B.Tech. SEM -IV Electronics / Bio Medical 2014 Course (CBCS) :
WINTER - 2018
SUBJECT: ELECTRONIC CIRCUITS AND APPLICATIONS

Day: Wednesday | **W-2018-2348** | Time: 02.30 PM TO 05.30 PM
Date: 14/11/2018 | Max Marks. 60

N.B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat diagrams **WHEREVER** necessary.
4) Use of scientific calculator is **ALLOWED**.

Q.1 Draw and describe the CE-CE cascade amplifier circuit and derive expressions for voltage gain, current gain, input impedance and output impedance. **(10)**

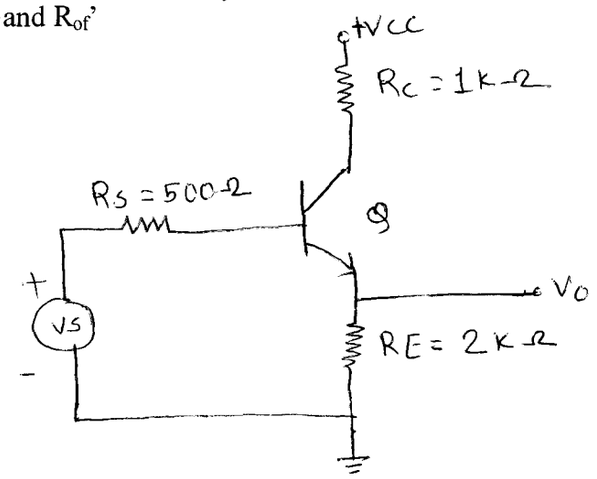
OR

Q.1 Describe the bootstrapped Darlington amplifier with circuit diagram. Why Darlington connection is not preferable for more than two stages. **(10)**

Q.2 Describe with necessary derivations, the effect of negative feedback on the bandwidth, gain stability and distortion in an amplifier. **(10)**

OR

Q.2 In the BJT emitter follower circuit shown in the figure, the h parameter values for transistors are h_{fe}=100, h_{ie}=1.1 kΩ and h_{re}=h_{oe}=0. Calculate A_{vf}, R_{if}, R_{of} and R_{of}' **(10)**



Q.3 Draw circuit diagram of class A power amplifier with: **(10)**

i) Resistive load (series fed)
ii) Transformer coupled load

Also derive expressions for their maximum efficiency.

OR

Q.3 A class B push pull amplifier has V_{cc} =50V, the collector voltage swigs from V_{cc} down to 10V with input signal. If the transistors used as maximum power dissipation rating of 20W. Calculate: **(10)**

i) The load presented by the output transformer
ii) Power output
iii) D. C. power input
iv) Efficiency of collector circuit
v) Power delivered to the load if the transformer efficiency is 85%.

P.T.O.

Q.4 Draw the circuit diagram of Hartley oscillator and describe its working. Derive the expressions for frequency of oscillation and condition for starting oscillation. **(10)**

OR

Q.4 a) In colpitts oscillator, the frequency of oscillations is observed to be 2.5MHz. Oscillator uses L=15mH, C_1=0.02μF. **(06)**

Find :

i) Value of C_2 **ii)** If L is doubled, new value of frequency of oscillations.

b) A crystal has the following parameters: **(04)**

L = 10mH, C = 0.02pF, R = 5.5KΩ, C_M = 12pF.

i) Find series resonant frequency.

ii) By what percentage does parallel resonant frequency exceed series resonant frequency?

Q.5 Draw the circuit diagram of feedback type transistorized series regulator with foldback type of current limiting facility and describe its operation. **(10)**

OR

Q.5 The emitter follower regulator is to supply a load current of 600 mA at 10V. The unregulated dc supply varies from 18V to 22V. Use a zener diode of V_Z=13V which requires minimum bias current of 4mA for stable operation. The series pass transistor has parameters as given below: **(10)**

$hfe = 50,\ V_{BE} = 0.7V\ \ hie = 100\Omega$ and $\frac{dv_z}{dI_z} = 20\,\Omega$

Determine:

i) Value of zener bias resistor R_b

ii) The wattage of R_b

iii) Power dissipation rating of zener

iv) Power dissipation rating of transistor

Q.6 For a single stage CE amplifier at high frequencies derive the expression for current gain with short circuit load. Define f_β and f_T. What is the relationship between f_β and f_T. **(10)**

OR

Q.6 For a BJT amplifier the following parameters are known: **(10)**

$r_{b'c}$ = 2MΩ, r_{ce}=80KΩ, $C_{b'e}$=200pF, $C_{b'c}$=3pF,f_T=40MHz, T=300^{0}K, I_{CQ} =4mA $r_{bb'}$=200Ω, $r_{b'e}$=2KΩ

Obtain the h parameters if K=1.381×10^{-23}J/^{0} K and q = 1.6×10^{-19}C.

* * *