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S.E. (Electronics & TC / Electronics & Comm. Engg) (Sem-IV) (Revised Course 2016-2017)
EXAMINATION MAY/JUNE 2019
Electronics Devices and Circuits - II

[Duration : Three Hours]

[Max. Marks : 100]

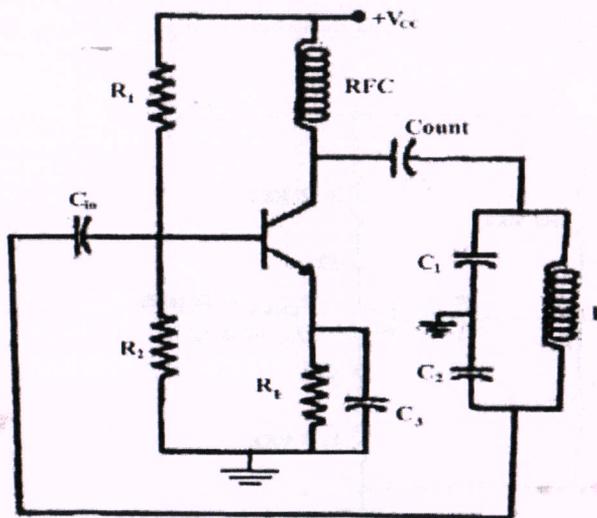
Instructions:

- i) Answer Any Five questions by selecting Two questions from Part – A, Two questions From Part – B and One question from Part –C.
- ii) Assume missing data if any with proper justification.
- iii) Notations used have usual meaning.
- iv) Illustrate with neat circuit diagrams/ Characteristics where appropriate.
- v) Figure to right indicate full marks.

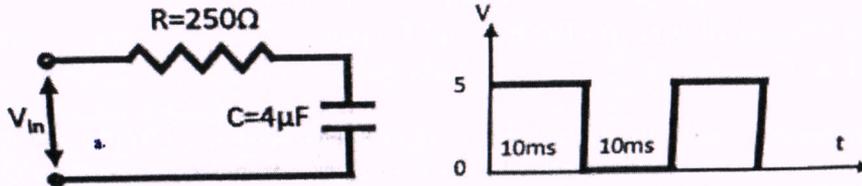
PART A

Answer any TWO questions from the following:

- Q.1
- a) Sketch the four basic topologies used in feedback amplifiers. Summarize the following 10 parameters for the various configurations;
 - i) Gain without feedback
 - ii) Gain with feedback
 - iii) Feedback factor β
 - b) With the help of a neat circuit diagram, explain the operation of a Transistorized 3 stage RC phase shift oscillator. Calculate the frequency of oscillations for the circuit if $R_1 = R_2 = R_3 = 800k\Omega$ and $C_1 = C_2 = C_3 = 100pF$ 06
 - c) For the Colpitt's Oscillator operating at 528 KHz shown below, if $L_{RFC} = 0.6 mH$, $C_1 = 0.001 \mu F$, $C_2 = 0.01 \mu F$, and $C_{in} = 10 \mu F$, Determine (i) Inductance of the tank circuit (ii) Feedback fraction β . 04



- Q.2 a) For the circuit and the input depicted in the figure below, find the output voltage level 10ms, 25ms, 40ms. 06



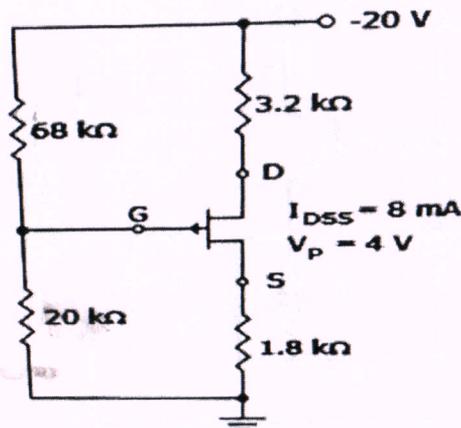
- b) Explain the working of BJT Schmitt Trigger circuit with a neat circuit diagram and waveforms. 06
- c) Design an Astable Multivibrator using BJT to generate a square wave of 1.4 KHz having a duty cycle of 60%. Given: $V_{CC} = 12V$, $I_C = 5mA$. Assume $h_{fe} = 20$. Draw the designed circuit. 08

