



P.E.S. College of Engineering, Mandya - 571 401
 (An Autonomous Institution affiliated to VTU, Belagavi)
Second Semester, B.E. – Semester End Examination; June - 2017
Electronic Devices and Communication
 (Common to All Branches)

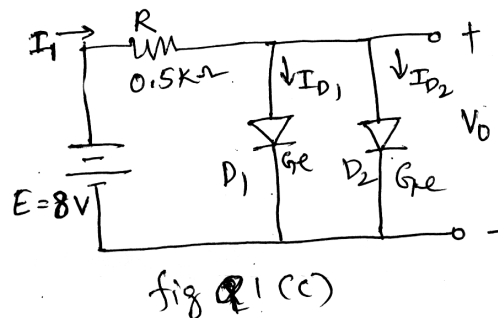
Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

1. a With neat circuit diagram and waveform explain the working of full wave bridge rectifier. 8
- b. Discuss the DC load line analysis and Q point for series diode configuration using a neat circuit diagram and characteristics. 7
- c. For the network shown in Fig. Q1(c) compute :
 - i) V_0 ii) I_1 iii) I_{D1} iv) I_{D2} .



- 2 a. Write the circuit diagram of Zener diode regulator and analysis the circuit for fixed input voltage V_i and variable load R_L . 7
- b. Describe the operation of solar cell with a neat diagram. 5
- c. Draw and explain the biasing circuit and characteristics of photodiode. 8

UNIT - II

- 3 a. With a neat diagram, explain the construction, operation and characteristics of P-channel depletion type MOSFET. 10
- b. Sketch the circuit diagram of voltage-divider biasing arrangement for an n-channel enhancement MOSFET, If the circuit has $V_{DD} = 40\text{ V}$, $R_1 = 22\text{ M}\Omega$, $R_2 = 18\text{ M}\Omega$, $R_D = 3\text{ k}\Omega$, $R_S = 0.82\text{ k}\Omega$, $V_{GS(th)} = 5\text{ V}$, $I_{D(ON)} = 3\text{ mA}$ at $V_{GS(ON)} = 10\text{ V}$: 10
 - i) Draw the load line ii) Calculate I_{DQ} , V_{GSQ} and V_{DS} .
- 4 a For the network shown in Fig. Q.4 (a) was $V_{GSQ} = 0.35\text{ V}$ and $I_{DQ} = 7.6\text{ mA}$. Compute;
 - i) g_m and r_d ii) Z_i , Z_o and A_v iii) Sketch the ac equivalent network.

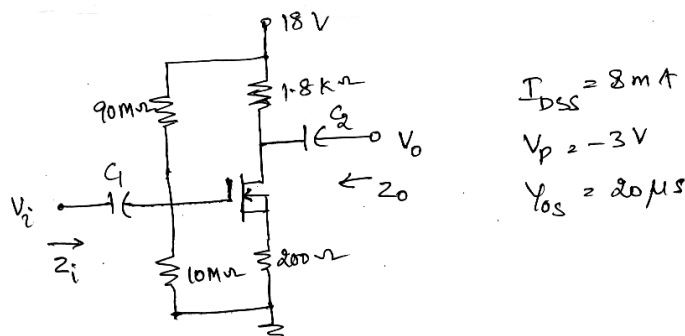


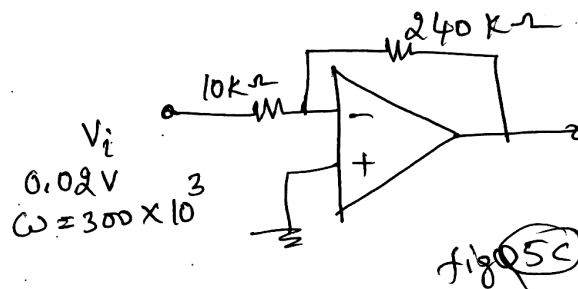
Fig. Q4(a)

$I_{DSS} = 8\text{ mA}$
 $V_p = -3\text{ V}$
 $Y_{os} = 20\text{ }\mu\text{S}$

- b. Write the feedback circuits used as an oscillator and explain the Barkhausen criterion for oscillation. 6
- c. With neat circuit, describe the working of FET phase shift oscillator. 6

UNIT - III

- 5 a. Write the circuit diagrams of Op-Amp Inverting and Non-Inverting amplifiers. If $R_1 = 20\text{ k}\Omega$, $R_f = 60\text{ k}\Omega$, $V_i = 0.5\text{ V}$, calculate the output voltage of Op-Amp and Non-Inverting amplifier circuits. 6
- b. Write the Op-Amp circuit and output voltage equation for: 8
 - i) Inverter
 - ii) Differentiator
 - iii) Voltage follower.
- c. Define the term slew rate of the Op-Amp. For the circuit shown in Fig. Q 5(c). Calculate the maximum frequency that may be used. If slew rate = $0.5\text{ V}/\mu\text{s}$.



- 6. a. Design an Op-Amp summing amplifier to obtain an output voltage $V_0 = -(3V_1 + 4V_2 + 5V_3)$ where V_1, V_2, V_3 are inputs. Assume $R_f = 120\text{ k}\Omega$. 6
- b. With neat circuit diagrams, explain the working of current controlled voltage source and current controlled current sources. 7
- c. Draw the circuit of Band pass active filter and its frequency response. If $R_1 = R_2 = 10\text{ k}\Omega$, $C_1 = 0\text{ }\mu\text{F}$ and $C_2 = 0.002\text{ }\mu\text{F}$. Calculate the cutoff frequencies of the band pass filter. 7

UNIT - IV

- 7 a. Draw the block diagrams of microprocessor and microcontroller. Discuss the architectural differences between μp and μc . 8
- b. Compute the following conversions : 9
 - i) $(29.3749)_{10} = ()_2 = ()_{16}$
 - ii) $(FACE)_{16} = ()_{10} = ()_2$
 - iii) $(110.1101)_2 = ()_{10} = ()_{16}$.
- c. Write a note on 16-bit microcontroller. 3
- 8 a. Discuss the flags and PSW of 8051 μC . 8
- b. With neat diagram, explain the 8051 μC oscillator circuit and timing. 8
- c. Draw the diagram of Port 2 pin configuration of 8051 μC . 4

UNIT - V

- 9 a. List the frequency band, range and application of radio spectrum. 9
- b. Write and explain the block diagram of Basic cellular system. 6
- c. What is Duplexing? Define frequency division Duplexing and time division Duplexing. 5
- 10 a. Describe the basic wireless network topologies. 8
- b. Write the advantages and disadvantages of cellular systems with small cells. 6
- c. With a neat diagram, explain the simplified cellular telephone system. 6