FIFTH SEMESTER B.Sc. DEGREE (SUPPLEMENTARY/IMPROVEMENT) EXAMINATION, NOVEMBER 2016

(UG—CCSS)

Physics

PH 5B 12—ELECTRONICS (ANALOG AND DIGITAL)

(2009—2012 Admissions)

Time : Three Hours　　　　　　　　　　　　　　　　　　　Maximum : 30 Weightage

Part A

Answer all *questions.*

Each question carries ¼ weightage.

1. With a full wave rectified voltage across the load resistor, load current flows for what parts of a cycle ?

    (a) 45 degree.

    (b) 90 degree.

    (c) 180 degree.

    (d) 360 degree.

2. The diodes in a bridge rectifier have a maximum d.c. current rating of 2 A. This means the d.c. load current can have a maximum value of :

    (a) 1 A.

    (b) 2 A.

    (c) 4 A.

    (d) 8 A.

3. If the load resistance increases in a zener regulator, the zener current :

    (a) Increases.

    (b) Decreases.

    (c) Remains the same.

    (d) Becomes zero.

4. In a transistor the collector diode has to be :

    (a) Forward biased.

    (b) Reverse biased.

    (c) Non-conducting.

    (d) None of these.

5. A circuit with a fixed emitter current is called :

    (a) Base bias.

    (b) Emitter bias.

    (c) Collector bias.

    (d) Reverse bias.

6. Three different Q points are shown on a load line. The upper Q point given the :

   (a) Minimum current gain.   (b) Intermediate current gain.

   (c) Maximum current gain.   (d) Cut off point.

7. The a.c. equivalent circuit is derived from the original circuit by shorting all :

   (a) Resistors.   (b) Inductors.

   (c) Transistors.   (d) Capacitors.

8. The input impedance of a JFET :

   (a) Approaches zero.   (b) Approaches one.

   (c) Approaches infinity.   (d) Impossible to predict.

9. Amplitude modulation is used for broadcasting because :

   (a) It is more noise immune.

   (b) It requires lens transmitting power.

   (c) Its use avoids receiver complexity.

   (d) It gives large bandwidth for high fidelity.

10. Each 4-bit binary group is called :

   (a) Bit.   (b) Nibble.

   (c) Byte.   (d) Word.

11. A combinational circuit can be designed using only :

   (a) AND gates.   (b) OR gates.

   (c) OR and X-NOR gates.   (d) NOR gates.

12. An AND gate can be imagined as :

   (a) Switches connected in series.

   (b) Switches connected in parallel.

   (c) Transistors connected in series.

   (d) Transistors connected in parallel.

$(12 \times \frac{1}{4} = 3$ weight

Part B

Answer all questions.
Each question carries 1 weightage.

13. What is a voltage multiplier. Give one use.

14. What is ripple factor ? On what factors does it depend ?

15. What is decibel ? How is the gain of an amplifier expressed in decibels ?

16. What is negative feedback ? What are its important characteristics ?

17. What is FET ? In what ways is it different from a transistor ?

18. What is slew rate ? On what factors does it depend ?

19. What is pulse code modulation ? Where is it used ?

20. Why is the binary number used in digital systems ?

21. Distinguish between positive logic system and negative logic system.

$(9 \times 1 = 9$ weightage)

Part C

Answer any five questions.
Each question carries 2 weightage.

22. Explain how voltage stabilization is done using a zener diode. A zener regulator has an input voltage ranging from 15 V to 20 V and a load current ranging from 5mA to 20 mA. If the zener voltage is 6.8v, what is the maximum series resistance ?

23. Draw and explain the common emitter characteristics of an NPN transistor. Draw the load line and define quiescent point.

24. Explain the construction and working of a RC phase shift oscillator.

25. What is frequency modulation ? Where is it used ? Compare it with AM.

26. What is a UJT ? Give its working and characteristics. Mention one application.

27. Distinguish between Inverting and Non-inverting amplifiers using figures.

28. With the help of circuit diagrams, explain the working of (a) OR gate ; and (b) NAND gate. Give the truth table and logic symbols also.

29. State and prove Demorgans theorem.

$(5 \times 2 = 10$ weightage)

Part D

*Answer any **two** questions.*
Each question carries 4 weightage.

30. Explain the working of a full wave rectifier. What is a filter circuit ? Explain any *one* type of a filter circuit. How does a filter circuit affect the ripple factor ?

31. Describe the working of RC coupled amplifier. Using the a.c. equivalent circuit obtain an expression for the amplification. Draw the frequency response and define band width.

32. Explain the working of an op-amp as (a) Differentiator ; and (b) Integrator.

33. (a) What is the necessity to reduce Boolean expression. Give the procedure to reduce Boolean expression ; and (b) What are universal gates ? Explain the working of NAND and NOR gates as universal gates.

(2 × 4 = 8 weightage)