

M.Sc. 1st Semester Examination, 2019**CHEMISTRY***(Food Processing and Computer Basics)***PAPER – CEM-104***Full Marks : 40**Time : 2 hours*

**Answer Q. Nos. 1 & 2 and any two from
Q. Nos. 3, 4, 5 & 6**

The figures in the right hand margin indicate marks

*Candidates are required to give their answers in their
own words as far as practicable*

Illustrate the answers wherever necessary

- 1. Answer any four questions : 2 × 4**
- (a) What is canning ?
- (b) What is water activity (a_w) ?
- (c) What are food preservatives ?

- (d) What is the mechanism of food preservation by sodium benzoate ?
- (e) Write the structure of KMS. How does it preserve the food ?
- (f) How excess glucose is stored in the body ? Write its chemical structure.
- (g) How much energy is produced from 1 g each of carbohydrate, fat and proteins ?
- (h) What are essential and non-essential amino acids ?

2. Answer any *four* questions : 4 × 4

- (a) What are complete proteins and incomplete proteins ? What are the effects of excess proteins on health ?
- (b) (i) What are the principles of food preservation ?
(ii) What are the methods of food preservation ?
- (c) How can one classify food based upon its perishability ? Give examples.

- (d) (i) What is blanching ?
- (ii) What are the advantages of blanching of fruits and vegetables ?
- (e) What is a Typical Drying Curve ? What is Critical Moisture Content ?
- (f) (i) What is hurdle technology ?
- (ii) In what way it preserves food materials ? Give some examples.
- (g) What is spray dryer ? Show the schematic diagram of a spray dryer. What are the steps involved in a spray dryer ?
- (h) What is thermal processing ? How many temperature categories are employed in thermal processing ? Give examples. Give a schematic diagram of a pasteurization process.
3. (a) Convert the following number as specified below :
- (i) $(845.27)_{10}$ to Octal Number up to three decimal points.

(ii) $(343.12)_8$ to Hexa Decimal Number.

(b) Perform the following operation as specified below :

(i) $100100 - 100001$ using 1's complement.

(ii) $101110 - 101100$ using 2's complement.

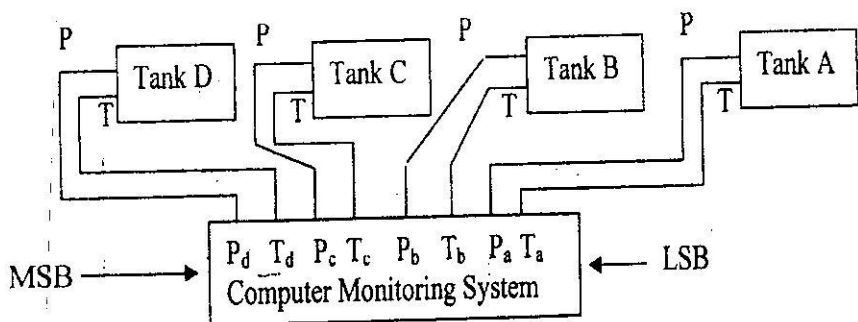
4×2

4. A Chemical processing plant uses a computer to monitor the temperature and pressure of four chemical tanks as shown in Fig 1. Whenever a temperature or a pressure exceeds the danger limit, an internal tank sensor applied a "1" to its corresponding output to the computer. If all conditions are OK, then all output is zero.

(i) If the computer reads the binary string 11101110, what problems exist ?

(ii) What problems exist if the computer is reading D5 H ?

(iii) What Hexadecimal number is read by the computer if the temperature and Pressure in both the tank B and C are high ?



P = Pressure sensor,
 T = Temperature Sensor

Fig. 1

2 + 2 + 4

5. Draw the circuit diagram for the following Boolean expression and show the Truth Table : 4×2

(i) $\overline{(A+B)} + (C+A)B$

(ii) $\overline{A}BC + (\overline{A} + C)$

6. (a) What are the differences between ROM and RAM? Explain their unit of measurement. 3GB means how many bits.
- (b) Draw the Block Diagram of Computer and Explain the Major Component of it. 4×2