[38] No. of printed pages : 03

SARDAR PATEL UNIVERSITY
S.Y. B.Sc. (III SEMESTER) EXAMINATION
2012
Friday, 30th November
10.30 a.m. to 1.30 p.m.
USO3CPHY02 : PHYSICS (Basic Solide State Electronics)

Total Marks : 70

Q.1 Write the appropriate answers of the following questions. [10]

(1) Identify the ckt used to increase the voltage level or power level of an electrical signal.
a) Oscillater b) Vibrater c) an amplifier d) transistor

(2) Identify the point which will lie at the intersection of the output characteristics curves of transistor and dc load line.
a) A-point b) Q-point c) active point d) B-point

(3) Which of the following h-parameters gives reverse voltage ratio of a C-E transistor.
a) hre b) hfe c) hie d) hoe

(4) The coupling capacitors mainly affect _____ cutoff frequency of an amplifier.
a) upper b) single c) double d) lower

(5) The emitter by pass capacitor CE across the emitter resistor RE is used to _____
a) by pass ac voltage developed across emitter resistor RE.
b) develope ac voltage developed across emitter resistor RE.
c) prevent emitter being short circuited
d) maintain constant ac current across emitter resistor RE.

(6) The –ve feedback in an amplifier _____
a) increases the voltage gain
b) reduces the voltage gain
c) decreases the bandwidth
d) does affect the voltage gain

(7) The voltage gain of an amplifier is 100. On applying –ve feedback with $\beta = 0.04$ its gain will reduce to _____ .
a) 30 b) 20 c) 70 d) 25

(8) Write the full form of R.FC
a) Resistor feedback circuit
b) Resistor frequency circuit
c) Radio frequency chock
d) Radio frequency circuit

(9) Identify the circuit that generates an alternating voltage
a) An amplifier b) An oscillator
c) Rectifier d) Biasing circuit

(10) We use a crystal oscillator because
   a) it gives high output voltage
   b) the frequency of oscillations remains substantially constant
   c) it requires very low dc supply voltage
   d) it works at high efficiency

Q.2 Attempt **Any Ten** : [20]

1) Why collector to base bias circuit is not widely used ?
2) Why Q-point shifts ? State requirements of good biasing circuit.
3) Discuss limitations of fixed bias circuit.
4) Write need of multistage amplifier.
5) Why db is used ?
6) Draw the complete ac equivalent circuit of the transistor amplifier.
7) Write merits and demerits of negative feedback amplifier.
8) Define positive feedback and negative feedback in an amplifier.
9) An amplifier with Zi=1kΩ has a voltage gain A = 1000. If a negative feedback of β = 0.01 is applied to it, what shall be the input impedance of the feedback amplifier ?
10) Define piezo electric effect.
11) Write the basic requirements of an oscillator circuit.
12) Draw the circuit diagram of Hartley oscillator using NPN transistor.

Q.3

(a) What is Q-point ? Explain selection of a proper operating point. [06]

(b) In a voltage divider biasing circuit V_{CC} = 12v, R_1 = 40kΩ, R_2 = 5kΩ, R_E = 1kΩ, R_C = 5kΩ and V_{BE} = 0.3 v with β = 60. Find various dc biasing voltages and currents. [04]

OR

Q.3

(a) What is voltage divider biasing circuit ? Using approximate analysis explain determination of operating point of such circuit. [06]

(b) Discuss Emitter-Bias circuit using NPN transistor. [04]

Q.4

(a) Discuss and derive 'h' parameters and its equivalent ckt with necessary circuit diagrams. [06]

(b) Explain gain of multi-stage amplifier. [04]

OR

Q.4

(a) What are small signal amplifiers ? Draw the circuit of such amplifier and discuss function of each component. Define gain of the amplifier. [06]

(b) Discuss phase-relation-ship between input and output in CE mode using NPN transistor. [04]

Q.5

(a) What is feed-back ? Explain the effect of negative feedback on input impedance, output impedance and bandwidth of an amplifier. [06]

(b) State and explain specific applications of an emitter-follower circuit. [04]

OR

Q.5

(a) Explain voltage gain of feed-back amplifier. [06]

(b) Discuss various types of feedbacks with proper diagram in detail. [04]

Q.6 Give the meaning of terms ; [10]
(a) damping oscillations (b) growing oscillations and sustained oscillations. Explain positive feedback amplifier as an oscillator and write Barkhausen criterion of oscillation.

OR

Q.6 Explain phase-shift oscillator with proper ckt diagram, If in a phase-shift oscillator, three identical feedback networks consist of R=200Ω and C = 0.01 μF. Find the frequency of oscillation of the circuit. [10]

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