

**2 0 1 5**

( 3rd Semester )

**ELECTRONICS**

THIRD PAPER

( **Electronic Devices and Amplifiers** )

( PART : A—OBJECTIVE )

( Marks : 20 )

*The figures in the margin indicate full marks for the questions*

SECTION—I

( Marks : 5 )

Put a Tick (✓) mark against the correct answer in the brackets provided : 1×5=5

1. The intrinsic stand-off ratio of a UJT lies between

(a) 0.15 and 0.82 ( )

(b) 0.15 and 0.28 ( )

(c) 0.51 and 0.82 ( )

(d) 0.28 and 0.51 ( )

2. The control element in an SCR is

- (a) cathode ( )
- (b) anode ( )
- (c) cathode supply ( )
- (d) gate ( )

3. The advantage of using transistor in transistor series regulator is

- (a) it behaves like a variable resistor ( )
- (b) its high amplification property ( )
- (c) it reduces Zener current by a factor  $\beta$  ( )
- (d) its series connection with the load ( )

4. The OP-AMP can amplify

- (a) a.c. signal only ( )
- (b) both a.c. and d.c. signals ( )
- (c) d.c. signal only ( )
- (d) neither d.c. nor a.c. signal ( )

5. Crossover distortion occurs in \_\_\_\_\_ amplifiers.

(a) push-pull ( )

(b) class A ( )

(c) class AB ( )

(d) class C ( )

( 4 )

SECTION—II

( Marks : 15 )

Answer any *five* questions of the following : 3×5=15

1. Mention three differences between JFET and BJT.

( 5 )

2. Explain the formation of  $p-n$  junction diode.

( 6 )

3. State and explain parameters of JFET.

( 7 )

4. Explain how Zener diode can be used as meter protector.

( 8 )

5. Discuss the construction of solar cell with a neat diagram.



6. A transformer coupled class A amplifier operates from  $V_{cc} = 20\text{ V}$  draws a no-signal current of 5 A and feeds a load of  $40\ \Omega$  through a step-up transformer of  $N_2 / N_1 = 3 \cdot 16$ . Find—
- (a) maximum a.c. signal power output;
  - (b) maximum d.c. power input;
  - (c) conversion efficiency at maximum signal input.

( 10 )

7. State the advantages of tuned amplifier.

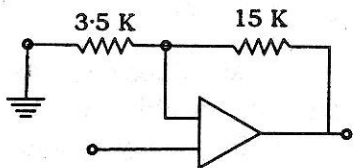
8. Define input offset voltage in an OP-AMP and also mention the effect of temperature change in OP-AMP.

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( 4 )

Or

- (a) Find the expression for overall gain in an OP-AMP in case of non-inverting configuration. 4
- (b) Find the voltage gain of a non-inverting OP-AMP amplifier from the circuit diagram given below : 3



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**III/ELEC (iii)**

**2015**

( 3rd Semester )

**ELECTRONICS**

**THIRD PAPER**

**( Electronic Devices and Amplifiers )**

*Full Marks : 55*

*Time : 2½ hours*

**( PART : B—DESCRIPTIVE )**

*( Marks : 35 )*

*The figures in the margin indicate full marks for the questions*

1. (a) Describe in brief how JFET acts as an amplifier. 3
- (b) Explain the construction and working of depletion-type MOSFET. 4

Or

- (a) What is pinch-off voltage? Write two applications of FET. 1+2=3
- (b) Discuss the construction and working of FET. 4

( 2 )

2. (a) Discuss the operation of SCR. 3  
(b) Explain the output characteristics of UJT. Write two advantages of UJT. 3+1=4

Or

- (a) Derive the efficiency and ripple factor of a full-wave rectifier. 3  
(b) Describe in brief the two-transistor analogy of SCR. Also write two applications of SCR. 3+1=4
3. (a) What is voltage regulation? Explain how Zener diode can be used as voltage regulator. 1+3=4

- (b) Discuss how PIN diode can be used as high-frequency switching device. 3

Or

- (a) With necessary diagram, explain the construction and working of liquid crystal display. 2+3=5  
(b) How is population inversion created in laser diode? 2

( 3 )

4. (a) What are power amplifiers? Show that in a class B push-pull amplifier, the power efficiency is 78.5%. 1+4=5

- (b) Show the power diagram of transformer coupled class A power amplifier, and locate its Q-point. 2

Or

- (a) With a neat diagram, explain the working of double-tuned amplifier. Discuss its frequency response. 3+2=5

- (b) A double-tuned circuit operates at an operating frequency of 10 MHz having coefficient of coupling of 0.02. Determine the bandwidth. 2

5. (a) What are the characteristics of an ideal operational amplifier? Why is voltage at the summing point of a negative feedback OP-AMP reduced almost to zero? 3+2=5

- (b) Write the equation for common-mode rejection ratio (CMRR) and also mention some importances of CMRR. 1+1=2