



US – 404

II Semester B.Sc. Examination, May 2017  
(F + R) (CBCS) (2014-15 and Onwards)  
**ELECTRONICS – II**  
**Electronic Circuits and Special Purpose Devices**

Time : 3 Hours

Max. Marks : 70

**Instructions :** Answer **all** the questions from Part – A, **any five** questions from Part – B and **any four** questions from Part – C.

**Note :** It is required to answer **all** the questions of Part – A in **any one page** answering the same questions multiple times will not be considered for evaluation.

PART – A

1. Answer **all** the subdivisions :

(15×1=15)

- i) Gain decreases at low frequencies for a common emitter amplifier because of
  - a) Coupling capacitor
  - b) Emitter by-pass capacitor
  - c) Both a) and b)
  - d) Inter electrode capacitance
- ii) Which amplifier offers best impedance matching with the load ?
  - a) Resistor coupled amplifier
  - b) Transformer coupled amplifier
  - c) Direct coupled amplifier
  - d) Swamped amplifier
- iii) A common source *JFET* amplifier produces
  - a) 180° phase shift
  - b) Zero phase shift
  - c) 90° phase shift
  - d) 60° phase shift
- iv) Which power amplifier has maximum distortion ?
  - a) Single ended class A
  - b) Transformer coupled class A
  - c) Class B
  - d) Class C
- v) Efficiency of a single ended class A power amplifier is
  - a) 25%
  - b) 50%
  - c) 78.5%
  - d) > 90%
- vi) Cross over distortion is eliminated by
  - a) Using germanium transistor
  - b) Properly biasing transistors
  - c) By increasing ac input voltage
  - d) By increasing dc supply voltage

P.T.O.



- vii) What happens to resonant frequency of a tuned amplifier if its inductance is quadrupled ?
- Resonant frequency is quad-doubled
  - Resonant frequency is reduced by one fourth
  - Resonant frequency is reduced by half
  - Resonant frequency is not affected
- viii) A differential amplifier has one input and the output is measured between collectors, the configuration is referred as
- Dual input balanced output
  - Dual input unbalanced output
  - Single input unbalanced output
  - Single input balanced output
- ix) Ideal value of CMRR is
- Zero
  - Unity
  - Infinite
  - 70-90 dB
- x) Differential gain means
- Amplifying the sum of inputs
  - Amplifying the difference between inputs
  - Attenuating the difference between inputs
  - Attenuating the sum of inputs
- xi) Tail current is calculated by using
- $-V_{EE} / R_C$
  - $-V_{CC} / R_C$
  - $-V_{EE} / R_E$
  - $-V_{CC} / R_E$
- xii) CC amplifier is a circuit example of
- Voltage series negative feedback
  - Voltage shunt negative feedback
  - Current series negative feedback
  - Current shunt negative feedback
- xiii) When a negative feedback is used in an amplifier, its gain bandwidth product
- Increases
  - Decreases
  - Remains same
  - All of the above
- xiv) A mono stable multivibrator has
- Single stable state
  - Two stable states
  - No stable state
  - One stable state for short period
- xv) A solar cell basically converts solar radiation into
- Voltage
  - Current
  - Heat
  - Light



PART - B

Answer **any five** questions :

(5×7=35)

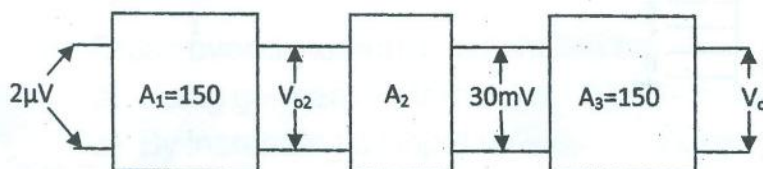
2. Draw the circuits of *CC* amplifier and swamped amplifier. Mention their applications.
3. Explain the working of common source *JFET* amplifier and derive the expression for its gain using equivalent circuit.
4. a) How the power amplifiers are classified ?  
b) Explain the frequency response of a double tuned amplifier for tight coupling and critical coupling. (3+4)
5. What is a current mirror ? Explain its working with a circuit and give its importance.
6. State the conditions for sustained oscillations. With a circuit diagram, explain the working of a Hartley Oscillator.
7. What is a multivibrator ? Explain the working of transistor astable multivibrator.
8. Explain the working of *SCR* full wave rectifier and derive the expression for its average output current.
9. Draw the circuit symbol of p channel enhancement type *MOSFET*, triac, diac, tunnel diode, varactor diode, photo diode and photo transistor.

PART - C

Answer **any four** questions :

(4×5=20)

10. For the given multistage amplifier calculate gain of second stage, overall gain and express it in dB.





11. A transistor rated for a maximum collector dissipation of 200 mW operates a single ended class A stage from a 15 V supply. Calculate the approximate values of

- i) Maximum undistorted ac output power,
- ii) The quiescent current and
- iii) Turns ratio of the output transformer, if the load resistance is  $24 \Omega$ .

Given collector efficiency of 50%.

12. In a dual input balanced output differential amplifier,  $I_E = 3 \text{ mA}$ ,  $R_C = 3 \text{ k}\Omega$ ,  $R_E = 10 \text{ k}\Omega$  and  $\beta = 200$ . Calculate :

- i) Differential gain
- ii) Common mode gain and
- iii) *CMRR*.

13. An amplifier with negative feedback has a voltage gain of 100. It is found that without feedback an input signal of 50 mV is required to produce a given output, where as with feedback, the input signal must be 600 mV for the same output. Calculate open loop gain, feedback factor and loop gain.

14. A unijunction transistor with  $\eta = 0.66$  is used in a relaxation oscillator circuit with  $5.6 \text{ k}\Omega$  resistance and  $0.022 \mu\text{F}$  capacitance. Determine the time period, frequency of oscillation and new value of capacitance to have a frequency of 10 kHz.

15. Identify the type of seven segment display. Which are the input segments to be activated to display :

- a) 3                      b) 4                      c) 8 and                      d) 9

