

Code: AE53/AC53/AT53

Subject: ELECTRONIC DEVICES & CIRCUITS

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.

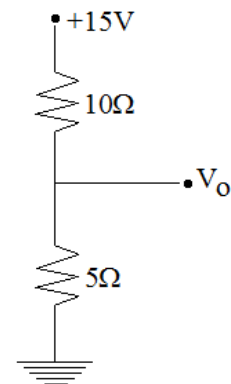
- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining 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 $V_{GS} = 0$ V, the drain current will be _____

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

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- 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

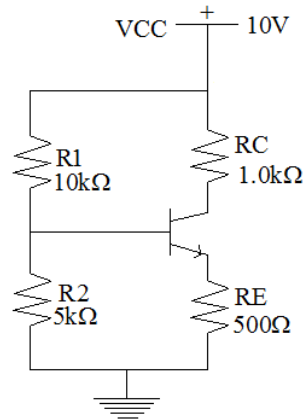
**Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.**

- 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)

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- 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)