

5. (a) Draw the structure of JFET and explain its operation.  
(b) What do you mean by pinch-off voltage?  
(c) Draw a neat diagram of a CMOS NAND gate and explain its working principle. (1+4)+2+(1+2)
6. (a) Explain the operation of SCR used as 'ON' – 'OFF' switch.  
(b) Draw the circuit diagram of SMPS.  
(c) Write short note on *any one* of the following :  
(i) LED  
(ii) LCD. 4+2+4
7. (a) Write differences between ideal OPAMP and practical OPAMP.  
(b) Define CMRR.  
(c) Draw a neat circuit diagram of Operational amplifier as Non-inverting Amplifier. Explain its working and derive the expression for the output voltage and closed loop gain. 3+2+(2+3)
8. (a) Draw and explain the circuit diagram of Astable multivibrator using 555 timer. 5+5  
(b) Design and explain the functionality of R-2R Ladder DAC. \_\_\_\_\_

2019

## COMPUTER SCIENCE — HONOURS

Paper : CC-4

Full Marks : 50

*The figures in the margin indicate full marks.  
Candidates are required to give their answers in their own words  
as far as practicable.*

Answer **question no. 1** and **any four** questions from the rest.

1. Answer **any five** questions from the following :

2×5

- (a) Define PIV of  $p-n$  junction diode.
- (b) The doping in all regions of a transistor is different – why?
- (c) Explain why FETs are unipolar device and BJTs are bipolar device.
- (d) What is threshold voltage related to enhancement type MOSFET?
- (e) Draw the circuit diagram of NOT gate using CMOS logic.
- (f) Why optical fibre is so useful for data transmission?
- (g) Write down the expressions of gain of OPAMP used as —
  - (i) inverting amplifier,
  - (ii) non-inverting amplifier.
- (h) What is resolution of an ADC?

2. (a) State KCL.

(b) State and explain Norton's Theorem.

(c) A 10 volt zener diode along with a series resistance ( $R_S$ ) is connected across a 40 volt supply. Calculate the minimum value of the resistance required, if the maximum zener current is 50 mA.

2+(2+3)+3

3. (a) Explain the importance of donor and acceptor impurities in extrinsic semiconductors.

(b) Draw the circuit diagram of full-wave rectifier and explain its operation. Calculate rectifier efficiency for the same.

(2+2)+(1+3+2)

4. (a) Define Load line.

(b) Explain  $\alpha$  and  $\beta$  of transistors.

(c) Find out the relationship between  $\alpha$  and  $\beta$ .

(d) Define stability factors of Transistor.

2+2+3+3

Please Turn Over