Total No. of Questions : 8]

SEAT No. :

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S.E.
(Electronics/E&TC/Electronics (VLSI & Design & Technology) Electronics & Communication Advanced Communication Technology)
ELECTRONIC CIRCUITS
(204181) (2019 Pattern) (Semester - III)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidate:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of Calculator is allowed.***
5) ***Assume Suitable data if necessary***

Q1) a) Enlist the advantages and disadvantages of SMPS over linear power supply. Draw the block diagram of SMPS and explain each block in detail. **[8]**

b) Design an adjustable voltage regulator using LM317 for output voltage 5 V to 15 V and draw necessary connection diagrams. Assume R_1=240Ω, 1_{adj}=100 μA. **[9]**

OR

Q2) a) Draw the block diagram of a regulated DC power supply and explain the function of each block in detail. **[9]**

b) Explain the following performance parameters of DC power supply **[8]**

i) Load regulation ii) Line regulation,

iii) Ripple rejection and iv) Efficiency.

P.T.O.

Q3) a) Explain the following op-amp parameters: **[8]**

i) Input offset Voltage

ii) CMRR

iii) Slew Rate

iv) Unity gain bandwidth.

b) What is current minor circuit? Draw and explain working of differential amplifier with current mirror circuit. Why current mirror circuit is used in Op Amp? **[6]**

c) State the values of all ideal parameters of Op Amp. **[3]**

OR

Q4) a) Draw block diagram of Op-Amp. Explain the functions of each block in detail. **[8]**

b) A dual input, balanced output(DIBO) differential amplifier has following specifications: $R_{C1}=R_{C2}=2.2\ k\Omega$, $R_E= 4.7\ k\Omega$, $R_{in1} = Ri_{n2}=50\Omega$, + Vcc= 10V, $-V_{EE} = -10V$, $\beta dc = \beta ac =100$ and $V_{BE} = 0.7$ V. **[6]**

Calculate : i) IC ii) VCEQ iii) Voltage gain : Ad
iv) Input and output resistance

c) Explain how to improve CMMR in Op Amp. **[3]**

Q5) a) What are the limitations of ideal integrator? How these are overcome in practical integrator? Draw the circuit diagram of practical integrator and its frequency response. Write equation for output voltage Vo and explain its operation. **[9]**

b) Draw an inverting summing amplifier with three inputs. Derive an expression for its output voltage. **[6]**

c) Draw square wave generator using Op Amp with relevant waveforms **[3]**

OR

Q6) a) Explain with a neat circuit diagram, working of inverting symmetric Schmitt trigger with its input output waveform and hysteresis plot. **[9]**

b) Enlist the requirements of instrumentation amplifier. Draw and explain instrumentation amplifier using three Op Amp. **[6]**

c) Draw full wave precision rectifier with relevant waveforms. **[3]**

Q7) a) Draw circuit diagram and explain successive approximation ADC. **[6]**

b) Explain the following characteristics of DAC **[6]**

i) Resolution, ii) Accuracy and iii) Settling time.

c) Draw the block diagram of PLL and explain each block in detail. **[6]**

OR

Q8) a) Draw and explain circuit diagram for 3- bit weighted resistor D/A converter, and give output voltage equation for the same. **[6]**

b) Calculate the output frequency f_o, lock range and capture range of PLL if R_T = 10 kΩ, C_T (Timing capacitor) = 0.01 μF, C_F (Filter capacitor) 10 μF, R (Internal filter resistor) 3.6kΩ. **[6]**

c) Draw and explain the block diagram of frequency multiplier with relevant output waveforms. **[6]**