Total No. of Pages 02 *Roll No. .....*

FOURTH SEMESTER **B.Tech. (EC)**

MID SEMESTER EXAMINATION ***March-2019***

EC202 ANALOG ELECTRONICS

Time: 1:30 Hours ***Max. Marks: 20***

Note: Answer all questions. Assume suitable missing data, if any.

1 **(a)** A CE amplifier having load resistance R_L= 2 kΩ, C_π = 100 fF, C_μ = 20 fF, β_0 =100 is biased at 1mA.Using Miller theorem derive the expression for input impedance and compute the value of resistance and capacitance at the input of the transistor. **2**

(b) For the circuit shown in **Fig.1** derive the voltage transfer function $\frac{V_L(s)}{V_S(s)}$ and draw Bode magnitude and phase plots if L=1 mH and R =1 kΩ. **3**

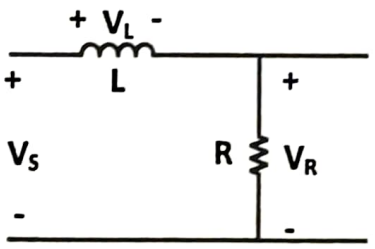

Fig.1

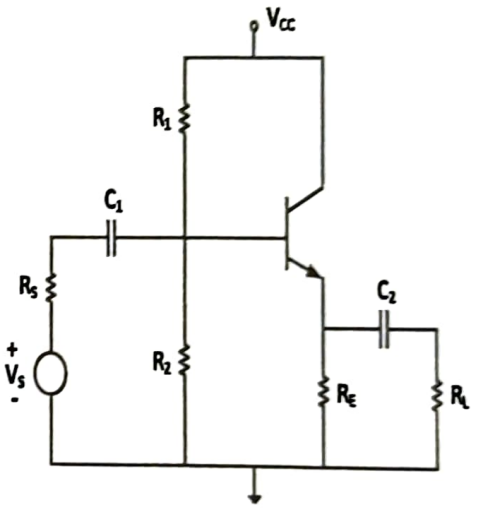

Fig.2

2 **(a)** For the amplifier circuit shown in **Fig.2** derive the expression for lower cut off frequency. **3**

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(b) An amplifier with mid-band gain of 200 and high frequency poles at 50 KHz and 4 MHz is connected in negative feedback loop with $\beta = 0.02$. Calculate the closed loop gain and the upper cutoff frequency of the feedback amplifier. 2

3 Determine the upper cut off frequency for the cascaded amplifier shown in **Fig.3** assuming dominant pole approximation is valid. Given that $C_{gs1} = C_{gs2} = 250$ fF, $C_{gd1} = C_{gd2} = 80$ fF, $C_{db1} = C_{db2} = 100$ fF; Rs $= 200\Omega$, $R_L = 2k\Omega$, $g_m = 150$ S. Consider $\lambda = 0$. 5

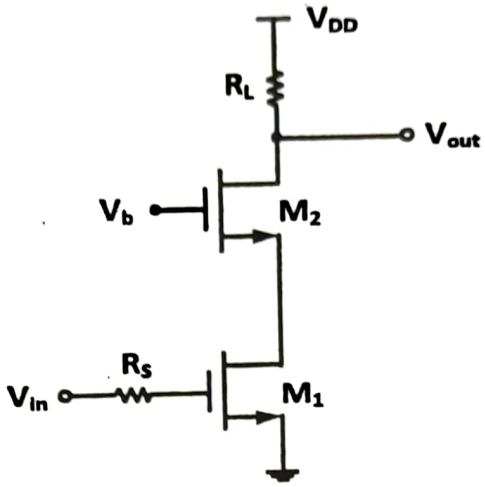

Fig.3

4 **(a)** Derive the expression for input impedance of a series-series negative feedback amplifier. 2

(b) Derive relation for the transit frequency (f_T) of a MOSFET. If the minimum channel length of MOSFET is scaled from 1µm to 65nm then the overdrive voltage reduces from 400mV to 100 mV due to inevitable reduction in power supply. By what factor the f_T of MOSFET increases? 3

End