| BIEL-027 |

DECVI / DELVI / DCSVI / ACECVI / ACELVI / ACSVI

00297

Term-End Examination

June, 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) The output of power amplifiers is several times its input power. It is possible because

    2

    (i) Power amplifier introduces a negative resistance

    (ii) There is a positive feedback in circuit

    (iii) Step-up transformer in used in circuit

    (iv) Power amplifier converts a part of input D.C. power into A.C. power

(b) A Class B push-pull power amplifier has an A.C. output of 10 Watts. The D.C. power drawn from power supply under ideal condition is 2

(i) 10 W

(ii) 12·75 W

(iii) 15 W

(iv) 20 W

(c) In amplifier applications, FET is operated 2

(i) In the controlled resistor region

(ii) In controlled source region

(iii) In the avalanche region

(iv) In none of these

(d) State whether the following statements are true (T) or false (F) : 2

(i) Feedback always increases the gain of an amplifier.

(ii) The closed loop gain of an amplifier is always greater than open-loop gain.

(e) The Barkhausen criterion gives   *2*
  (i) Condition for stability
  (ii) The maximum gain for which there are no oscillations
  (iii) The phase-shift required for oscillations
  (iv) The maximum feedback for a stable amplifier

(f) Clamper circuits are known as   *2*
  (i) AC restorers
  (ii) DC restorers
  (iii) Voltage to frequency converters
  (iv) Sweep circuits

(g) For a Miller timebase circuit, the main requirement to obtain the highest linearity is that the amplifier gain should ideally be   *2*
  (i) $+1$
  (ii) -1
  (iii) $-\infty$
  (iv) $+\infty$

2. (a) Draw the circuit diagram of a complementary symmetry push-pull Class B power amplifier and explain its principle of operation. Also give its advantages and disadvantages.   *8*

(b)   For Class A, CE amplifier shown in figure
       below, $(V_{ce})_\theta$ = 10 V, $(I_c)_\theta$ = 500 mA. If the
       output current varies by ± 250 mA when an
       input signal is applied at the base,
       calculate maximum efficiency and overall
       efficiency.   6
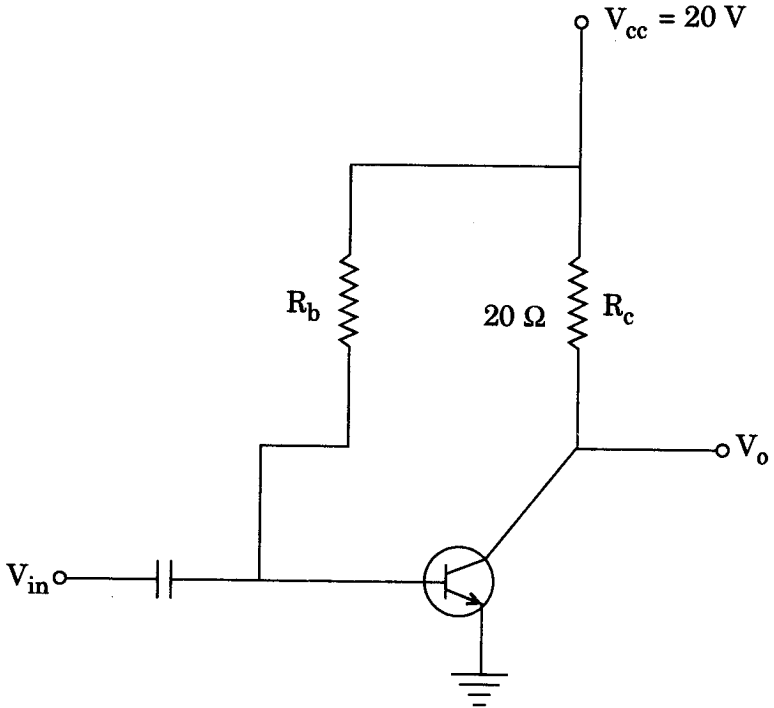
3. (a) With the help of circuit diagram, explain
         the working of FET as voltage variable
         resistor (VVR) and give its applications.   6

    (b) Explain   basic   construction   of   an
         enhancement type N-channel MOSFET.
         Draw and explain its static characteristics.
         How   is   the   threshold   voltage   of
         MOS-transistor adjusted ?   8

4. (a) Explain with a circuit diagram the operation of a single-tuned amplifier. Draw its AC equivalent circuit and find the expressions for voltage, gain and bandwidth. 7

(b) Explain the concept of feedback in amplifiers. What do you mean by positive and negative feedback ? 7

5. (a) Draw the circuit diagram of Colpitt's oscillator and explain its operation. What is the approximate frequency of oscillations ? 7

(b) What do you mean by clippers ? Draw and mention various kinds of clippers and explain any one. 7

6. (a) Explain with block diagram the working of bistable multivibrator. 7

(b) Describe the switching characteristics of a transistor. A rectangular pulse of voltage is applied to the base of a transistor. Explain various times that are involved in switching process. 7

7. (a) Draw the circuit diagram of UJT relaxation oscillator and explain its working. 7

(b) Explain the need for troubleshooting. Which approximations does the technician normally use when performing initial troubleshooting procedures and why ? 7

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

   (i)   Features of time base signals

   (ii)   Frequency stability of oscillators

   (iii)   Power Amplifiers

   (iv)   Clippers and Clampers

   (v)   Applications of Schmitt trigger

   (vi)   Troubleshooting and Testing