2017

M.Sc.

1st Semester Examination

CHEMISTRY

PAPER—CEM-104

Subject Code—24

Full Marks : 40

Time : 2 Hours

The figures in the margin indicate full marks.

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

Illustrate the answers wherever necessary.

(*Food Processing and Computer Basics*)

Answer any *three* questions from Group-A and *two* questions from Group-B.

Group—A

1. (i) After critical moisture content _____ starts.

(a) Saturated drying region

(b) Unsaturated drying region

(c) Constant drying region

(d) None of the mentioned.

(ii) If the dry spot appears in the substance in the batch drying curve at _____

(a) Critical moisture content

(b) Equilibrium moisture content

(c) Bound moisture

(d) Unbound moisture

(iii) After the unsaturated drying completed _____ starts to evaporate.

(a) Bound moisture

(b) Unbound moisture

(c) Equilibrium moisture

(d) None of the mentioned

(iv) Which one is considered the oldest food preservation method ?

(a) Freezing (b) Drying (c) Smoking (d) Pickling

(v) For food products, the water activity is generally less than

(a) 1   (b) 0.25   (c) 0.65   (d) 0.50

(vi) 99.9% reduction in microbial population (over survivor from 1,00000) is equivalent to

(a) 5D (b) 4D (c) 3D (d) 2D

(vii) A biological method of food preservation is :

(a) Freezing   (b) Drying

(c) Fermentation   (d) Adding Sugar & Salt

(viii) Which organism is generally taken as indicator for sterilization ?

(a) Coxiella burnetii   (b) Bacillus subtilis

(c) Escherichia coli   (d) Clostridium botulinum

1×8

2. (a) What do you understand by the term food preservation ? Enlists the various principles of food preservation.

(b) What is blanching ? How blanching of fruits and vegetables are performed ? $1+3+1+3$

3. (a) With the help of a schematic diagram discuss the working principle of drum dryer.

(b) Classify the food on the basis of perishability. What are the causes of spoilage ? $4+2+2$

4. Write notes on any *two* of following :

    (a) Flass-18 process

    (b) Aseptic canning

    (c) Hot-packing.   2×4

5. Describe the working principle of spray dryer with the help of a neat diagram. Also mention the advantages of spray drying of a food items.   8

Group—B

6. Convert the following number as specified below :
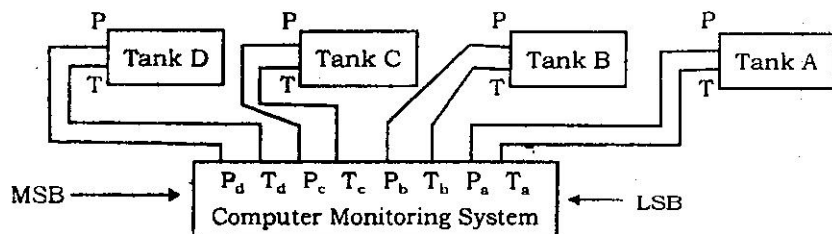
    (i) $(163.24)_{10}$ to Binary Number up to three decimal points.

    (ii) $(65.36)_8$ to Decimal Number.   8

7. 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.

    (Continued)

(i) If the computer reads the binary string 10101010, what problems exist ?

(ii) What problems exist if the computer is reading C2 H ?

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

P = Pressure sensor,

T = Temperature Sensor.

Fig–1   8

8. Perform the following operation as specified below :

(i) 100110 – 100001 using 1's complement.

(ii) 101110 – 100100 using 2's complement.   8

9. Draw the circuit diagram for the following Boolean expression and show the truth table :

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

(ii) $B\overline{C} + \left(\overline{A} + C\right)$.   8

10. What are the differences between system software and application software ? Explain their unit of storage.   8

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