Question Paper

Exam Date & Time: 02-Dec-2023 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV/DEC 2023

ELECTRONICS CIRCUITS [BME 2122]

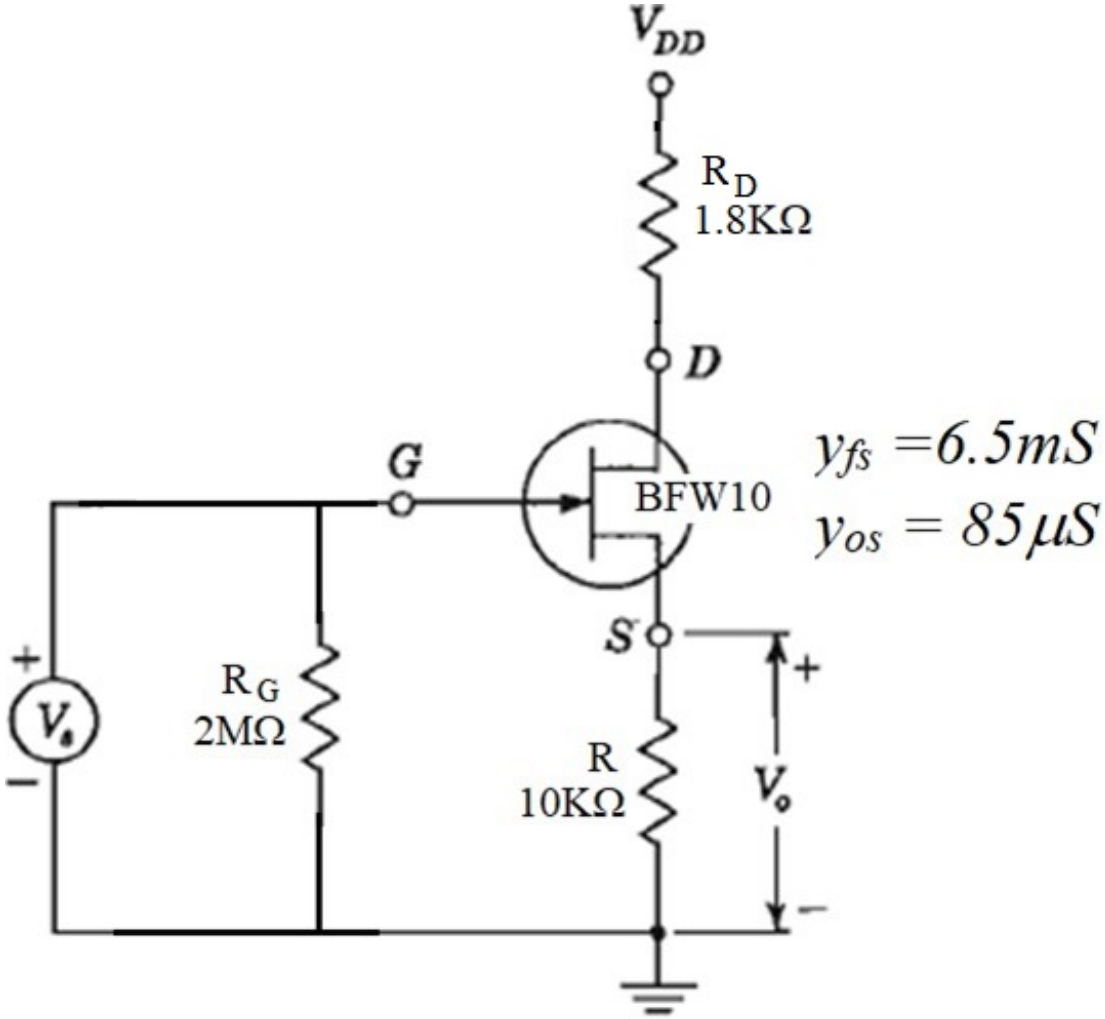
Marks: 50 **Duration: 180 mins.**

Answer all the questions.

Missing data may be suitably assumed

1) Analyze the amplifier circuit shown below for voltage gain and output resistance ignoring load resistance. (4)

A)



B) Modify a common source JFET amplifier in to a sinusoidal oscillator using RC network, and explain the operation of the oscillator. (3)

