SH-III/Electronics-301C-5(T)/19

B.Sc. Semester III (Honours) Examination, 2018-19

ELECTRONICS

Course ID : 31711 **Course Code : SHELC-301C-5(T)**

Course Title : Electronic Circuits

Time: 1 Hour 15 Minutes **Full Marks: 25**

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer *any three* of the following: 1×3=3

(a) Draw the forward and reverse characteristics of an ideal diode.

(b) Draw the block diagram of a Zener diode based power supply.

Or,

What is an electronic filter?

(c) Draw the circuit diagram of a voltage divider method of biasing with *n-p-n* transistor.

(d) What is Darlington pair?

(e) What is feedback in an Amplifier?

(f) What is class A operation?

Or,

What is the maximum conversion efficiency of a class A power amplifier?

2. Answer *any three* of the following: 2×3=6

(a) What is ripple factor (γ)? What is its value for a half wave and for a full wave rectifier circuit? 1+1=2

(b) Show the output waveform of a full wave rectifier when the input is a sinusoidal wave.

(c) Draw and explain both dc and ac load line for a transistor based CE amplifier.

Or,

Give the *h*-parameter based model of an Amplifier in CE configuration.

(d) What are 'Barkhousen criterian' for the condition of oscillations?

Or,

What is 'sustained oscillation'? What is the condition for this type oscillation?

(e) How many types of power amplifiers are there? Classify them according to their nature of operation. 1+1=2

Or,

What are the basic difference between a Voltage Amplifier and a Power Amplifier?

(f) What is quality factor (Q) of a tuned amplifier? How is it related to bandwidth (Δf) of the same amplifier?

3. Answer *any two* of the following: 5×2=10

(a) Derive the expression for ripple factor (γ) and rectification efficiency (η) for a full wave rectifier circuit.

Or,

Draw the circuit diagram of a zener diode based voltage regulator circuit and explain it. What are load and line regulation? 4+1=5

(b) Derive an expression for voltage gain of a CE-Amplifier in the mid frequency range with *h*-parameter ac equivalent circuit.

Or,

How the individual gain of a CE-Amplifier is being effected/changed during Cascading with other amplifiers? Derive its expression from *h*-parameter ac equivalent circuit. 1+4=5

(c) With proper circuit diagram obtain an expression for the frequency of generated signal for an R-C 'phase shaft' oscillator. What type of frequencies are generated by this oscillator? 4+1=5

Or,

Draw the circuit diagram of class-B push-pull power amplifier circuit. Explain briefly about its operation and obtain the expression for conversion efficiency (η). 1+1+3=5

(d) Draw the circuit diagram of a single tuned voltage amplifier circuit. Obtain its *h*–parameter ac equivalent circuit. Hence obtain the expression for measure voltage gain for this type of amplifier. 1+1+3=5

4. Answer *any one* of the following questions: 6×1=6

(a) What are clipping and clamping circuits? How many types of clipping circuits are there? With proper circuit diagram describe the operation of a clipper. 2+1+3=6

Or,

Draw the circuit diagram of either a centre-tapped /or a bridge type full-wave rectifier circuit and hence draw its output wave-form. What is PIV (Peak Inverse Voltage)? 3+2+1=6

(b) With proper circuit diagram explain the working principle of either a Hartley or a Colpitt oscillator. Obtain the expression for generated frequency of the same oscillator. Give one application of it. 5+1=6

(c) Draw and explain the operation of complementary symmetry class-B push-pull power amplifier. What is Harmonic distortion? 5+1=6

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