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D5BPH2004 (PAGES 2) Reg.No.....

Name: .....

FIFTH SEMESTER B.Sc. DERGEE EXAMINATION, NOVEMBER 2022
(Regular/Improvement/Supplementary)
PHYSICS
GPHY5B09T: ELECTRONICS (ANALOGUE & DIGITAL)

Time: 2 Hours **Maximum Marks: 60**

SECTION A: Answer the following questions. Each carries 2 marks.
(Ceiling 20 Marks)

1. Compare the features of a bridge wave rectifier and centre tap rectifier.
2. Define ripple factor of a rectifier. Give its value for full wave rectifier.
3. Obtain the relation between current amplification factors in CB and CE transistor configurations.
4. What is meant by active region in transistor?
5. Why does RC coupled amplifier give lower gain in the upper frequency range compared to its mid frequency range?
6. How does the negative voltage feedback increase bandwidth of an amplifier?
7. Differentiate between differential mode and common mode voltage gain of an Op-Amp.
8. What do you mean by noninverting and inverting input of a differential amplifier?
9. Convert $[11011.011]_2$ to its equivalent decimal number.
10. Represent +3and -3 in four bit representation using sign magnitude method.
11. What is a logic gate? Describe OR function with a 2-input OR gate.
12. What is a half adder? Draw the circuit of a half adder.

SECTION B: Answer the following questions. Each carries 5 marks.
(Ceiling 30 Marks)

13. A crystal diode having internal resistance rf = 10Ω is used for half-wave rectification. If the applied voltage v = 50 sinGƆt and load resistance RL = 900Ω , find :
    (i) Im, Idc, Irms (ii) a.c. power input and d.c. power output (iii) d.c. output voltage
14. For a transistor amplifier, if RC = 15 kΩ, RL = 10 kΩ, Rin = 3.5 kΩ, β= 60, find the output voltage for an input voltage of 1.5 mV r.m.s. Also find the power gain.
15. Define power gain and voltage gain in decibel. Find the gain in the following cases
    a) Voltage gain of 60 b) power gain of 200.
16. With the help of a diagram explain the action of an op-amp differentiator. Obtain the expression for the voltage gain.

(PTO)

17. Convert the following decimal numbers to binary (i) -35 (ii) 23.56 (iii) 2.8x108
18. A logic circuit with 4 bit input should give a high output for inputs 0,1,2,3,4,6,8,9,10 and 11. Obtain the simplest circuit using Karnaugh map method.
19. Simplify the expression Y=$\overline{AB + AC} + \bar{A}\bar{B}C$, using Boolean algebra.

SECTION C: Answer any 1 question. Each carries 10 marks.

20. What is the need for biasing in transistor? Mention the conditions required for faithful amplification. Explain stabilization and derive an expression for stability factor.
21. Distinguish between LC and RC oscillators. With the help of a circuit diagram, describe the working of Wein Bridge oscillator. What are its merits and demerits?

(1 x 10 = 10 Marks)