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 ?

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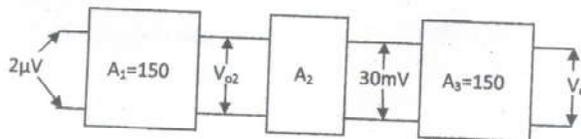
11. A transistor rated for a maximum collector dissipation of 200 mW operates a single ended class A stage from a 15 V supply. Calculate the approximate values of

    i) Maximum undistorted ac output power,

    ii) The quiescent current and

    iii) Turns ratio of the output transformer, if the load resistance is 24 Ω.

    Given collector efficiency of 50%.

12. In a dual input balanced output differential amplifier, $I_E = 3$ mA, $R_C = 3$ kΩ, $R_E = 10$ kΩ 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 kΩ resistance and 0.022 μ 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