and output characteristics of a transistor in common base configuration. Explain their nature and shape. What does its slope represent?

4. What is Hall coefficient? Show that for a p-type semiconductor the Hall coefficient R_H is given $R_H = 1/ep$. Describe an experimental set up for measurement of Hall voltage V_H .
 5. Explain the working of a full wave rectifier having an inductor filter. Derive necessary relation for the ripple factor. When such filter is useful? What is the output voltage in this case?

UNIT - III

6. Draw the circuit diagram of a tuned collector oscillator. Explain how the oscillations start in the circuit? Give the necessary condition for maintaining the oscillations. Draw the input and output characteristics of a transistor in common base configuration. Explain their nature and shape. What does their slope represent?

(3)