KUMARAGURU
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Register Number: ……..

B.E DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2009)

Third Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

EIE102**:** Electronic Circuits

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The reason for drop in current gain of a bipolar transistor at high frequencies is due to
   a) Transistor capacitances
   b) High current effects in the base
   c) Parasitic inductive elements
   d) early effects
2. darlington amplifier has
   a) Large current gain and high input resistance
   b) Large voltage gain and low output resistance
   c) Small voltage gain and low input resistance
   d) Small current gain and high output resistance
3. Select an amplifier type used for tuned amplifier
   a) Class A amplifier
   b) Class AB amplifier
   c) Class B amplifier
   d) Class C amplifier
4. Which of the following parameter is to be increased in order to improve the CMRR in a differential amplifier?
   a) Emitter resistance
   b) Source resistance
   c) Collector resistance
   d) Power supply voltages
5. Examine the type of feedback network used in emitter follower circuit.
   a) Current shunt feedback
   b) Current series feedback
   c) Voltage series feedback
   d) Voltage shunt feedback
6. Which of the following is required for oscillation?
   a) $A\beta<1$ and the phase shift around the feedback network must be 180^o
   b) $A\beta> 1$ and the phase shift around the feedback network must be 180^o.
   c) $A\beta<1$
   d) Phase shift around the feedback network must be 180^o

7. Bi-stable multivibrator is also called as

a) Amplifier b) Tuned Circuits

c) One shot multivibrator d) Flip Flop

8. Ripple factor of a half-ware rectifier is

a) 0.86 b) 1

c) Infinity d) 0.482

9. The function of a clamper circuit is to

a) Raise positive half cycle of the signal b) Raise negative half cycle of the signal

c) Suppress variations in signal voltage d) Introduce a DC level into AC signal

10. A half wave rectifier circuit with a capacitive filter is connected to a 200 volts, 50 Hz AC line. The output voltage across the capacitor should be approximately

a) 300V b) 280V

c) 180V d) 80V

PART B (10 x 2 = 20 Marks)

11. What is bias? What is the need for biasing?
12. Define the stability factor S' and S".
13. What is a tuned amplifier?
14. Define Common Mode Rejection Ratio.
15. Illustrate the electrical equivalent of piezo electric crystal.
16. What is meant by oscillator?
17. List out the applications of clipper and clamper.
18. What is meant by dead zone of Schmitt trigger?
19. What are the advantages of shunt capacitive filter?
20. Define ripple factor.

PART C (5 x 14 = 70 Marks)

21. a) i) Analyze the AC equivalent circuit of CE amplifier with fixed bias using h-parameter model and derive the equation for input impedance, output impedance, voltage gain and current gain (10)

ii) Define thermal runaway and identify the steps to avoid it. (4)

(OR)

b) i) Illustrate the working of transformer coupled class A amplifier with neat sketch. (10)

ii) What is a darlington transistor? What are its salient features? (4)

22. a) i) Explain the AC operation of single ended differential amplifier. (8)

ii) Estimate the DC voltage and currents in the circuit shown in figure below (6)

(OR)

b) How to arrive the equation for 3dB bandwidth of double tuned amplifier

23. a) i) What is the effect of a voltage series negative feedback in the following performance measures of a BJT amplifier: (a) Input resistance (b) Output resistance (c) bandwidth (d) Gain stability? (8)

ii) Find the voltage gain A_f, input resistance R_{if} and output resistance R_{of} of voltage series negative feedback amplifier with feedback, which has a voltage gain A=500, input resistance Ri=3kΩ, output resistance Ro=20kΩ and feedback ratio β=0.01, without feedback. (6)

(OR)

b) Show that the frequency of RC phase shift oscillator using BJT amplifier is equal to $1/2\pi RC\sqrt{6}$

24. a) i) Discuss the operation of biased clipper and combination clipper with necessary circuit diagrams. (10)

ii) Distinguish between positive and negative clamper. (4)

(OR)

b) i) Why is triggering needed for multivibrators? Explain a triggering method for monostable multivibrator (7)

ii) Design a Schmitt trigger circuit to have Vcc=12V, UTP=5V, LTP=3V and Ic=2mA, using two silicon NPN transistor with h_{FE} (min) = 50 and $I_2 = 0.1I_{c2}$. (7)

25. a) Derive the expressions for the rectification efficiency, ripple factor, transformer utilization factor, form factor and peak factor of full wave rectifier.

(OR)

b) Explain the operation of switched mode power supply in detail with a block diagram.

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