UNIVERSITY OF THE PUNJAB
Fifth Semester – 2019
Examination: B.S. 4 Years Program

Roll No. in Fig. ....

Roll No. in Words. ....

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PAPER: Electronic Devices and Circuits
Course Code: PHY-304-A   Part–I (Compulsory)

MAX. TIME: 15 Min.
MAX. MARKS: 10

Signature of Supdt.:

Attempt this Paper on this Question Sheet only.
Please encircle the correct option. Division of marks is given in front of each question.
This Paper will be collected back after expiry of time limit mentioned above.

Q.1.   Encircle the right answer, cutting and overwriting is not allowed.   (1x10=10)

(i)   If both the emitter-base and the collector-base junctions of a BJT are forward biased, the transistor is in the
    (a) active region   (b) cut-off region   (c) saturated region   (d) inverse mode

(ii)   When operated in cutoff and saturation, the transistor acts like
    (a) a switch   (b) a linear amplifier   (c) an oscillator   (d) a variable resistor

(iii)   The input resistance of a common-collector amplifier is
    (a) very low   (b) very high   (c) the same as a CE   (d) none of these answers

(iv)   The low-frequency response of an amplifier is determined by the
    (a) coupling capacitors   (b) bias circuit
    (c) transistor capacitances   (d) all of these answers

(v)   The bandwidth of an amplifier is defined by
    (a) the midrange gain   (b) the critical frequencies
    (c) the roll-off rate   (d) the input capacitance

(vi)   The efficiency of a power amplifier is the ratio of the power delivered to the load to the
    (a) input signal power   (b) power dissipated in the last stage
    (c) power from the dc power supply   (d) none of these answers

(vii)   Crossover distortion is a problem for
    (a) class A amplifiers   (b) class AB amplifiers
    (c) class B amplifiers   (d) all of these amplifiers

(viii)   The main feature of a crystal oscillator is
    (a) economy   (b) beauty   (c) stability   (d) high frequency

(ix)   In a Wien-bridge oscillator, if the resistances in the positive feedback circuit are decreased, the frequency
    (a) decreases   (b) increases   (c) remains the same   (d) none of these answers

(x)   The triac is
    (a) like a bidirectional SCR   (b) a four-terminal device
    (c) not a thyristor   (d) both answers (a) and (b)

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Fifth Semester – 2019
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PAPER: Electronic Devices and Circuits

Course Code: PHY-304-A   Part – II

MAX. TIME: 2 Hrs. 45 Min.

MAX. MARKS: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2: Write short answers of the following questions: (5×4 = 20)

i). Describe briefly why the gain of RC coupled amplifier reduces at low and high frequencies?

ii). What two requirements must be satisfied to make an oscillator from a feedback amplifier?

iii). What function does the C_C and C_E serve in a common emitter (C-E) BJT amplifier?

iv). Describe briefly under what conditions do we use a π filter and π-R filter?

v). How does a Zener *diode* regulate dc voltage?

Q.3: (a)   Draw the circuit and discuss the high frequency response of RC coupled BJT amplifier by determining $A_{V(high)}$.

(b)   Find out an expression for the phase angle $\theta_{(high)}$ of above circuit.   **(8, 2)**

Q.4: (a)   Describe circuit operation of a class B power amplifier and find out an expression for its theoretical power conversion efficiency.

(b)   Draw the circuit diagram of an Astable multivibrator.   **(8, 2)**

Q.5: (a)   Draw the circuit of a practical Colpitts oscillator and determine its frequency of oscillations.

(b)   A transistor Colpitts oscillator has $C_1 = C_2 = C$ *and* $L = 150 \mu H$. Find $C_1 = C_2$ for oscillations at 1.5 M Hz.   **(7, 3)**