

Time: 3 Hours

DECEMBER 2012

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions, answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. The impedance at the resonant frequency of a series RLC circuit with $L = 20$ mH, $C = 0.02$ F and $R = 90$ ohm is _____

- (A) 0 (B) 90 Ohm
(C) 20 K Ohm (D) 40 K Ohm

b. The Power Amplifier which will give minimum distortion is _____

- (A) Class A (B) Class AB
(C) Class C (D) Class D

c. The equivalent circuit shown in Fig.1 is for the device _____

- (A) BJT
(B) JFET
(C) UJT
(D) CMOS

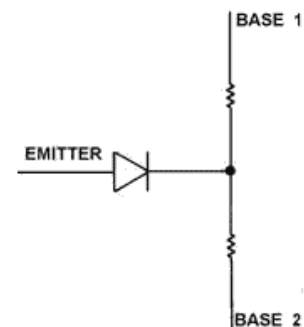


Fig.1

d. The amplifier which have the largest bandwidth is _____

- (A) single stage amplifier (B) two stage amplifier
(C) tuned amplifier (D) multistage amplifier

e. The factor which almost doubles for every 10^0 rise in temperature is _____

- (A) base to emitter voltage (B) reverse saturation current
(C) collector to emitter voltage (D) β

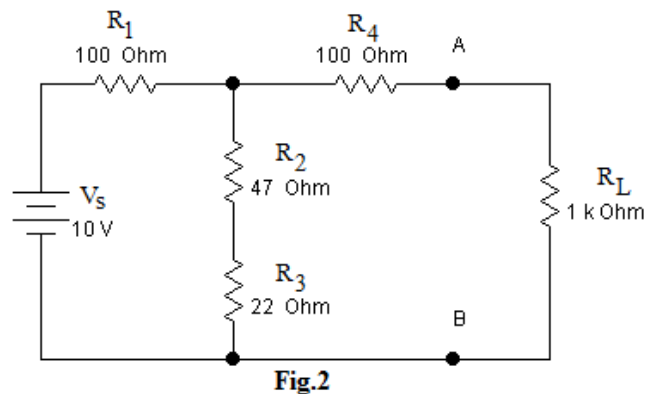
f. Thevenin's theorem cannot be applied to _____

- (A) Circuits consisting of linear components
(B) Circuits consisting of nonlinear components
(C) Resistive networks
(D) AC networks

- g. The device which exhibits negative resistance region is _____
- (A) Zener diode (B) BJT
(C) FET (D) Tunnel diode
- h. The amplifiers input impedance increases and output impedance decreases with the application of _____
- (A) Voltage Series Feedback (B) Voltage Shunt Feedback
(C) Current Series Feedback (D) Current Shunt Feedback
- i. The main advantage of Darlington Transistor Pair is _____
- (A) Large voltage amplification (B) Large current amplification
(C) Very low input impedance (D) Very high output impedance
- j. In IC fabrication, silicon dioxide is used as _____
- (A) diffusing element (B) mask against diffusion
(C) contact material (D) photo resistive material

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

- Q.2** a. Explain Miller's theorem with the help of diagram. Give its applications. (8)
- b. For the circuit shown in Fig.2, find out the voltage across R_L and current through R_L using Thevenin's Theorem. (8)



- Q.3** a. Explain in detail the switching characteristics of a diode. (8)
- b. The Zener diode in the circuit of Fig.3 is specified to have $V_Z=6.8V$ at $I_Z=5$ mA, $R_Z= 20$ Ohm. The supply voltage (V_S) is 10V and source resistance is $0.5K\Omega$. Find
- (i) V_O at no load
(ii) Find the change in V_O resulting from connecting a load resistance R_L of 2 K Ohm. (8)

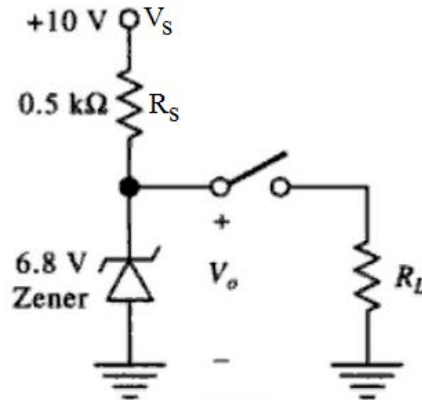


Fig.3

Q.4 a. What are the different BJT operating mode? Explain all the operating modes along with their area of applications. (10)

b. A depletion mode FET has saturation drain current of 3mA when $V_{GS} = 0$. If the pinch off voltage is -4.25 V, find drain current for $V_{GS} = -2.5$ V (6)

Q.5 a. Explain briefly which parameters support the fact that a CB has a low input resistance and a CE high value of input resistance. (6)

b. Determine the bias resistors R_b for fixed bias circuit and collector to base bias circuit shown in Fig.4, and compare stability factor S for the two circuits. Given $V_{CC} = 12$ V, $R_C = 330$ Ohms, $I_B = 0.3$ mA, $\beta = 100$, $V_{CE} = 6$ V. (10)

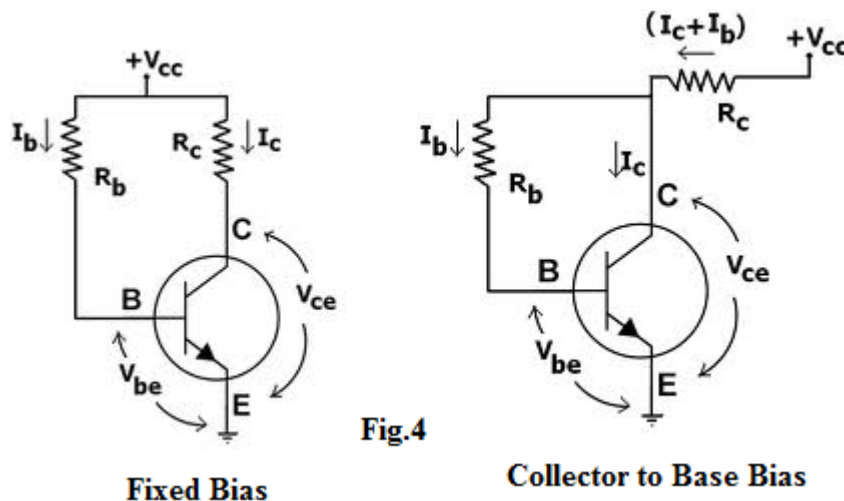


Fig.4

Fixed Bias

Collector to Base Bias

Q.6 a. Explain the significance of Gain Bandwidth Product in amplifiers. (8)

b. Explain multistage amplifiers and discuss their merits and demerits. (8)

Q.7 a. Give the classification of Power Amplifiers and explain why these are also called as Large Signal Amplifiers. (8)

b. Derive an equation for the efficiency of series-fed class-A Power Amplifier along with its circuit diagram and waveforms. (8)

- Q.8** a. What is a feedback? Derive generalised formula for feedback and also discuss different types of feedback. (8)
- b. What factors decide the frequency of Unijunction Oscillator and explain its operation in detail. (8)
- Q.9** a. Explain the fabrication of NMOS Enhancement Transistor with the help of neat diagrams. (8)
- b. Briefly discuss the characteristics of IC components. (8)