



Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH/BME(N)/SEM-3/BME(EC)-304/2012-13

2012

ANALOG ELECTRONIC CIRCUITS

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

$10 \times 1 = 10$

- i) For construction of a *p*-type material, the doped material will be
 - a) Monovalent b) Bivalent
 - c) Trivalent d) Tetravalent.
- ii) Basically, diode is used to maintain
 - a) Unidirectional current flow
 - b) Bi directional current flow
 - c) Both (a) and (b)
 - d) None of these.



- iii) Zener diode operates in
 - a) forward bias mode
 - b) reverse bias mode
 - c) both forward and reverse bias mode
 - d) none of these.
- iv) For active region operation of a BJT the BE and CB junction will be biased as
 - a) Reverse, Forward b) Forward, Reverse
 - c) Forward, Forward d) Reverse, Reverse.
- v) The maximum theoretical efficiency of class B push-pull transistor amplifier is approximately
 - a) 50% b) 25%
 - c) 70.7% d) 78.5%.
- vi) An neat op-amp has
 - a) zero BW b) Infinite BW
 - c) maximum 20 MHZ d) none of these.
- vii) The output voltage of IC7912 is
 - a) 5V b) 12V
 - c) - 12V d) - 5V.
- viii) An instrumentation amplifier should have a
 - a) low CMRR b) high CMRR
 - c) infinite CMRR d) none of these.
- ix) A free running oscillator is a
 - a) bistate
 - b) astable
 - c) monostable multivibrator
 - d) none of these.
- x) A transistor operating as a switch works in
 - a) cut-off region b) linear region
 - c) saturation region d) none of these.
- xi) An astable multivibrator can be used as
 - a) f-v converter
 - b) compactor
 - c) square wave generator
 - d) v-f convutor.



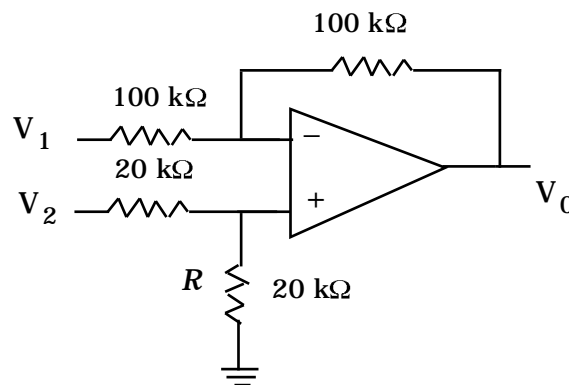
GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following.

3 × 5 = 15

2. Estimate gain of a high pass RC filter. Explain briefly how the attenuation of output response depends to the frequency. 3 + 2
3. What will be the output voltage of IC 7912 ? Draw the Zener regulator circuit and explain voltage and current regulation technique. 1 + 4
4. The following circuit has input voltage of $V_1 = 20\text{ V}$ and $V_2 = 10\text{ V}$. Find the output of the circuit.



5. Draw the block diagram of a PLL and describe its operation.
6. Draw a three op-amp. configuration of an Instrumentation amplifier and find its output voltage.



GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Draw the circuit diagram of a Wien-bridge oscillator and derive the expression of its frequency of oscillation.

b) What is a multivibrator ? Explain the operation of a monostable multivibrator using IC 555 timer.

$8 + (2 + 5)$
8. Explain the need of biasing of a transistor. Mention different schemes of biasing of a transistor. Compare their merits and demerits. Briefly describe high frequency R-C coupled transistor model.

$3 + 2 + 2 + 8$
9. a) What are the characteristics of an ideal op-amp ?
b) Describe the function of an op-amp as adder and integrator.
c) Explain the function of an op-amp as logarithmic amplifier.

$3 + (4 + 4) + 4$
10. a) What is meant by 'Feedback' ? Explain negative & positive feedback. Why Barkhausen's criterion is important ?

$2 + 3 + 2$

b) Describe Hartley Oscillator.

4

c) Describe a non-inverting type half-wave precision rectifier.

4
11. Write short notes on any *three* :
a) SMPS
b) Colpitts oscillator
c) Voltage regulator
d) Tuned Amplifier.

