

DECVI/DELVI/DCSVI/ACECVI/ACELVI/
ACSVI

Term-End Examination

June, 2013

BIEL-027 : APPLIED ELECTRONICS

Time : 3 Hours

Maximum Marks : 70

Note : (1) First question is **compulsory** and attempt **any four**
out of remaining **seven** questions.

(2) Use of scientific calculator is allowed.

1. Attempt **all** subparts of followings : 2x7=14

(a) A common source FET amplifier provides :

- (i) High voltage gain and high input impedance
- (ii) High voltage gain and low input impedance
- (iii) Low voltage gain and high input impedance
- (iv) Low voltage gain and low input impedance

(b) A MOSFET can be used as a _____
resistance by connecting gate to drain
terminal.

- (c) By negative feedback, the non-linear distortion and effect of amplifier noise :
- (i) Reduced by factor $1/(1+T)$
 - (ii) Increased by factor $(1+T)$
 - (iii) Remain same
 - (iv) Can not say
- (d) If voltage gain of an amplifier without feedback is 200 and $\beta = 0.1$ then voltage gain of amplifier with negative feedback is _____.
- (e) The voltage gain of FET phase shift oscillator should be greater than _____.
- (f) The voltage gain for Wien bridge oscillator :
- (i) $A > 2$
 - (ii) $A > 3$
 - (iii) $A > 5$
 - (iv) $A > 7$
- (g) A class B push - pull amplifier can provide a maximum conversion efficiency of :
- (i) 50%
 - (ii) 25%
 - (iii) 78.5%
 - (iv) 90%

2. (a) Define r_d , g_m and μ . Derive a relationship between them. 8
- (b) Show that the transconductance, g_m of a JFET is related to the drain current I_{DS} by : 6

$$g_m = \frac{2}{|V_P|} \sqrt{I_{DSS} I_{DS}}$$

3. (a) Enumerate the effects of negative feedback on : 8
(i) Gain (ii) Frequency response
(iii) Input and output Impedances
- (b) Calculate the voltage gain, input and output impedances of a series - shunt feedback configuration having : 6
 $A_{v}/\text{open loop} = 300$
 $R_i = 1.5 \text{ k}\Omega$
 $R_o = 50 \text{ k}\Omega$
 $\beta = 1/15$
4. (a) Explain Barkhausen criterion for sustained oscillations. 6
- (b) Derive the condition of oscillation for the generalized oscillator having only reactive components. 8
5. Draw the circuit of Hartley and Colpitt's oscillator using BJT and derive the expression for the frequency of oscillation and condition on loop gain. 14
6. (a) Can we use small signal model of a transistor for power amplifier analysis ? Justify. 6
- (b) Determine the maximum conversion efficiency of a class A series feed and transformer coupled power amplifier. 8

7. (a) Explain working of Bistable multivibrator circuit with the help of circuit diagram and wave forms. 10
- (b) What do you mean by negative clamping ? 4
8. Attempt *any four* of the followings : 3.5x4=14
- (a) Harmonic and relaxation oscillators
- (b) Concept of cross over distortion
- (c) Combinational Clipper Circuit
- (d) Applications of time-base generators
- (e) Advantages of negative feedback in amplifiers.
- (f) Single tuned amplifier
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