

AMIETE – ET (OLD SCHEME)

Time: 3 Hours

OCTOBER 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. In semiconductor the current is because of flow of _____
- (A) only electrons (B) only holes
(C) both electrons and holes (D) photons
- b. Cascode amplifier using BJT is composed of _____
- (A) CE followed by CB (B) CB followed by CC
(C) CC followed by CE (D) CE followed by CC
- c. Input impedance of FET is higher because of _____
- (A) small gate current (B) large gate current
(C) drain current (D) drain to source voltage
- d. Efficiency of Transformer Coupled Class A amplifier is _____
- (A) 25 % (B) 78.5 %
(C) 50% (D) 90%
- e. Ripple Factor for full wave rectifier without filter is _____
- (A) 1.21 (B) 0.48
(C) 1.00 (D) 0.75
- f. The oscillator which gives most stable frequency is _____
- (A) Crystal oscillator (B) Wien Bridge oscillator
(C) RC phase shift oscillator (D) Hartley oscillator
- g. Which statement is true for Bistable circuit _____
- (A) has one stable state and one quasi stable state
(B) has two stable states
(C) has two quasi stable states

Code: AE05

Subject: BASIC ELECTRONICS

- h. Fermi level in intrinsic semiconductor at 0°K is _____
- (A) near to valence band.
 (B) near to conduction band.
 (C) in the middle of energy gap between conduction band and valence band.
 (D) inside the conduction band.
- i. In a Master Slave flip flop circuit, master is enabled _____
- (A) at positive trigger edge.
 (B) at negative trigger edge.
 (C) both positive and negative trigger edge.
 (D) without any trigger.
- j. Voltage Gain of the OP-AMP shown in Fig.1 with $R_f=47\text{ K}$ and $R_{in}=10\text{ K}$ is
- (A) +4.7 (B) +5.7
 (C) -4.7 (D) +47

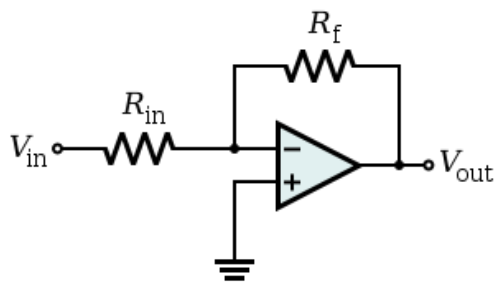


Fig.1

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

- Q.2** a. Differentiate between Avalanche and Zener breakdown mechanisms. (6)
- b. What is meant by stability factor S? Draw and explain the biasing circuit which gives the best stability. (10)
- Q.3** a. Draw the h-Parameter equivalent circuit of a CE transistor amplifier and derive an expression of
 (i) Its Voltage Gain and
 (ii) Current Gain. (8)
- b. Explain the circuit of Darlington Amplifier. Also obtain an expression for its overall current gain. (8)
- Q.4** a. Describe the structure of JFET and also explain its working along with its characteristics. (8)
- b. Draw the circuit of a class-B push-pull power amplifier and explain its operation. (8)

Code: AE05

Subject: BASIC ELECTRONICS

- Q.5 a. For the circuit shown in Fig.2, identify the type of feedback and find out its effect upon Input Impedance, Output Impedance and Voltage Gain. (8)

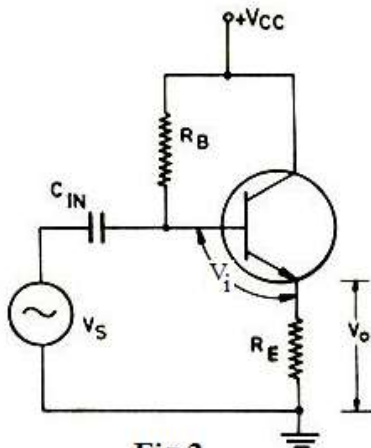


Fig.2

- b. An amplifier with a $2.2\text{K}\Omega$ input resistance and $40\text{K}\Omega$ output resistance has a voltage gain of 80. The amplifier is now modified to provide 10% negative voltage feedback in series with the input. Calculate the following:
- the voltage gain with feedback.
 - the input resistance.
 - the output resistance.
- If the feedback were effected using current series feedback which of the above (if any) would change? (8)
- Q.6 a. Explain the distinguishing features of
- the Colpitts and
 - the Hartley oscillators. (8)
- b. Explain how the IC 555 can be used as Astable multivibrator with the help of circuit diagram and waveforms. (8)
- Q.7 a. With a neat diagram explain OP-AMP as
- Comparator
 - Sample and Hold circuit. (12)
- b. Define
- Slew rate and
 - CMRR referred to OP-AMP. (4)
- Q.8 a. What are the ideal characteristics of regulated power supply? Also draw the circuit of a series voltage regulator and describe its working. (8)
- b. Draw the circuit of Sawtooth generator and explain its operation in detail. (8)
- Q.9 a. State and Prove De-Morgan's Theorems. (4)
- b. Simplify the following Boolean Function
 $F(w,x,y,z) = \sum (0,1,2,4,5,6,8,9,12,13,14)$ (4)
- c. Draw the truth table of a Full Adder circuit. Obtain the simplified expressions for the 'sum' and 'carry' outputs of the adder and draw its logic diagram. (8)