

K21P 0542

Reg. No. :

Name :

**First Semester M.Sc. Degree (CBSS – Reg./Suppl. (Including Mercy
Chance)/Imp.) Examination, October 2020
(2014 Admission Onwards)**

PHYSICS

PHY 1C04 : Electronics

Time : 3 Hours

Max. Marks : 60

SECTION – A

(Answer **both** questions (either **a** or **b**))

1. a) Explain with circuit diagram the closed loop op-amp configuration with voltage series feedback. Derive the expressions for its input resistance and output resistance.

OR

- b) With necessary circuit diagram, input and output waveforms explain the working of an integrator. Also deduce the expression for its output voltage.
2. a) Explain with circuit diagram and output waveforms the working of a triangular wave generator. Deduce the expression for its frequency.

OR

- b) Explain with block diagram the conversion of flip flops. With conversion table, K map and logic diagram explain the conversion of

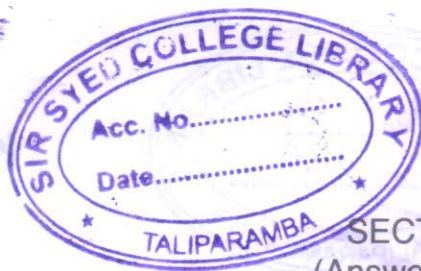
a) SR flip flop to JK flip flop

b) D flip flop to SR flip flop

c) D flip flop to JK flip flop.

(2×12=24)

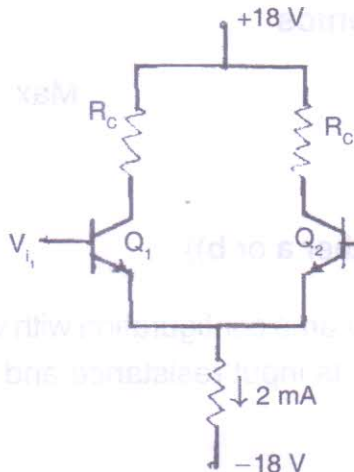
P.T.O.



SECTION – B
(Answer any four)

(1 mark for Part a, 3 marks for Part b, 5 marks for Part c)

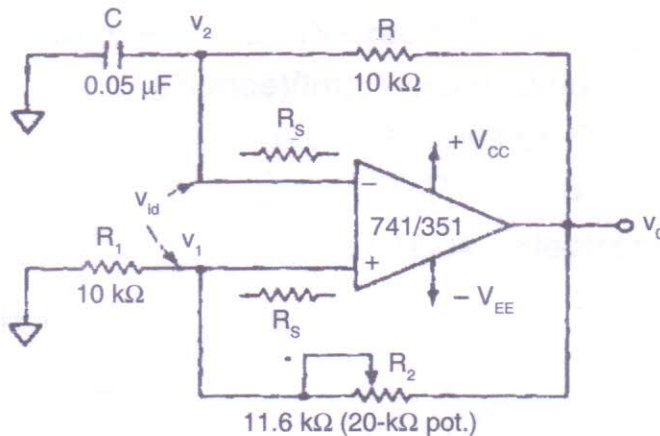
3. a) What is an op-amp ?
 b) Calculate the dc bias values of I_C and V_C for an amplifier with $R_C = 18 \text{ k}\Omega$, $V_{CC} = +18 \text{ V}$, $V_{EE} = -18 \text{ V}$, $V_{BE} = 0.7 \text{ V}$ and current flowing through $R_E = 2 \text{ mA}$.



- c) Explain with circuit diagram the differential amplifier using transistors and hence obtain the conditions for DC bias.
4. a) What is supply voltage rejection ratio ?
 b) An op-amp has a slew rate of 35 V/ms . How long will it take the output to change from 0 to 15 V ?
 c) Explain with circuit diagram the working of an open loop op-amp in inverting amplifier configuration.
5. a) What are the important characteristics of a comparator ?
 b) If $R = 15.9 \text{ k}\Omega$ and $C = 0.01 \mu\text{F}$ for a Butterworth first order low pass filter, using frequency scaling technique obtain the value of resistance to be used to convert frequency of the filter from 1 kHz to 1.6 kHz .
 c) Explain with circuit diagram the conversion of a triangular wave generator into a sawtooth wave generator.



6. a) What do you mean by a zero crossing detector ?
b) Calculate the frequency of the following square wave generator.



- c) Explain with a suitable figure the different registers in 8085 microprocessor.
7. a) What is EPROM ?
b) Explain with a functional diagram the working of a Demultiplexer.
c) Explain with logic diagram the working of a parallel in serial out shift register.
8. a) What do you mean by toggling ?
b) Distinguish between synchronous and asynchronous counters.
c) Explain with circuit diagram and waveform the working of monostable multivibrator using 555 Timer. **(4×9=36)**