Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16
(Autonomous)
End Semester Examination: MAR / APR 2025
Faculty: Science and Technology

Program: B.Sc. (Gen03) **Semester: VI** **SET: A**
Program (Specific): General B.Sc. **Course Type: DSC**
Class: T.Y.B.Sc. **Max. Marks: 35**
Name of the Course: Electronics
Course Code: 24-PHY-365 **Time: 2Hr**
Paper: V

Instructions to the candidate:

1) *All Questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw a well labeled diagram wherever necessary.*
4) *Use of a scientific calculator and log table is allowed.*

Q1) Answer the following: **5**

i) Draw opto-coupler circuit.
ii) Define duty cycle.
iii) Draw symbols of N and P-channel JFET.
iv) Draw circuit diagram of integrator.
v) What is meant by monostable multivibrator?

Q2) Answer the following (Any four): **4**

i) What do you mean by SOP?
ii) Draw a circuit of half adder.
iii) What do you mean by multiplexer?
iv) What is shift register?
v) State unit of trans-conductance.
vi) Draw logic diagram of R-S flip-flop with NAND gates.

Q3) Answer the following (Any four): **8**

i) When a reverse gate voltage of 20 V is applied to a FET, the gate current is 10^{-3} μA. Find the resistance between gate and source.

ii) A JFET has V_p = 5V and I_{DSS} = 100 mA. What is ohmic resistance? What is the gate source cut-off voltage?

iii) The adjustable resistor of fig. (a) sets both emitter diodes on the verge of conduction. What is the maximum transistor power dissipation and the maximum output power?

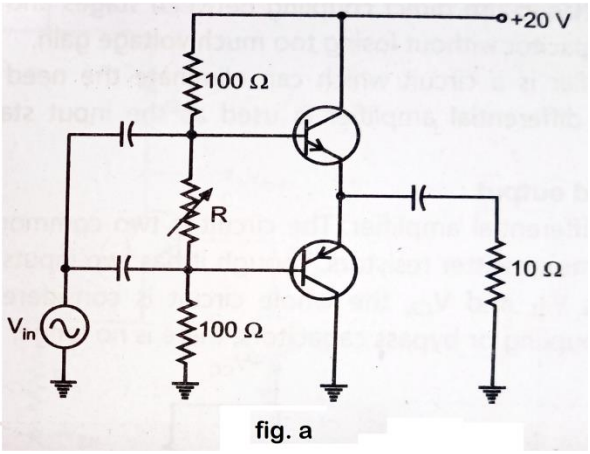

fig. a

iv) A 5-bit asynchronous counter begins with 00000 state. What will be the state of a counter after 80 input pulses?

v) Convert Y= AB + A$\overline{B}$C into standard SOP form.

vi) Draw circuit diagram of astable multivibrator.

Q4) Answer the following (Any two): 8

i) Explain seven segment display with circuit diagram.

ii) Explain the working of class B push-pull emitter follower.

iii) Draw circuit diagram for differentiator using op-amp. Derive the expression for it.

iv) Determine the frequency of oscillation for the astable multivibrator using IC555. Given data is R_A =R_B =10kΩ and C = 0.01μF.

Q5) Answer the following (Any two): 10

i) Using K- map technique minimise the following logical expression in the SOP form
Y = $\overline{A}$ B $\overline{C}$ $\overline{D}$ + A B $\overline{C}$ $\overline{D}$ + $\overline{A}$ B $\overline{C}$ D + A B $\overline{C}$ D.

ii) Draw a circuit diagram of a 4-bit SIPO shift register. Explain its working.

iii) Explain the working principle of JFET.

iv) Explain working of a 4-bit synchronous counter using a diagram.

--------x-------