

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

Model Question Paper -1

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.

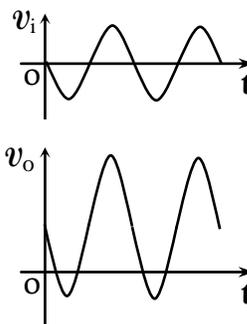
- i) In a multistage amplifier, loading effect of one stage with the following stage leads to
- a) increase in overall voltage gain
 - b) decrease in overall voltage gain
 - c) stability in voltage gain
 - d) decrease in noise.

ii) Emitter follower exhibits

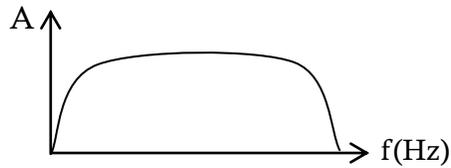
- a) higher values of current gain and power gain.
- b) Low input impedance and high output impedance
- c) High voltage gain and low current gain.
- d) Low power gain.

iii) Name the type of multistage amplifier for which the input and output waveforms are as follows.

- a) RC coupled amplifier
- b) Transformer coupled amplifier
- c) Direct coupled amplifier
- d) Inductance coupled amplifier

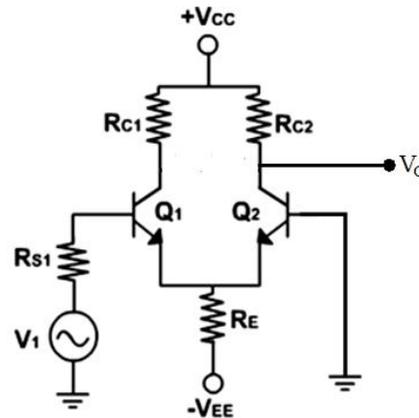


iv) Following is the frequency response curve of _____



- a) Single tuned amplifier
 b) Double tuned amplifier
 c) Direct coupled amplifier
 d) RC coupled amplifier
- v) For biasing the transistor in class C mode (i.e for Class C power amplifier), the operating point is
- a) at the centre of load line
 b) exactly at cutoff point.
 c) in the saturation region
 d) beyond the cutoff point.
- vi) 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



- vii) In an ideal differential amplifier, if same signal is given to both the inputs, output will be
- a) same as the input
 b) double the input
 c) zero
 d) floating above the ground
- viii) Following is not true in amplifiers with negative feedback.
- a) decreased gain.
 b) increased bandwidth.
 c) stabilised gain.
 d) increased noise.

ix) Astable Multivibrator always

- a) has low state as stable state
- b) has high state as stable state
- c) periodically switches between high and low states.
- d) has two stable states.

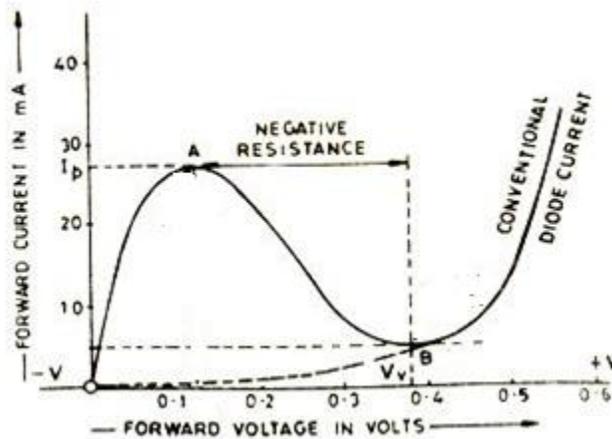
x) If A and β are the voltage gain and the feedback ratio in a positive feedback oscillator, to startup the oscillations, initially the loop gain (i.e., $A\beta$) should be

- a) equal to 1
- b) greater than 1.
- c) less than 1
- d) 29

xi) DIAC is a device which conducts during

- a) positive half cycles of the input signal
- b) negative half cycles of the input signal
- c) both positive and negative half cycles of the input signal
- d) alternate positive half cycles of the input signal.

xii) The device which exhibits the following VI characteristics is _____



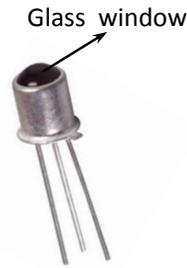
- a) UJT b) DE-MOSFET c) Tunnel diode d) SCR

xiii) Identify the Solar cell (photo voltaic cell) from the following circuit symbols

