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GS-378

II Semester B.Sc. Examination, May/June - 2019

ELECTRONICS - II

Electronic Circuits and Special Purpose Devices
(CBCS) (F+R) (2014-15 & Onwards)

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) In a CE amplifier the _____ is at ac ground.
  (a) Emitter (b) Base
  (c) Collector (d) None of the above

(ii) In a transistor amplifier circuit, the current in any branch is :
  (a) Sum of ac and dc (b) ac only
  (c) dc only (d) None of the above

(iii) A Swamped amplifier is :
  (a) a high gain amplifier (b) a gain stabilized amplifier
  (c) a narrow band amplifier (d) both (a) and (c)

(iv) A Class A power amplifier is sometimes called _____ amplifier.
  (a) Symmetrical (b) single ended
  (c) Differential (d) Tuned

(v) The last stage of multistage amplifier usually employs :
  (a) Class A amplifier (b) Pre-amplifier
  (c) Push-pull amplifier (d) None of the above

(vi) The voltage gain of a tuned amplifier is _____ at resonant frequency.
  (a) Minimum
  (b) Zero
  (c) Half way between maximum and minimum
  (d) Maximum

(vii) The tail of a differential amplifier acts like a :
  (a) battery (b) current source
  (c) transistor (d) diode

(viii) With zero volts on both inputs, a differential amplifier ideally should have an output equal to :
  (a) The positive supply voltage
  (b) The negative supply voltage
  (c) Zero
  (d) V_{BE}

P.T.O.

(ix) The gain of an amplifier with feedback is known as _____ gain.
(a) resonant (b) open loop
(c) closed loop (d) None of the above

(x) The working of oscillators is based on _____ conversion.
(a) ac to dc (b) dc to ac
(c) electricity to sound (d) None of the above

(xi) Product of amplifier gain and feedback ratio is equal to :
(a) Loop gain (b) resistance
(c) capacitance (d) conductance

(xii) Damped oscillations are those whose amplitude _____ with time.
(a) increases (b) remains constant
(c) decreases (d) none of the above

(xiii) A DIAC is a _____ switch.
(a) Bidirectional (b) Unidirectional
(c) mechanical (d) controlled

(xiv) A TRIAC is equivalent to two SCRs :
(a) in parallel (b) in series
(c) in inverse-parallel (d) none of the above

(xv) In LED, light is emitted because :
(a) of recombination of charge carriers
(b) diode gets heated up
(c) of light falling on the diode gets amplified
(d) light gets reflected due to lens action

PART - B

Answer **any five** questions : **5x7=35**

2. (a) Classify amplifiers based on any two criteria. **2+5**
(b) With a circuit diagram explain the working of CE amplifier.

3. (a) With the equivalent circuit of Common source JFET amplifier, derive an expression for its voltage gain. **4+3**
(b) Draw the circuit diagram of CC amplifier. Mention its applications.

4. (a) Compare voltage amplifiers and power amplifiers.
(b) Derive an expression for overall efficiency of a transformer coupled Class A power amplifier. **3+4**

5. (a) Explain the circuit operation of Complementary symmetry Class B push-pull amplifier. **5+2**
(b) What is the role of heat-sinks in electronic devices ?

6. (a) Draw the dc eqivalent circuit and derive expressions for Q point of a Dual input balanced output differential amplifier. 4+3

(b) Explain the working of a current mirror circuit.

7. (a) What is feedback in amplifiers ? 1+6

(b) Sketch the block diagrams of the following negative feedback configurations.

(i) Voltage Series (ii) Voltage Shunt (iii) Current Shunt

8. (a) Draw the equivalent circuit of Piezo electric crystal. 2+5

(b) What is a multivibrator ? Explain the working of Astable Multivibrator using transistors.

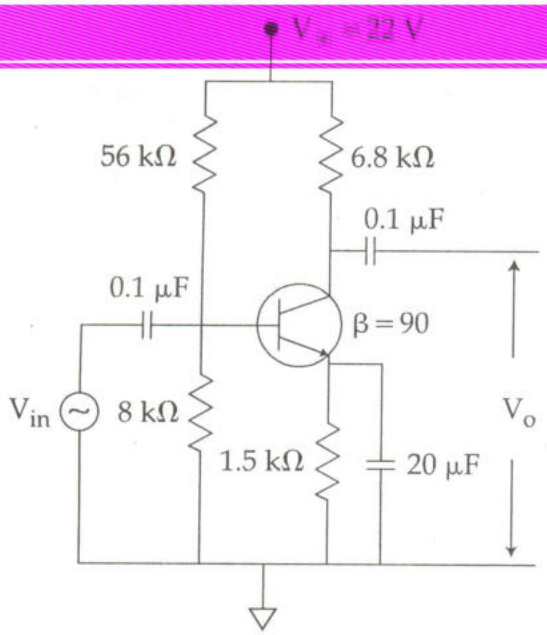
9. (a) Draw the symbols of depletion type and enhancement type MOSFET. 2+5

(b) Explain the working of n-channel enhancement type MOSFET with necessary schematic diagrams.

PART - C

Answer **any four** questions : 4x5=20

10. Determine the voltage gain, input impedance and output impedance of the given CE amplifier. Consider $V_{BE} = 0.7$ V



11. For a three stage RC coupled amplifier, individual gains are 20,15 and 30 respectively. If the output voltage at the last stage is 45V, calculate :
    (i) the decibel voltage gain of individual stages
    (ii) overall decibel voltage gain
    (iii) input voltage to the first stage.

12. In a Dual input balanced output differential amplifier, $I_E = 2.5$ mA, $R_c = 3.9$ kΩ, $R_E = 3.3$ kΩ and $\beta = 150$. Calculate :
    (i) Differential gain (ii) Common mode gain
    (iii) input impedance (iv) CMRR

13. An amplifier has an open loop gain of 100, an input impedance of 1kΩ and an output impedance of 100Ω. Calculate the new input impedance and output impedance for a voltage series negative feedback with a feedback factor of 0.99.

14. A coil in a Hartley oscillator has two sections of inductances of 90 mH and 30 mH. Calculate the oscillator frequency if the tuning capacitance is 100 pF. If the capacitance is doubled, determine the frequency of oscillation.

15. In an SCR full wave rectifier, peak ac supply voltage between center tap and end of secondary is 200 V, find the :
    (i) average output voltage
    (ii) power delivered to a 1 kΩ load resistance
    for firing angle 60°. Determine the average output voltage if the firing angle is increased to 120°.

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