(6 pages)

Reg. No. : ....

Code No. : 7375   Sub. Code : HPHM 13

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2015.

First Semester

Physics

ELECTRONIC DEVICES

(For those who joined in July 2012 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. A MOSFET is called as

    (a) Insulated gate JFET   (b) Open gate JFET

    (c) Shorted gate JFET   (d) Closed gate JFET

2. In BJT, the fairly doped region is called

    (a) Collector   (b) Base

    (c) Emitter   (d) None-above

3. In photodiode, the external light is exposed at

    (a) P type region   (b) N type region

    (c) P-N junction   (d) None above

4. For lasing action, the diode required a minimum
    voltage in the range of

    (a) 1 – 2 V   (b) 100 – 200 V

    (c) 1 mV – 5 mV   (d) 1000 – 2000 V

5. In DRAM, the charged capacitor possess the bit
    sign as

    (a) 1   (b) 0

    (c) 0 or 1   (d) none of the above

6. DRAM and SRAM are

    (a) Volatile

    (b) Non-volatile

    (c) Both volatile and non volatile

    (d) None above

7. The change in refractive index in proportional to
    linear electric field is

    (a) Pockel effect   (b) Non-linear Kerr effect

    (c) Electro-gyration   (d) Kerr effect

8. Liquid crystal is

   (a) An isotropic crystal

   (b) A quasi isotropic crystal

   (c) An anisotropy crystal

   (d) A perfect crystal

9. The quantity of diffraction intensity of light in acoustic optic material depends on

   (a) Intensity of sound   (b) Number of gratings

   (c) Angle of incidence   (d) Above all

10. In tunnel diode the depletion layer width is of the order of

    (a) 10 nm   (b) 100 nm

    (c) 1 micron   (d) 5 micron

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Why JEET and BJT cannot be used in the high frequency applications.

Or

(b) List out the biasing condition role on the I-V characteristics of a MESFET. Calculate the maximum frequency of oscillation for a MESPET has a gate width of 0.018 mm.

12. (a) What are radiative and non-radiative transitions in semiconductor devices? Explain them.

Or

(b) Give the principle and working of a diode laser.

13. (a) Differentiate between the Static RAM and dynamic RAM.

Or

(b) Explain the data storage principle by magneto-optical method.

14. (a) What are the properties of liquid crystal and ferroelectric materials? Explain their role in electronic device applications.

Or

(b) Write a short note on acoustic delay lines.

15. (a) Make a distinction between transferred electron devices and avalanche transit time devices.

Or

(b) Give an account on the specific applications of IMPATT diode.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) With a neat diagram, explain the structure, working of a bi-polar junction transistor under different biasing conditions.

Or

(b) What are MOSFETs? Explain the construction, operation and I-V characteristics of a typical n-channel depletion type MOSFET.

17. (a) Derive the expressions for the gain of a photoconductor with different dc excitation.

Or

(b) With the help of suitable diagrams and V-I curves, explain the operation of a junction photodiode and the junction solar cell.

18. (a) (i) What is Charge coupled device?

(ii) Explain the basic structure and the charge transfer mechanism in CCD device.

Or

(b) Differentiate between CMOS and NMOS. With suitable diagram, explain the Basic CMOS a structure and frequency response in detail.

19. (a) List out the important properties and materials related to electro optic, magneto-optic and acousto-optic effects.

Or

(b) Give the construction and working of a typical piezoelectric resonator and filters.

20. (a) With neat diagram, explain the operation, VI characteristics of Tunnel diode.

Or

(b) Describe the fabrication, packing and operation of Gunn diode.

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