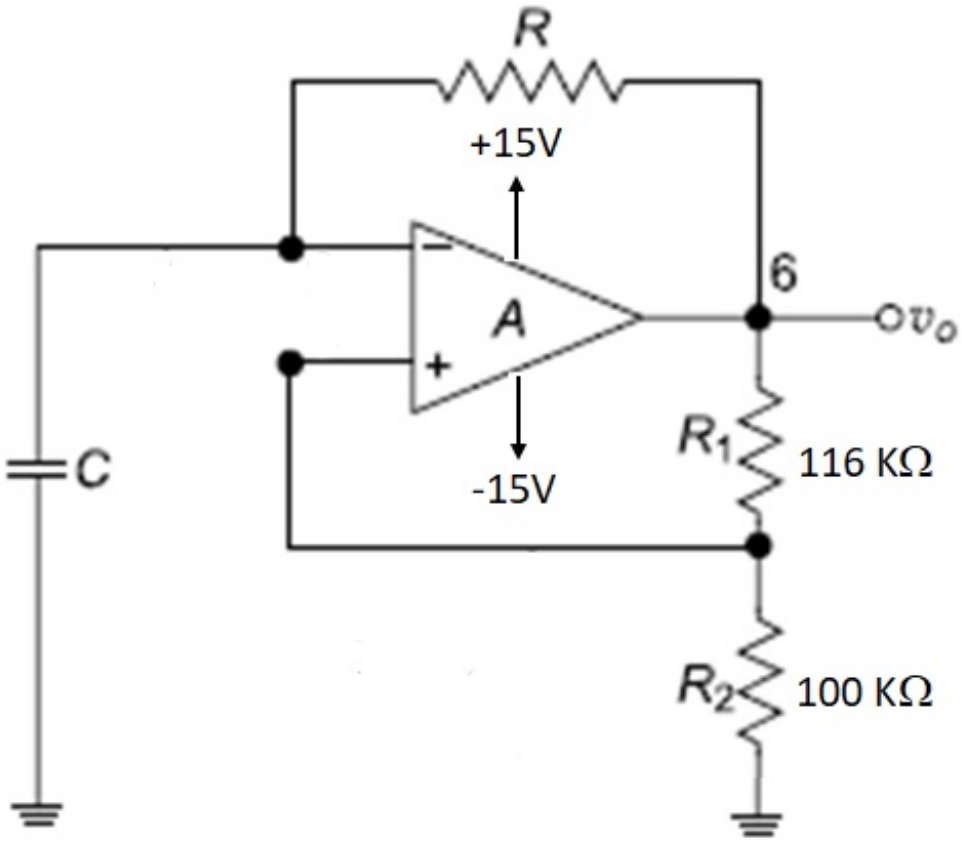
C) Develop a zero-cross detector using an Op-amp and explain its operation. (3)

2) Develop a negative edge triggered monostable multivibrator using an Op-amp and derive an expression for pulse width. (4)

A)

B) How do you make use of an Op-amp for generating timing marker signals? Explain. (3)

C) For the circuit shown below, compute (3)
(i) The time constant required to produce an output of frequency 2 KHz.
(ii) The value of R required when C=0.01μF.



3) How do you employ successive approximation technique and a DAC to convert an analog signal in to digital signal? Explain. (4)

A)

B) Design an 8-bit R-2R ladder DAC such that the full-scale output is 10V. Assume a reference voltage of 5V. Draw the circuit diagram for the designed DAC. (3)

C) Modify a 555 timer astable multivibrator designed to produce a square wave output of 1 KHz with 50% duty cycle in to a voltage controlled oscillator. Draw the necessary waveforms. And write where you can make use of your design? (3)

4) A medical device requires a regulated power supply with the following specifications. (5)
(i) V_O = 10V.

A) (ii) Load current = 400 mA.
Design a regulated power supply using IC7805 for the above specifications. Assume a quiescent current of 4 mA.

B) How do you make use of a 555 timer astable mutlivibrator as a Schmitt trigger? Explain in detail. (3)

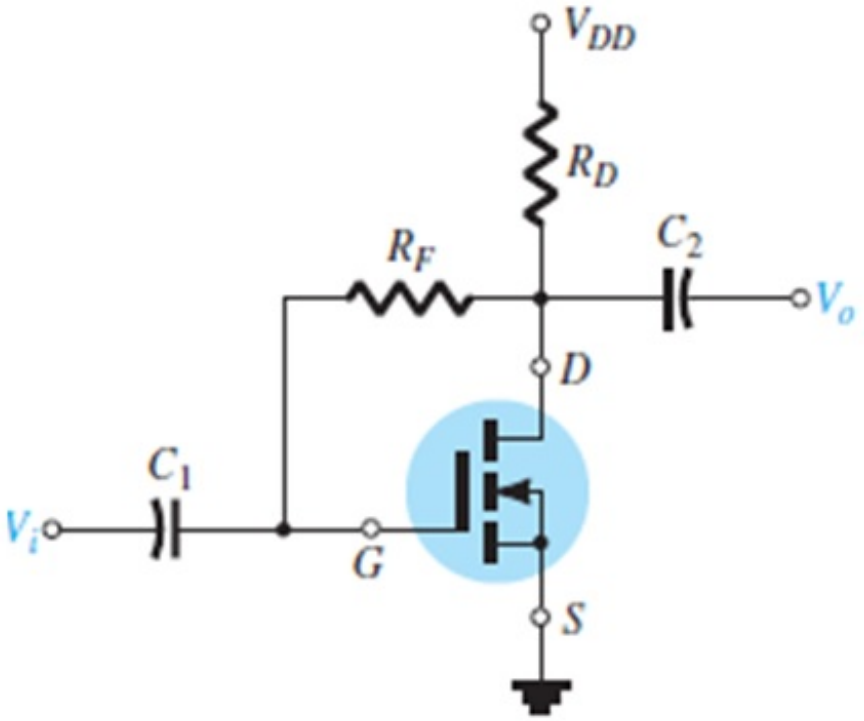
C) Construct a -5V regulator using a suitable regulator IC and explain its operation. (2)

5) Design a IC 555 timer based astable multivibrator to generate an output of frequency 1 KHz with 75% duty cycle and amplitude 5V. Assume a capacitor of value 0.1μF. (4)

A)

B) How do you make use of IC 555 timer astable mutlivibrator to generate free-running ramp signal? Explain. (4)

C) Develop a small signal a.c equivalent circuit for the amplifier circuit shown below. (2)



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