- Q.3 a) With suitable mathematical expressions, explain the effect of negative feedback on; 06
- i) Gain Stability
 - ii) Nonlinear Distortion
 - iii) Bandwidth
 - iv) Input and Output Impedances
 - v) Noise
- b) Write a short note on 08
- i) Nyquist Criteria for stability
 - ii) Junction and Diffusion Capacitance
- c) Explain the working of a Hartley Oscillator using BJT. With $L_1 = 1000\mu H$, $L_2 = 100\mu H$, $M = 20\mu H$ and $C = 20pF$, calculate the operating frequency of the circuit. 06

PART B

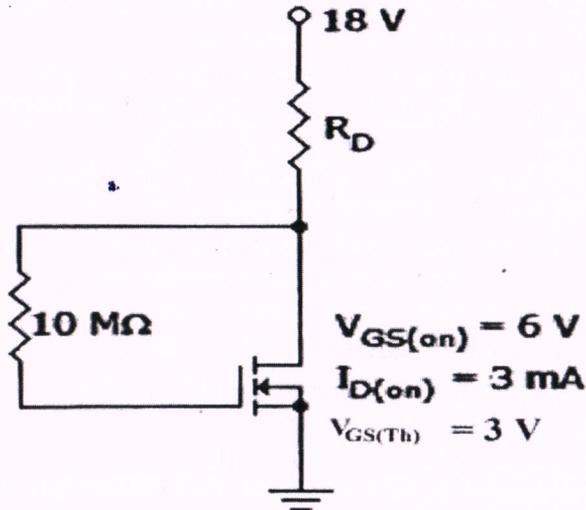
Answer any TWO questions from the following:

- Q.4 a) For the circuit shown in figure, calculate i) I_{DSQ} , ii) V_{GSQ} and V_{DSQ} . 07



- b) For the circuit shown in figure below, calculate the value of R_D .

06



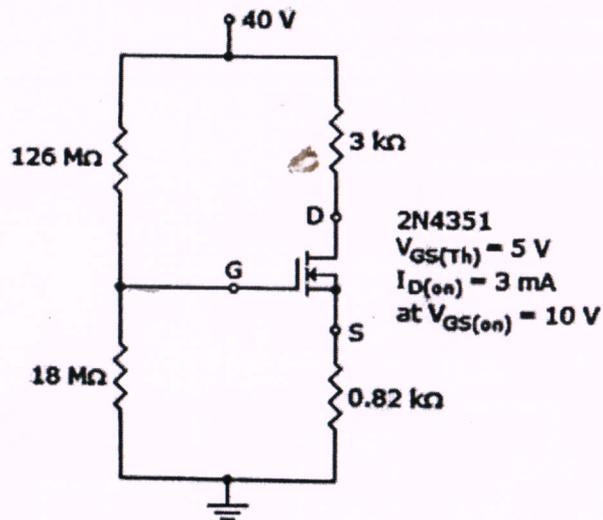
- c) With neat circuit diagrams, explain the analysis of JFET self-bias circuit and obtain expressions for various voltages.

07

Q.5

- a) For the circuit shown in figure below, Calculate the value of V_G , I_D , V_{DS} , V_{GS} .

08



- b) Write short note on MOSFET sampling gate.
 c) What are the major components of CRO? Why are the operating voltages in a CRT arranged so that the deflection plates are nearly at ground potential?

06

06

Q.6

- a) Write short notes on:
 i) LED
 ii) LCD
 iii) Power Diode
 b) Describe the various Turn-on methods of SCR with the help of forward characteristics.

5×3=15

05

PART C

Answer any ONE questions from the following:

- Q.7
- a) With suitable mathematical expressions and waveforms, explain how can pulse width and RC Time constant affect the working of a RC differentiator circuit? What is the ideal design for a differentiator? **06**
 - b) Using a suitable circuit diagram, explain the circuit operation of a monostable multivibrator. **06**
 - c) Using mathematical analysis, state the effects of negative feedback on input and output impedance in a voltage series configuration? **08**
- Q.8
- a) Explain in brief Transistor bootstrap ramp generator. **07**
 - b) Give the construction and characteristics of PUT. Draw the circuit and explain the working of PUT relaxation oscillator. Draw the waveforms. **07**
 - c) Explain as to how a phototransistor is different from Solar cells. **06**