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B—162—2019

FACULTY OF SCIENCE

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

MARCH/APRIL, 2019

(CBCS/CGPA Pattern)

PHYSICS

Paper IX (Phy.-222)

(Basic Electronics)

(MCQ+Theory)

(Friday, 5-4-2019)

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 minute are for Q. No. 1 (MCQ) and remaining time for other questions.
(iii) Figures to the right indicate full marks.

(MCQ)

1. Choose the *correct* answer : 10
- (i) The efficiency of a voltage regulator is high, when
- (A) input power is low (B) output power is high
(C) little power is wasted (D) input power is high
- (ii) Voltage regulators normally use
- (A) Negative feedback (B) Positive feedback
(C) No feedback (D) Phase limiting
- (iii) The barrier potential across each germanium depletion layer is
- (A) 0 V (B) 0.3 V
(C) 0.7 V (D) 1 V
- (iv) The (β) beta of a transistor is the ratio of the
- (A) collector current to emitter current
(B) collector current to base current
(C) base current to collector current
(D) emitter current to collector current

P.T.O.

- (v) A transistor is used to
- (A) Amplify weak signal (B) rectify line voltage
(C) step down voltage (D) emit light
- (vi) The closed-loop voltage gain of an inverting amplifier equals
- (A) the ratio of the input resistance to the feedback resistance
(B) the open loop voltage gain
(C) the feedback resistance divided by the input resistance
(D) the input resistance
- (vii) An oscillator always needs
- (A) positive feedback (B) negative feedback
(C) both types of feedback (D) no feedback
- (viii) In a Colpitt's oscillator, feedback is obtained
- (A) by magnetic induction
(B) by a tickler coil
(C) from the centre of split capacitors
(D) from emitter of transistor
- (ix) The definition of slew rate is
- (A) $S_R = \frac{\Delta t}{\Delta V_{out}}$ (B) $S_R = \frac{V_{out}}{\Delta t}$
(C) $S_R = \frac{Vt}{\Delta_{in}}$ (D) $S_R = \frac{V_{in}}{\Delta t}$
- (x) The common mode gain is
- (A) very high (B) very low
(C) always unity (D) unpredictable

(Theory)

2. Attempt any *five* :

10

- (i) Define voltage regulation.
- (ii) Explain the use of voltage regulator in regulated power supplies.
- (iii) Explain meaning of faithful amplification.
- (iv) Draw the circuit diagram to study I/O characteristics of an npn transistor in CB configuration.

- (v) Differentiate between common-mode signals and differential mode signals.
- (vi) Explain in brief input bias current of an op-amp.
- (vii) Explain undamped oscillations.
3. Attempt any *two* : 10
- (i) With the help of well labelled circuit diagram, describe the working of series feedback voltage regulator.
- (ii) Describe input characteristics of a transistor in CB configuration and find input impedance.
- (iii) Draw circuit diagram for non-inverting op-amp and derive relation for closed loop voltage gain.
- (iv) Draw the circuit diagram for transistorized Hartley oscillator. Describe its working.
4. Attempt the following questions :
- (i) Draw and explain an ordinary d.c. power supply. 5
- (ii) Draw circuit diagram for common collector configuration of a transistor and derive expression for its collector current. 5
- Or*
- (i) Derive an equation for output impedance with the help of necessary circuit diagram for an op-amp. 5
- (ii) Describe how LC tank generates oscillations. 5