- a)
- b)
- c)
- d)

xiv) The device shown here is a

- a) Solar cell
- b) RF transistor
- c) Photo transistor
- d) LDR



xv) To display the decimal number '5', the Pin Nos. for the respective segments to be activated in a seven segment L.E.D display are _____

- a) 2,4,7,9,10
- b) 5,4,7,2,10
- c) 1,2,6,4,5
- d) 7,6,4,2,10

PART – B

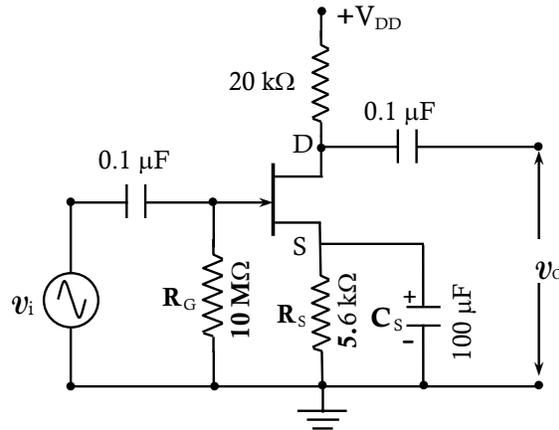
Answer any FIVE questions.

5×7 = 35

2. With the help of equivalent circuit of a CE amplifier, derive the expression for voltage gain. Write the expressions for input and output impedances.
3. a) Draw the circuit diagrams of Swamped amplifier and CC amplifier. Mention any two applications of each.
b) Draw the circuit diagram of a Darlington amplifier and mention its characteristic features. (4+2)
4. Compare voltage amplifier with a power amplifier in any two aspects. Draw the circuit of a Class B Push Pull power amplifier and explain its working.
5. Explain the working of a dual input balanced output differential amplifier with a necessary circuit diagram. Derive the expressions for I_C and V_{CE} .
6. a) Draw the block diagrams for voltage shunt and current series negative feedback connections.
b) Derive the expression for the voltage gain of a voltage series negative feedback amplifier. (3+4)
7. What is piezo electric effect? Draw the equivalent circuit of a Piezo Electric crystal. Explain with circuit diagram, the working of a Crystal oscillator.
8. a) Explain the working of a Full wave controlled rectifier using SCRs. Derive the expressions for average Load voltage and current.
b) Draw the circuit of a UJT relaxation Oscillator (5+2)
9. a) With a circuit diagram, explain the working of N channel Enhancement type MOSFET.
b) Draw the circuit symbol of a Varactor diode and mention any one application of it. (5+2)

PART – C**Answer any FOUR questions****4×5 = 20**

10. Calculate the voltage gain of common source FET amplifier shown in the fig. Parameters of the FET are $r_d=40\text{ k}\Omega$ and $g_m=2\text{ milli Siemens}$.



Also find the voltage gain if a load resistance of $5\text{ k}\Omega$ is connected across the output terminals.

11. Derive the expression for overall efficiency of a Transformer coupled Class A power amplifier.
12. Draw the circuit diagram of a double tuned voltage amplifier & briefly explain its operation.
13. In a dual input balanced output differential amplifier, the DC emitter current is given by 2 mA , collector resistance $R_C=2.2\text{ k}\Omega$, emitter resistor $R_E=4.7\text{ k}\Omega$ and $\beta=100$. Calculate
 i) Differential gain ii) Common mode gain
 iii) Input impedance iv) CMRR
14. In a transistor Hartley's oscillator the frequency of oscillations is 15.2 kHz . If the capacitor used in the tank circuit is $0.01\text{ }\mu\text{F}$ and the inductance providing the positive feedback voltage is of 1 mH , calculate the value of the other inductance used.
15. The input voltage required to turn ON a certain UJT is 6.8 V when the voltage applied between the bases is 10 V . Calculate the value of Intrinsic standoff voltage. If the voltage across the bases is increased to 14 V , what will be the value of peak point voltage? If the value of inter base resistance is $12\text{ k}\Omega$, calculate the values of R_{B1} and R_{B2} .

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