FIRST SEMESTE EXAMINATION-2004

BASIC ELECTRONICS

Answer question no-1 which is compulsory and any 5 from rest

1. Answer the following question   2x10
a. Which of the following are available as IC? CE Amplifier, Operatioal Amplifier, NAND gates, Flip Flops
b. What is doping insemiconductors?
c. If the reverse bias of a p-n junction is increased what happens to the depletion layer?
d. Ebers-Moll model is used for what purpose?
e. What are the two reasons of greatest impact of enhancement-type MOSFETs in digital circuiits?
f. What is the effect of negative feedback on the voltage gain and distortion inan amplifier ?
g. If the CMRR of an opamp is 60dB and the common mode gain is -0.5 what is the differential made gain of the opamp ?
h. How many flip-flops are needed in modulo-39 counter ?
i. The envelope detector for AM signal consists of three components . Name them.
j. What is the need of time base in an oscilloscope?

2.a. How does barrier potential affect the diffusion and drift currents in a p-n junction diode?   4
  b. Afull-wave rectifier circuit is fed from a transformer whose secondary is center-tapped with a line-to-line voltage of 60 V_{rms}. Assuming the total resistance of diode and half of the transformer secondary winding to be 10Ω and load resistance to be 1000Ω, determine no-load dc voltage and dc power delivered to load.   6
3.a. A MOSFET has the transconductance curve shown in *Fig.1* .If it is used in the circuit shown in *Fig.2* what is the dc voltage from drain to ground?   4
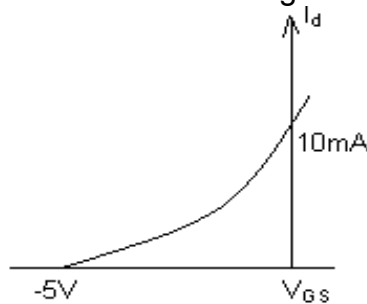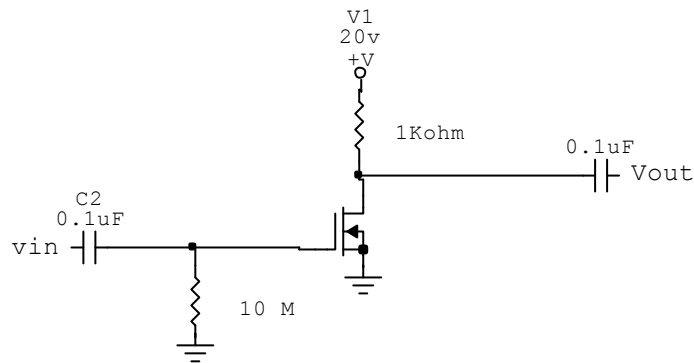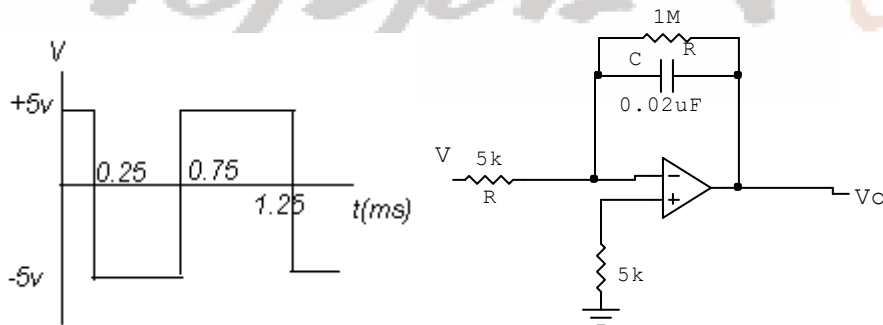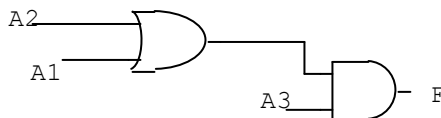

Fig.1

Fig. 2

  b. Draw the circuit diagram of a grounded emitter amplifier using voltage divider bias .Draw its ac load line and Q point in the characterstic . why do you get phase inversion between output and input voltage in such circuit?   6

4. a. Draw the circuit diagram of a CMOS inverter and explain its working .   5

  b. An amplifier gain changes by ±10% . Using negative feedback the amplifier is to be modified to yield a gain of 100 with ±0.1% variation . Find the required open-loop gain of the amplifier and the amount of feedback.   5

5. a. Avoltage follower is circuit which has gain one and there is no phase inversion or change. Draw the circuit diagram of voltage follower opamp and explain why the gain 1 and there is nophase change.   5

  b. Sketch the utput waveform of the following circuit: 5

6. a. Draw a truth table for the following logic circuit: 5

  b. Draw the circuit diagram of a mod-10 ripple counter using T-flip-flops.   5

7. a. Draw the circuit diagram of an amplitude modulator.   5

  b. An AM transmitter radiates 4kW with an unmodulated carrier and 5kW when it is amplitude modulated . Calculate the percentage of modulation.   5

     Question by vgyan.com

8.   Write short note on :   5x2
     a. Displaying a waveform in oscilloscope
     b. Principle of operation of fiber optics system.

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