This question paper contains 4 printed pages]

R—126—2017

FACULTY OF SCIENCE

B.Sc. (Fourth Semester) EXAMINATION

MARCH/APRIL, 2017

PHYSICS

Paper IX

(Basic Electronics)

(MCQ+Theory)

(Tuesday, 11-4-2017) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) First 30 minutes are for question no. **1** (MCQ) and remaining time is for other questions.

(*iii*) Figures to the right indicate full marks.

(*iv*) Use black ball point pen to darken the circle of correct choice in OMR answer-sheet.

(MCQs)

1. Choose the *correct* answer : 10

(*i*) The line regulation indicates .....

(*a*) Change in output voltage due to change in input voltage

(*b*) Change in output voltage due to change in input current

(*c*) Change in output voltage due to change in load current

(*d*) None of the above

(*ii*) A Zener regulator ..... in the power supply.

(*a*) Increases the ripple

(*b*) Data insufficient

(*c*) Decreases the ripple

(*d*) Neither increases nor decreases the ripple

P.T.O.

(*iii*) The voltage gain of a transistor connected in common collector arrangement is .....

(*a*) equal to 1 (*b*) more than 10

(*c*) more than 100 (*d*) less than 1

(*iv*) A transistor is connected in CB mode. If it is now connected in CE mode with same bias voltage, the values of I_E, I_B and I_C will .....

(*a*) remain the same (*b*) increase

(*c*) decrease (*d*) become zero

(*v*) The op-amp can amplify .....

(*a*) a.c. signals only

(*b*) d.c. signals only

(*c*) both a.c. and d.c. signals

(*d*) neither d.c. nor a.c. signals

(*vi*) The input impedance of a differential amplifier equals r_e' times .....

(*a*) β (*b*) R_E

(*c*) R_C (*d*) 2β

(*vii*) In an LC oscillator, if the value of L is increased four times, the frequency of oscillations is .....

(*a*) increased 2 times

(*b*) decreased 4 times

(*c*) increased 4 times

(*d*) decreased 2 times

(*viii*) An oscillator produces ..... oscillations.

(*a*) damped (*b*) undamped

(*c*) modulated (*d*) unmodulated

(*ix*) In LC oscillators, the frequency of oscillations is given by .....

(*a*) $\frac{2\pi}{\sqrt{LC}}$ (*b*) $\frac{\sqrt{LC}}{2\pi}$

(*c*) $\frac{1}{2\pi\sqrt{LC}}$ (*d*) $\frac{2\pi L}{\sqrt{LC}}$

(*x*) The minimum load resistance is given by .....

(*a*) $\frac{V_{NL}}{I_{FL}}$ (*b*) $\frac{V_{FL}}{I_{FL}}$

(*c*) $\frac{V_{NL}}{I_{FL}}$ (*d*) $\frac{V_{NL}}{I_{NL}}$

(Theory)

2. Attempt any *five* : 10

(*a*) If the d.c. output voltage is 400 V with no-load attached to power supply but decreases to 300 V at full-load, find the percentage voltage regulation.

(*b*) Draw a well labelled diagram of CE connections.

(*c*) Define slew rate in operational amplifier.

(*d*) Give the expression for frequency of oscillations in Colpitt's oscillator.

(*e*) Define load regulation.

(*f*) Define input bias current in op-amp.

(*g*) What is Barkhausen criterion in oscillator ?

3. Attempt any *two* : 10

(*a*) Explain Zener-diode voltage regulator with neat diagram.

(*b*) Determine the output characteristics of CB connections.

P.T.O.

(*c*) Write a note on inverting amplifier in an op-amp.

(*d*) Explain the action of phase shift oscillator with neat labelled diagram.

4. Attempt the following questions :

(*a*) Explain the working of a transistor series voltage regulator d.c. power supply. 5

(*b*) Write a note on operating point on a d.c. load line. 5

Or

(*x*) Discuss the operation of a differential amplifier. 5

(*y*) Discuss the essentials of a sinusoidal oscillator. 5