* R M - 6 4 6 7 / 3 0 0 *

RM-6467

B. E. - II (Sem. IV) (Comp) Examination

May / June – 2010

Linear Electronics - II

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 2 (Sem. 4) (Comp)**

Name of the Subject :

☛ **Linear Electronics - 2**

☛Subject Code No. : **6 4 6 7** ☛Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Attempt **all** the questions.
(3) Assume suitable data whenever necessary.
(4) Figures to right indicate full marks.
(5) Use of scientific calculator casio fx 82, 83, 100 or equivalent of any compulsory.
(6) Answers to the two section must be written in separate answer books.

SECTION - I

1 (a) Attempt all questions: **10**

(i) The threshold voltage of an n-channel MOSFET can be increased by :
(a) increasing channel dopant concentration
(b) reducing the channel dopant concentration
(c) None of above

(ii) The main factor, which differentiates a D-MOSFET from E-MOSFET is the absence of :
(a) PN junction (b) electrons
(c) insulated gate (d) Channel

(iii) For a junction FET in the pinch off region, as the drain voltage is increased, the drain current
(a) becomes zero (b) abruptly decrease
(c) remains constant

(iv) _____ amplifier is used for radio frequency transmission.
(a) Class A (b) Class B
(c) Class C

(v) Which power amplifier doesn't require output transformer in its working?

(vi) In low frequency band which capacitors are important?

(vii) For voltage sampling what is the value of V_o to draw input circuit in any feedback amplifier.

(viii) The feedback signal is transmitted to input from the output through Block.

(a) True (b) False

(ix) Efficiency of Class C amplifier is 33%.

(a) True (b) False

(x) In a feedback amplifier desensitivity equals :

(a) $A\beta$ (b) $1/A\beta$

(c) $1+A\beta$

(b) Mention general characteristics of negative feedback amplifier. **2**

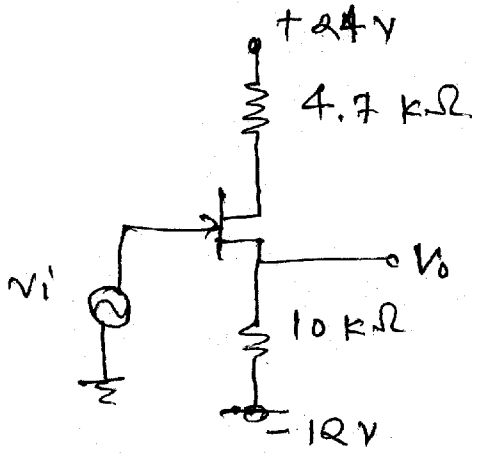
(c) What are the limitations of basic amplifier compared to negative feedback amplifier? **2**

(d) "F.E.T. is symmetrical". Justify the statement. State the advantages of FET over BJT. **6**

2 (a) The JFET shown in figure hus I_{po} = 5.6 mA V_{po} = –4 V. **7**

(i) Find V_o if V_i = 0V

(ii) Find V_i if V_o = 0V



(b) For transistor coupled class A power amplifier. max power of 5W is to deliver to the load with $R_L = 4\ \Omega$. The Q point is adjusted for Max. symmetrical swing and V_{CC} = 20V. Find the turns ratio N, peak collector I_{cm}, efficiency η. **8**

OR

2 (a) Obtain expression for all power calculation of transformer coupled class A amplifier. 8

(b) Justify, negative feedback increases the stability of amplifier. 7

3 Attempt any **three** : 15

(i) Explain the operation of Metal-oxide semiconductor FET and hence draw its characteristics.

(ii) Explain effect of an emitter bypass capacitor on low-frequency response of RC-coupled amplifier.

(iii) Draw the equivalent circuit for a voltage amplifier what are the values of R_i and R_o.

(iv) Advantages and disadvantages of negative feedback amplifier.

(v) Explain working of class C amplifier.

SECTION - II

4 (a) Attempt following : 10

(i) The amount of output offset voltage due to input bias current can be significantly reduced by _____.

(ii) The CMRR is ratio of _____.

