

Bangalore University B.Sc. II Semester (CBCS – 2014-15 onwards)

Model Question Paper -2

Subject: ELECTRONICS

Paper title: ELECTRONIC CIRCUITS AND SPECIAL PURPOSE DEVICES

Paper Code: EL-201T

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 and to be answered only once. *In this Part, answering the same question multiple times will not be considered for Evaluation.*

PART – A

Answer all the subdivisions

15×1 = 15

1. i) Base and Collector current waveforms of a single stage Common Emitter amplifier are

- a) 45° out of phase with each other
- b) 90° out of phase with each other
- c) 180° out of phase with each other
- d) in phase.

ii) In direct coupled amplifiers, the lower cutoff frequency is

- a) 10 kHz
- b) 100 kHz
- c) 0 Hz.
- d) Infinity.

iii) The emitter of a Swamped amplifier _____

- a) is at ground potential.
- b) has no dc voltage
- c) has an ac voltage
- d) has no ac voltage

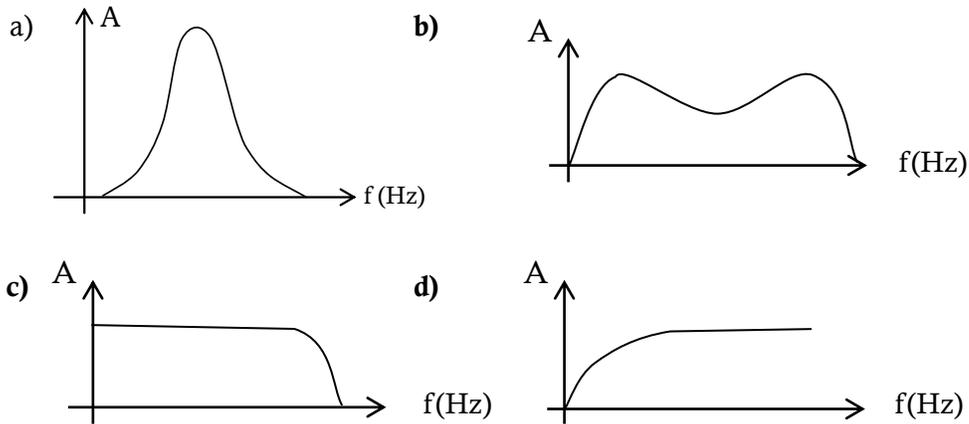
iv) Maximum theoretical efficiency of a Class B power amplifier is _____

- a) 60%
- b) 98.5%
- c) 45.8%
- d) 78.5%

v) For an ideal differential amplifier, the C.M.R.R is _____

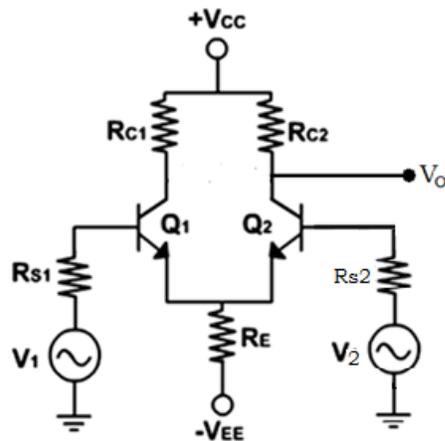
- a) zero
- b) low
- c) infinity
- d) high

vi) Select the frequency response curve of a single tuned amplifier from the following.



vii) Identify the operating mode of the differential amplifier circuit shown.

- a) Dual input Balanced output
- b) Dual input Unbalanced output
- c) Single input Balanced output
- d) Single input Unbalanced output



viii) The Gain Bandwidth product of an amplifier with negative feedback is _____ that of amplifier without feedback.

- a) greater than
- b) less than
- c) same as
- d) always double than

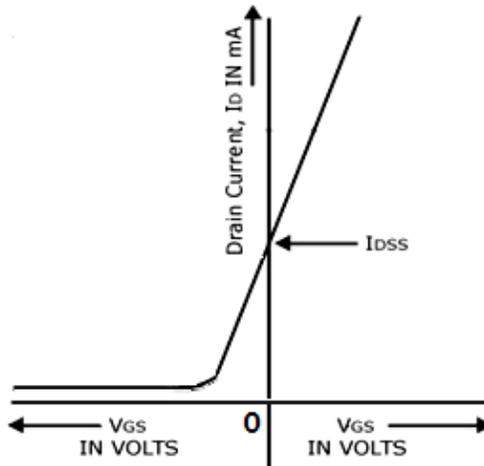
ix) Monostable Multivibrator has

- a) two stable states.
- b) single stable state.
- c) no stable state.
- d) only transition states

x) Natural frequency of the Piezo electric Crystal greatly depends upon

- a) temperature of the material used
- b) size, shape and elasticity of the material used
- c) D.C. voltage applied across the material
- d) series capacitors connected.

