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BIEL-027

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Term-End Examination

December, 2014

BIEL-027 : APPLIED ELECTRONICS

Time : 2 hours *Maximum Marks : 70*

Note : *All questions are to be answered in English Language only. Attempt any* ***five*** *questions including question no. 1 which is* ***compulsory****. Use of scientific calculator is permitted.*

1. (a) A transformer audio amplifier is found to have an overall efficiency of nearly 70%. It is 2

(i) Class B push-pull Amplifier

(ii) Class A push-pull Amplifier

(iii) Direct Coupled Amplifier

(iv) Single-stage Class C Amplifier

(b) Single-stage transformer coupled class A amplifier uses a transistor with maximum dissipation capability of 2·5 watts. The maximum a.c. power in the load is 2

(i) 1·25 W

(ii) 2·5 W

(iii) 5 W

(iv) 0·65 W

(c) A D-MOSFET differs from a JFET because it has no 2

(i) Gate

(ii) Channel

(iii) Drain

(iv) P-N junction

(d) State whether the following statements are *True* (T) or *False* (F). 2

(i) The feedback ratio can be a real or complex quantity.

(ii) Positive feedback in an amplifier reduces the stability of gain.

(e) In R-C-phase shift oscillator 2

(i) the β-network introduces a phase change of 180°.

(ii) the β-network introduces a phase change of 360°.

(iii) the amplifier gain has to be a positive number.

(iv) A β should be – 1.

(f) The circuit shown in Figure 1 is 2

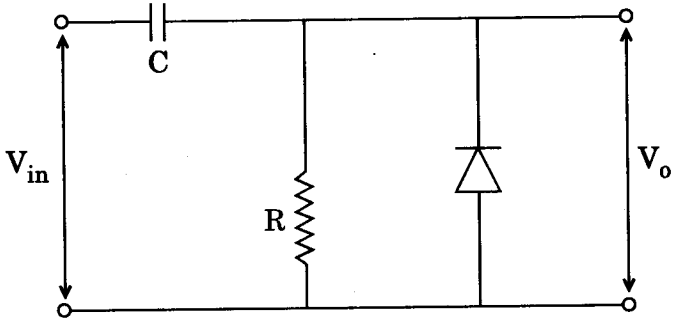

Figure 1

(i) Positive clamper

(ii) Negative clamper

(iii) Differentiator

(iv) Positive peak clipper

(g) In Ideal bootstrap sweep shown in Figure 2 V = 50 volts, R = 1 MΩ, C = 1 μF, C_1 = 100 μF. The sweep speed in volts/sec is 2

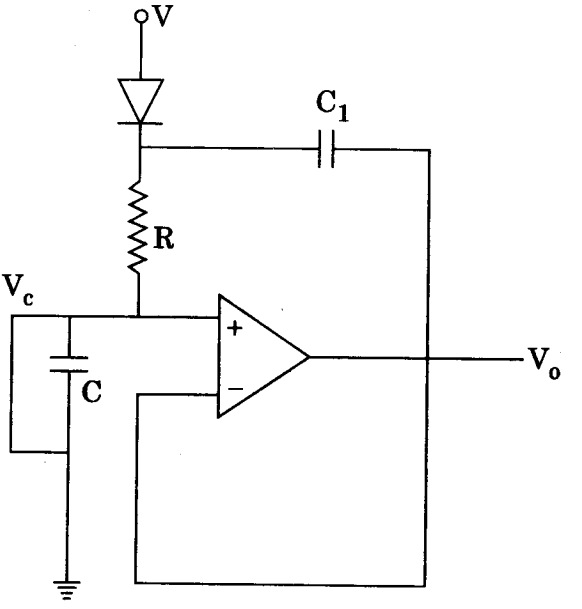

Figure 2

(i) 50

(ii) 0·5

(iii) 5

(iv) None of these

2. (a) What are the advantages of push-pull amplifiers ? Derive the expression for overall efficiency of class B push-pull amplifier. 7

(b) A class B push-pull amplifier must deliver 10 W of audio-power to the output load. 7

(i) If the output transformer is 80% efficient, what is the minimum power drain on the power supply under optimum conditions ?

(ii) What is the minimum average dissipation rating required for each transistor ?

3. (a) Explain different biasing schemes used for JFET. 7

(b) With a neat sketch describe the construction and working of an enhancement type insulated gate MOSFET using a p-type silicon bar. 7

4. (a) What is a tuned amplifier ? In which range of frequencies are tuned amplifiers used ? Draw the circuit diagram and explain the working of single-tuned amplifier. 7

(b) Explain with the help of a diagram the working principle of a feedback amplifier. Find an expression for voltage gain with feedback. 7

5. (a) What is Barkhausen criterion ? State the basic conditions for oscillations in a feedback amplifier. What are the primary requirements to obtain steady oscillations at a fixed frequency ? 7

(b) Explain the principle of working of Wein-Bridge oscillator circuit. Explain why negative feedback in addition to the usual positive feedback is employed in Wein-Bridge oscillators. 7

6. (a) What is a multivibrator ? Name different classes of multivibrators and briefly distinguish among them. 7

(b) Draw the circuit of Schmitt trigger and explain its operation. 7

7. (a) Explain the working of Bootstrap and Miller sweep ganerators. 7

(b) Explain the trouble-shooting of multivibrators and phase shift oscillators. 7

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(i) Advantages of push-pull Amplifiers

(ii) Necessity of tuned Amplifiers

(iii) RC Integrator

(iv) Transistor as a switch

(v) Current Time base generator

(vi) Trouble-shooting of clipping and clamping circuits