

DECVI / DELVI / DCSVI / ACECVI / ACELVI /
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Term-End Examination

December, 2017

00799

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 meanings.

1. (a) MOSFET can be used as
 - (i) Current controlled capacitor
 - (ii) Voltage controlled capacitor
 - (iii) Current controlled inductor
 - (iv) Voltage controlled inductor

- (b) In a Class - C power amplifier the input signal has a frequency of 250 kHz. If the collector current pulses are $0.1 \mu\text{s}$ wide, the duty cycle of current waveform is
 - (i) 50
 - (ii) 25
 - (iii) 2.5
 - (iv) 0.025

(c) The oscillation frequency in Colpitt's oscillator is

(i) $f = \frac{1}{2\pi} \sqrt{\left(\frac{C_1 + C_2}{LC_1C_2}\right)}$

(ii) $f = \frac{1}{2\pi} \sqrt{\left(\frac{C_1 + C_2}{L}\right)}$

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

(iv) None of these

(d) What is the scale multiplier (factor) of a basic integrator ?

(i) R/C

(ii) C/R

(iii) - RC

(iv) - 1/RC

(e) What is the other name for clamper ?

(i) DC clipper

(ii) DC finder

(iii) DC stopper

(iv) DC restorer

(f) The maximum theoretical efficiency for Class - A amplifier is

(i) 12.5%

(ii) 25%

(iii) 50%

(iv) 75%

- (g) Negative feedback in an amplifier
- (i) Reduces gain
 - (ii) Increases frequency and phase distortion
 - (iii) Reduces bandwidth
 - (iv) Increases noise 7×2=14

2. (a) With a neat circuit diagram, explain the operation of a transformer coupled resistive load single-stage power amplifier. 7
- (b) In the circuit of Figure 1, the JFET has $I_{DSS} = 10 \text{ mA}$, $V_P = -4 \text{ V}$. Calculate I_{DS} and V_{DS} . 7

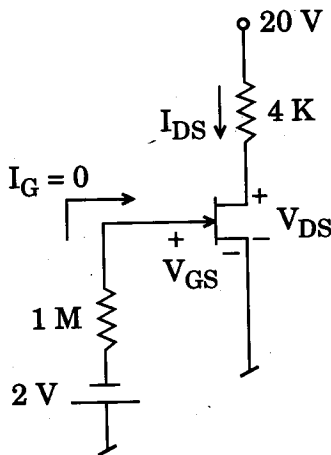


Figure 1

3. (a) A Class - B push-pull amplifier has peak output voltage of 20 V, $V_{CC} = 25 \text{ V}$ and $R_L = 8 \Omega$. Calculate input power and output power with conversion efficiency. 7

(b) Why is Hartley oscillator called tapped-inductor oscillator? Write down the main drawbacks of Colpitt's oscillator. 7

4. (a) With a block diagram, explain the difference between Voltage Series and Voltage Shunt Feedback. 7

(b) Draw the circuit diagram of the RC-differentiator and explain its operation with necessary waveforms. 7

5. (a) What is the difference between Clamper and Clipper circuits? Draw the output waveform of the given circuit (Figure 2). Here D is an ideal diode. 7

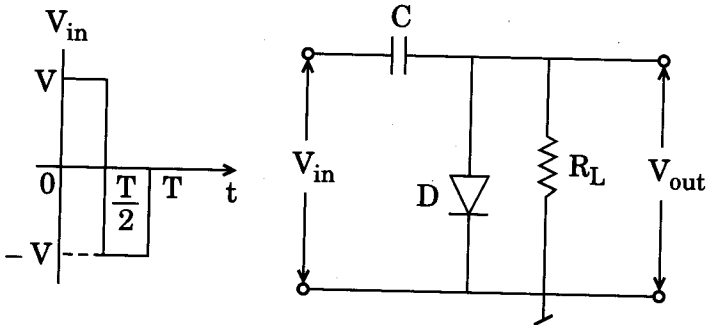


Figure 2

(b) Derive the expression for the time period and frequency of operation in an Astable Multivibrator. 7

6. (a) Describe the working principle and operation of an exponential sweep generator. 7

(b) Describe the operation of Schmitt Trigger with required waveforms and diagrams. 7

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

- (a) Trouble-shooting of Clipping and Clamping Circuits
 - (b) UJT Relaxation Oscillator
 - (c) Negative and Positive Feedback
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