xi) The device which exhibits the following transfer characteristics is _____



- a) JFET
- b) DE-MOSFET
- c) E-MOSFET
- d) D-MOSFET

xii) Following is the circuit symbol for

- a) Tunnel diode
- b) Varactor diode
- c) Shockley diode
- d) Signal diode



xiii) LEDs are commonly fabricated from gallium compounds like gallium arsenide and gallium phosphide because _____

- e) they are cheap
- b) of abundant availability in nature
- c) they emit more heat
- d) they emit more light

xiv) Tunnel diode is basically _____

- e) a very heavily doped PN junction diode .
- f) a very lightly doped PN junction diode .
- g) a slow switching device.
- h) a metal contact diode .

xv) Following is the circuit symbol for

- i) Schottky diode
- j) Varactor diode
- k) Photo diode
- l) Signal diode



PART – B

Answer any FIVE questions.

5×7 = 35

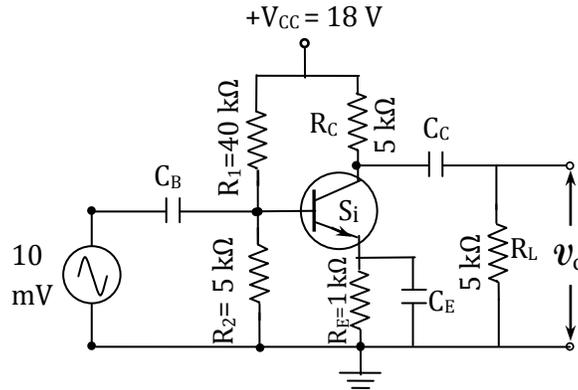
2. a) Classify the amplifiers based on any three criteria.
b) Explain the working of a single stage CE amplifier and discuss the fall of gain at high frequencies. **(3+4)**
3. Draw the circuit of a common source FET amplifier and explain its working. Using the equivalent circuit, derive the expression for its voltage gain.
4. a) Explain the working of a Transformer coupled Class A power amplifier with necessary circuit diagram. What is the value of theoretical maximum efficiency?
b) Draw the circuit of a Complementary symmetry Class B push pull power amplifier. **(5+2)**
5. a) Draw the circuit of a simple current mirror using a transistor and a diode. Show that the collector current is same as that of current through base resistor.
b) Draw the circuit of a differential amplifier with current mirror. What is the effect of current mirror on differential gain, common mode gain and C.M.R.R? **(3+4)**
6. a) Draw the block diagrams showing Voltage series and Current shunt negative feedback connections.
b) Explain the operation of an Astable multivibrator using transistors. **(2+5)**
7. Explain the conditions to be satisfied for producing sustained oscillations. Explain with circuit diagram, the working of a Hartley oscillator.
8. a) Explain the working of Silicon Controlled Rectifier with a necessary diagram. Draw its VI characteristic curves for different gate currents.
b) Draw the characteristic curves of a Photo transistor. **(5+2)**
9. Explain the basic constructional features and the working of a Triac with relevant diagrams.

PART – C

Answer any FOUR questions

4×5 = 20

10. For the given circuit, using approximate analysis calculate the voltage gain and input impedance from r_e model of the transistor. Consider the thermal potential at E-B junction as 26 mV.



11. a) What is the function of heat sink in electronic systems?
 b) What is crossover distortion? How to overcome it? (2+3)
12. a) Write a note on use of tuned amplifiers in communication circuits.
 b) Derive an expression for Tail current in a differential amplifier. (2+3)
13. 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
 iii) Input impedance iv) CMRR
14. In a transistor Colpitt's oscillator, two capacitors of 24nF and 240nF respectively are connected along with an inductor of 10mH. Determine the frequency of oscillations of the circuit, the feedback fraction and draw the circuit.
15. Each of the SCRs used in a Full wave rectifier will fire at 150 V for a gate current of 1 mA. If the peak a.c voltage across each SCR is 200V, calculate:
 (i) firing angle (ii) average output voltage
 (iii) average current for a load resistance of 100 Ω (iv) power output.

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