

AMIETE – ET/CS/IT

Time: 3 Hours

JUNE 2013

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.

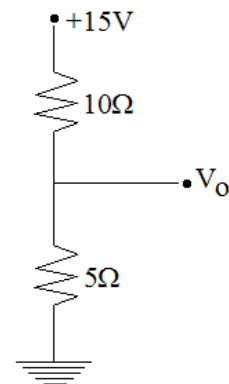
- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining 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 value of V_o in the given circuit is

- (A) 2.5 V
(B) 5 V
(C) 10 V
(D) 8 V



b. Avalanche breakdown of PN junction diode occurs_____.

- (A) in forward bias (B) in reverse bias
(C) due to manufacturing defect (D) none of these

c. Which of the following is **not** essential component of dc regulated power supply

- (A) rectifier (B) filter
(C) voltage regulator (D) voltage amplifier

d. For a BJT, what is β ?

- (A) I_c / I_E (B) I_c / I_B
(C) I_E / I_B (D) I_E / I_c

e. For a JFET, $I_{DSS} = 20$ mA, $V_{GS(OFF)} = -5$ V. Hence for $V_{GS} = 0V$, the drain current will be _____

- (A) 5 mA (B) 10 mA
(C) 15 mA (D) 20 mA

Code: AE53/AC53/AT53

Subject: ELECTRONIC DEVICES & CIRCUITS

- f. Two stage multistage amplifier has individual stage gains of 20 and 50. The total gain in dB will be _____
- (A) 1000 dB (B) 3 dB
(C) 60 dB (D) 30 dB
- g. The most suitable oscillator to generate 1 KHz frequency signal will be _____
- (A) Wein bridge oscillator (B) Crystal oscillator
(C) Hartley oscillator (D) Collpitt oscillator
- h. The maximum efficiency of class B power amplifier is _____
- (A) 25 % (B) 78.5 %
(C) 50 % (D) 80 %
- i. The open loop gain of an amplifier is 300. Its closed loop gain with negative feedback will be _____ (given $\beta = \frac{1}{12}$)
- (A) 10 (B) 11.5
(C) 30 (D) 40
- j. In integrated circuits, SiO₂ layer provides
- (A) Physical strength
(B) Conducting path
(C) Electrical connection to external circuit
(D) Isolation

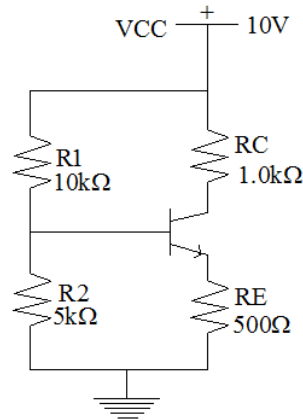
**Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.**

- Q.2** a. A RLC circuit has $R = 25 \Omega$, $L = 0.04 \text{ H}$ and $C = 0.01 \mu\text{F}$. Calculate the resonance frequency. If 1 V source of the same frequency as the resonance frequency is applied to the circuit, calculate the frequencies at which voltage across L and C are maximum. (8)
- b. State and explain with suitable example
(1) Reciprocity Theorem (2) Miller's Theorem (8)
- Q.3** a. Draw and explain with waveforms, the operation of full wave center-tapped rectifier. Show that its maximum efficiency is 81.2 %. (9)
- b. With neat block diagram, explain DC regulated power supply. Explain the role of each block. (7)

Q.4 a. Distinguish between BJT and JFET. Also state their merits and demerits. (8)

b. Draw and explain in brief the $V_{DS}-I_D$ and transfer characteristics curve of N-channel JFET. Show that $\mu = r_d \times g_m$. (8)

Q.5 a. Assuming Si transistor with $\beta = 100$ Calculate V_{CE} , I_C stability factor's. (8)



b. What are hybrid parameters of BJT in CE mode? Explain how it can be determined graphically from CE characteristics? (8)

Q.6 a. With neat circuit diagram and frequency response curve explain the two stage RC coupled amplifier. What are its advantages and applications? (8)

b. Draw ideal and the actual response of tuned amplifier. Compare single tuned and double tuned amplifier. (8)

Q.7 a. Explain briefly with suitable diagrams, how power amplifiers are classified with reference to operating point? (8)

b. Obtain the maximum efficiency of class A direct coupled power amplifier and class AB power amplifier. (8)

Q.8 a. What are the advantages and disadvantages of negative feedback in amplifier and discuss the current shunt negative feedback amplifier? (8)

b. With neat circuit diagram, explain RC phase shift oscillator. Also obtain its output frequency of oscillation. (8)

Q.9 a. What do you mean by Integrated Circuits? What are the advantages of ICs as compared to standard printed circuits? (8)

b. Explain in brief, the various steps involved in fabrication of ICs. (8)