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BIEL-027

DECVI / DELVI / DCSVI / ACECVI / ACELVI / ACSVI

Term-End Examination

00294

June, 2017

BIEL-027 : APPLIED ELECTRONICS

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. Question number **1** is **compulsory**. Use of scientific calculator is permitted. Symbols have their usual meaning.*

1. (a) The action of a JFET in its equivalent circuit can be best represented as a

(i) Current Controlled Voltage Source (CCVS)

(ii) Current Controlled Current Source (CCCS)

(iii) Voltage Controlled Voltage Source (VCVS)

(iv) Voltage Controlled Current Source (VCCS)

(b) Negative feedback in an amplifier

(i) improves SNR at the input

(ii) improves SNR at the output

(iii) does not affect the SNR at the output

(iv) reduces distortion

(c) Crossover distortion behaviour is a characteristic of

(i) Class A output stage

(ii) Class AB output stage

(iii) Class B output stage

(iv) Common base output stage

(d) The MOSFET switch in its ON-state may be considered to be equivalent to the

(i) Resistor

(ii) Inductor

(iii) Capacitor

(iv) Battery

(e) Oscillation frequency in Hartley oscillator is

(i) $f = \frac{1}{2\pi\sqrt{LC}}$

(ii) $f = \frac{1}{2\pi\sqrt{(L_1 + L_2 + 2m) \cdot C}}$

(iii) $f = \frac{1}{2\pi\sqrt{RC}}$

(iv) $f = \frac{1}{2\pi\sqrt{(L_1 + L_2) - C}}$

(f) A bootstrap sweep circuit employs _____ type of feedback.

(i) positive
(ii) negative
(iii) multiply
(iv) divide

(g) UJT is also known as

(i) positive resistance device
(ii) negative temperature device
(iii) negative resistance device
(iv) positive temperature device *7×2=14*

2. (a) Write down the advantages, disadvantages and applications of class A and class AB power amplifiers. *7*

(b) If a JFET has I_{DSS} = 12 mA, V_P = – 4V, calculate the operating point (I_{DS}, V_{DS}) of the JFET in the circuit of Figure 1. *7*

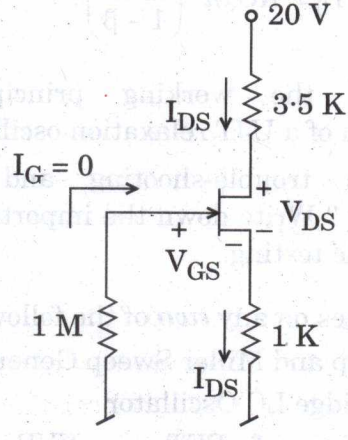

Figure 1

3. (a) Why is a tuned amplifier required in analog circuits ? Explain the operating principle of a single tuned amplifier with necessary diagrams. 7

(b) An RC phase shift oscillator generates sinusoidal output of 10 kHz. If a BJT has $h_{fe} = 60$, $h_{ie} = 2\ k\Omega$ and $R_C = 5\ k\Omega$, calculate the values of R and C used in the feedback network. 7

4. (a) What are the necessary conditions of oscillations ? Compare negative and positive feedback systems. 7

(b) Draw the circuit diagram of an RC integrator and explain its operation with required waveforms. 7

5. Draw and explain the operation of a monostable multivibrator with necessary diagram and waveforms. Also derive the expression for the pulse duration $T_0 \simeq RC\ ln\left(\frac{1}{1-\beta}\right)$. 7+7

6. (a) Describe the working principle and operation of a UJT relaxation oscillator. 7

(b) Why is trouble-shooting and testing required ? Write down the important steps for visible testing. 7

7. Write short notes on any ***two*** of the following : *2×7=14*

(a) Bootstrap and Miller Sweep Generator

(b) Wein Bridge LC Oscillator

(c) Application of FET as VVR (Voltage Variable Resistor)