

**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 : (15x1=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 ?
- a) Resonant frequency is quad-doubled
 - b) Resonant frequency is reduced by one fourth
 - c) Resonant frequency is reduced by half
 - d) Resonant frequency is not affected
- viii) A differential amplifier has one input and the output is measured between collectors, the configuration is referred as
- a) Dual input balanced output
 - b) Dual input unbalanced output
 - c) Single input unbalanced output
 - d) Single input balanced output
- ix) Ideal value of CMRR is
- a) Zero
 - b) Unity
 - c) Infinite
 - d) 70-90 dB
- x) Differential gain means
- a) Amplifying the sum of inputs
 - b) Amplifying the difference between inputs
 - c) Attenuating the difference between inputs
 - d) Attenuating the sum of inputs
- xi) Tail current is calculated by using
- a) $-V_{EE} / R_C$
 - b) $-V_{CC} / R_C$
 - c) $-V_{EE} / R_E$
 - d) $-V_{CC} / R_E$
- xii) CC amplifier is a circuit example of
- a) Voltage series negative feedback
 - b) Voltage shunt negative feedback
 - c) Current series negative feedback
 - d) Current shunt negative feedback
- xiii) When a negative feedback is used in an amplifier, its gain bandwidth product
- a) Increases
 - b) Decreases
 - c) Remains same
 - d) All of the above
- xiv) A mono stable multivibrator has
- a) Single stable state
 - b) Two stable states
 - c) No stable state
 - d) One stable state for short period
- xv) A solar cell basically converts solar radiation into
- a) Voltage
 - b) Current
 - c) Heat
 - d) Light



PART - B

Answer **any five** questions :

(5×7=35)

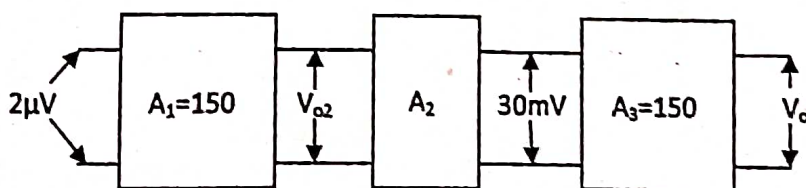
2. Draw the circuits of *CC* amplifier and swamped amplifier. Mention their applications.
3. Explain the working of common source *JFET* amplifier and derive the expression for its gain using equivalent circuit.
4. a) How the power amplifiers are classified ?
b) Explain the frequency response of a double 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 24Ω .

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

