UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 1st Semester Examination, 2021

GE1-P1-COMPUTER SCIENCE

Time Allotted: 2 Hours   Full Marks: 60

The figures in the margin indicate full marks.

The question paper contains GE 1A and GE 1B.
The candidates are required to answer any *one* from *two* courses.
Candidates should mention it clearly on the Answer Book.

GE 1A
DIGITAL ELECTRONICS

GROUP-A

Answer any *four* questions   3×4 = 12

1. What do you mean by the 1's and 2's complement of a binary number?

2. What is gray code? Why it is important?

3. What are the applications of boolean algebra?

4. State De Morgan's theorem.

5. Explain the term 'Universal gate'.

6. What is a half adder?

GROUP-B

Answer any *four* questions   6×4 = 24

7. Draw the block diagram of a computer.

8. Explain different types of computer languages.

9. Reduce the following boolean expressions:
   (i) $A\overline{B}C + \overline{A}\,\overline{B}C$
   (ii) $(\overline{A} + B)(A + B)$

10. Draw the logic diagram of an Ex-OR gate and discuss its operations.

11.   Draw the logic diagram of 8×1 multiplexer. Describe its application.

12.   Draw the logic diagram of a S-R flip-flop. What advantage does a J-K flip-flop have over an S-R flip-flop?

GROUP-C

Answer any *two* questions $12 \times 2 = 24$

13.(a) Convert the following octal number to binary :   3+3+6

         $(157)_8 = (\quad)_2$

   (b) Subtract the following numbers using 2's complement method:
         $+49 - (+32)$

   (c) Simplify the expression
         $Y = \Sigma(1, 3, 4, 5, 6, 7, 9, 12, 13)$

         using K-map.

14.(a) What is a BCD code? What are its advantages and disadvantages?   3+3+6

   (b) Write a short note on "weighted and non-weighted codes".

   (c) What is meant by a decoder? Explain it with a block diagram.

15.   Design a master slave J-K flip-flop. Explain its operations.   12

16.(a) What is a ripple counter? Explain the difference between the performance of   6+6
         asynchronous and synchronous counters.

   (b) Draw the logic diagram of a binary ripple counter using toggle flip-flop.

GE 1B

COMPUTER NETWORKS

GROUP-A

Answer any *four* questions $3 \times 4 = 12$

1.   Which is the best topology for a LAN in a building? Justify your answer.

2.   How frequency division multiplexing (FDM) works?

3.   Differentiate between Bridges and Repeaters.

4.   How flow control and error control is done in data link layer?

5.   What is three-way handshaking?

6.   Explain the function of data link layer.

GROUP-B

Answer any *four* questions

6×4 = 24

7. Explain any one error detection code with example.

8. Discuss point-to-point protocol (PPP).

9. Explain in detail about the steps involved in the routing process of a packet switching network.

10. Explain optical fibre with the help of a suitable diagram in detail.

11. Explain Hop-by-Hop choke packets with a suitable example.

12. What is framing and the significance of framing?

GROUP-C

Answer any *two* questions

12×2 = 24

13. Draw and explain TCP/IP model.

14. Explain different categories of congestion control. Discuss a congestion control Algorithm.

15. What is a URL and what are its components? How is HTTP related to WWW?

16. What is multiple access protocols? Explain ALOHA protocol in detail.

——×——