(iii) The input resistance of op-amp 741 C is_____.

(iv) The ideal op-amp have _____ slew rate.

(v) To reset the 555 timer we require _____ pulse on pin no._____.

(vi) Astable multivibrator often called_____.

(vii) Peak-detector measure _____ of the square wave input.

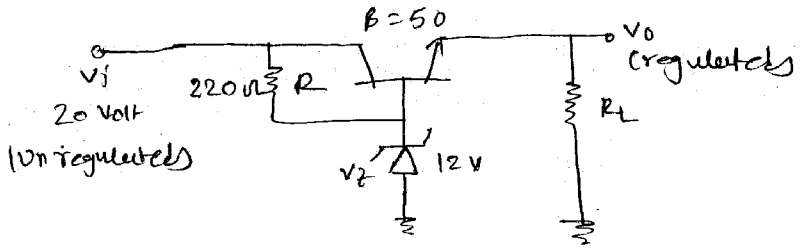
(viii) Linear power supply having _____ power factor.

(ix) A typical value for input offset current for an op.amp is _____.

(x) Calculate the output voltage of a non-inverting amp for value of V_1 = 2 volt, $R_f = 500\ k\Omega$ and $R_1 = 100\ k\Omega$.

(b) Explain 555 as an Astable Multivibrator. 6

(c) Calculate the output voltage and zener current in circuit given below for $R_L = 1\ k\Omega$. 4



5 (a) Design off-set voltage compensating network. 8

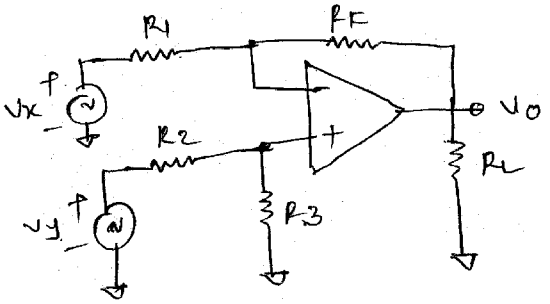
(b) Design the phase-shift oscillator such that F_o = 200 Hz. 4

(c) In the circuit of differentiator given below 3

$R_1 = R_2 = 1\ k\Omega$, $R_F = R_3 = 10\ k\Omega$ and op-amp is 741 C.

(i) What are the gain and input resistance of the amplifier.

(ii) Calculate the output voltage V_o if V_x = 2.7 V_{pp} and V_y = 3 V_{pp}. sine wave at 100 Hz.



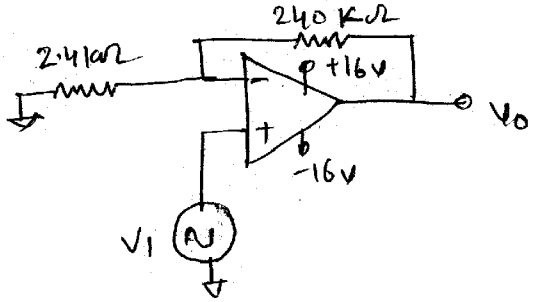
R1 = R2

RF = R3

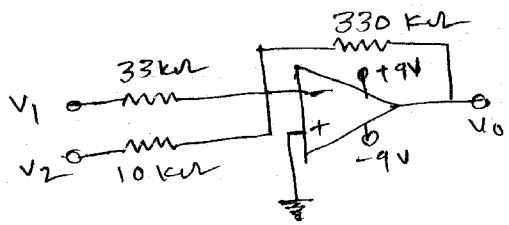
OR

5 (a) Write short note on differentiator; also draw the frequency response and effect of differentiator on different waves like sine, square. 8

(b) Calculate the output voltage from the circuit of fig. below for an input of 120 μ volt. 3



(c) Calculate the output voltage for the circuit of fig. below. The inputs are V_1 = 50 mV sin (1000 t) and V_2 = 10 mV sin (3000 t). 4



6 Attempt following (any **three**) 15

(a) Design op-amp as an integrator

(b) Write short note on phase-shift oscillator

(c) Design first-order low-pass butterworth filter.

(d) Explain series voltage regulation.