**Roll No. ……………………………………………………………**

**NEELKANTH INSTITUTE OF TECHNOLOGY**

**B.Tech ECE (Semester IV)**

**SECOND SESSIONAL EXAMINATION 2014-2015**

**ELECTRONICS CIRCUITS (NEC-402)**

***Time: 1:30 Hours Total Marks 60***

***NOTE: - i.*** *be precise in your Answer*

***ii.*** *All section are compulsory*

**SECTION A**

1. **Attempt all the Questions: 2X10=20**
2. Non-ideal OPM respond to both differential and common mode component of their input signal thus output voltage of the OPM can be expressed as
3. None
4. OPM effectiveness in rejecting common mode signal is measured by its CMRR defined as
5. None of these
6. For the ideal OPM given below find the voltage gain \_\_\_\_\_\_
7. For the ideal OPM given below find the voltage gain \_\_\_\_\_\_
8. For the ideal OPM given below find the voltage gain \_\_\_\_\_\_
9. Internal capacitor of the MOSFET cause the gain of the amplifier to fall off at \_\_\_\_\_\_\_\_.
10. High frequency
11. Low frequency
12. Mid frequency
13. None of these
14. In saturation mode MOSFET behave as
15. VCVS
16. VCCS
17. CCCS
18. CCVS
19. In common source amplifier, source resistance provide
20. Positive feedback
21. Stability
22. Negative feedback
23. High stability factor
24. In a particular n-channel enhancement MOSFET it measured to have drain current 4 mA at Vgs=Vds=5V and 1 mA at Vgs=Vds=3V. What are the value of K(W/L) and Vt.\_\_\_\_\_\_\_\_\_\_
25. 0.6 mA/V2, 1.1V
26. 0.5 mA/V2, 1V
27. 0.49 mA/V2, 0.9V
28. None of these
29. Draw Trans-conductance curve for the circuit shown below

**SECTION B**

1. **Attempt any Four Question : 5X4=20**
2. The inverting network with T-network in the feedback is redrawn in figure given below in such a way that R2 and R3 in effect are in parallel (because the ideal Opm forces a virtual ground at input terminal) use this observation to derive an expression for the gain (Vo/Vi) by finding **(Vx/Vi) & (Vo/Vx).**
3. Determine the low frequency gain or transfer function of the common source amplifier and compare the CS CG & CD configuration.
4. Determine the high frequency gain or transfer function of the common emitter amplifier and compare the CE CB & CC configuration.
5. Determine the mid-band gain of the common emitter amplifier with emitter resistance and I/O impedance.
6. Derive an expression for the Id of MOSFET & draw the Id-Vds and Id-Vgs curve. Also determine the trans-conductance.
7. Write down the various current component in BJT, draw the profile of minority carrier concentration and list only the expression for the gain of common base amplifier, I/O resistance.

**SECTION C**

1. **Attempt any Two Questions: 10X2=20**
2. Write a short note on
3. BJT internal capacitance
4. Derive an expression for fT in MOSFET and compare the trans-conductance of BJT and MOSFET.
5. How to bias MOSFET as a switch and as an amplifier. The CS amplifier bias to operate at Id=1mA and gm=1mA/V. neglect the channel length modulation find the mid-band gain. Find the value of Cs that places fl at 10Hz. RD =10k-Ohm.
6. A MOSFET CS amplifier has RG=2M-ohm gm= 4mA/V2  ro=100k-ohm, RD=10K-ohm, Cgs=2pf & Cgd=0.5pf. The amplifier is fed from a voltage source with internal resistance of 500k-ohm and connected to 10k-ohm load. Find
7. Overall mid-band gain
8. The upper 3-db frequency fh