End Semester Examination – PH2102

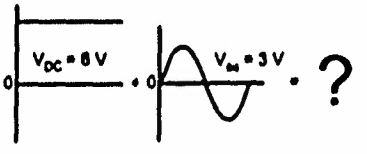
(Date : 05 / 12 / 2018, Time 2.00 PM)

Time : 3 Hours **Full Marks : 50**

(Answer all questions)

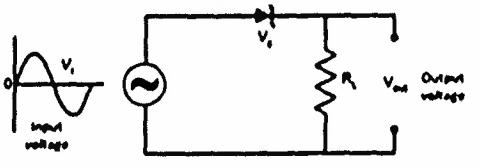
[2+1+1 = 4 Marks]

1) (i) Find out the RMS value of output of a full wave rectifier with sinusoidal input voltage, V. (ii) Draw star connection of 3-phase power supply and derive the relation between Line and Phase voltages using phaser diagram. (iii) Add the DC and AC signal as shown in the figure and show the output wave form with mentioning the value of $V_{peak(max)}$ and $V_{peak(min)}$ of output.



[4+2 = 6 Marks]

2) A circuit is drawn similar to a half wave rectifier circuit. The input sinusoidal voltage, V_i = 10 AC Volts. The diode is a Zener diode with Zener voltage, V_z = 4 Volts. Consider the knee voltage of Zener diode is zero. (i) Now draw the output waveform for both +ve and –ve half cycles of input AC voltage (ii) Calculate the output peak voltage for both positive and negative half cycles of input voltage.



[1+2+3 = 6 Marks]

3) (i) Explain ! How is Zener diode different from an ordinary pn-junction diode ? (ii) Write down advantage and dis-advantage of full wave bridge rectifier over center-tap full wave rectifier. (iii) Draw and explain how a voltage doubler circuit works with full wave bridge rectifier. [2+2+3+3 = 10 Marks]

4) (i) What is an oscillator ? Explain the oscillator principles and conditions. (ii) Construct the phase shift oscillator using OPAMP. (iii) Prove that the oscillator has a frequency, $f_0 = \frac{1}{2\pi\sqrt{6}RC}$. (iv) Also prove that the gain required for this oscillation frequency is $A_v = 29$.

[2+2+2 = 6 Marks]

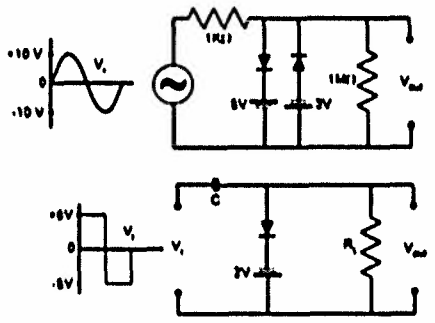
5) Draw circuit diagrams and (i) explain the gain of OPAMP in Non-inverting amplifier condition and (ii) Integration operation using OPAMP (iii) OPAMP as substractor.

[P.T.O]

5/12/2018

[2+2 = 4 Marks]

6) (i) Draw and explain the output waveform for the given clipper circuit. Also mention the peak output voltage for +ve and –ve cycles. Knee voltage of diode is zero.



(ii) Draw and explain the output waveform and mention quantitatively the output voltage of the clamper circuit. Assume that CR_t is much greater than the time period of the input wave. Knee voltage of diode is zero.

[1+2+1+2 = 6 Marks]

7) (i) Draw the common emitter configuration of transistor with proper biasing voltages. (ii) Draw the output characteristics of CE transistor (iii) What is DC loadline ? (iv) Explain the active region of the CE transistor with cut off & saturation points.

[2+2 = 4 Marks]

8) Derive the relation of α and β of a transistor. Find out the I_C value of a transistor with I_E = 30 mA and β = 440.

[1+1.5+1.5 = 4 Marks]

9) Explain two advantage of MoS FET over J FET. Explain how D-MoSFET and E-MoSFET works with circuit diagram.

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