MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, AKOLA

Semester-end Examination

B.Tech (Agril.Engg.)

SEMESTER : III(New) ACADEMIC YEAR ; 2000-2001

COURSE NO : CHEM-236/ 235 TITLE : Food Science

CREDITS : 3 (2+1) Time :- 9.00 to 11.00

DAY & DATE : FRI,/ 3-11-2000 TOTAL MARKS : 80

Note :- 1) Solve ANY FIVE questions from Section 'A'
2) All questions from Section 'B' are compulsory

SECTION 'A'

Q.1 How micro-organisms contribute to spoil the food. (10)

Q.2 Define term contamination. State common spoilage occuring in fruits and vegetables. (10)

Q.3 a) Define carbohydrates. Classify them with suitable examples under each class. (5)

b) What do you understand by the term 'Lipid' ? Classify lipids on the basis of products of hydrolysis with examples. (5)

Q.4 a) Define vitamins. Classify them and enlist water soluble vitamins with their Co-enzyme forms. (5)

b) What are nucleic acids ? State their major points for their differentiation. (5)

Q.5 a) What is ripening ? State hydrolytic changes during ripening of fruits. What are the treatments triggering ripening. (5)

b) Classify enzymes with examples and explain their chemical nature. (5)

Q.7 a) Define glycolysis. State the reactions involved in glycolysis. (5)

b) What is B (Beta) oxidation) ? Give sequence of reactions involved in B oxidation of fatty acids.(5)

Q.7 a) Define amino-acids. Classify them with examples under each class. (5)

b) Write in short about Watson and crick double helical structure of DNA. (5)

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SECTION 'B'

Q.8 Define the following terms (10)

1. Homopolysaccharides.
2. Hydrogenation
3. Holo enzyme
4. Nutrient
5. Pasteurization
6. Sapomification
7. Sterilization
8. Food
9. Enzyme
10. Di-saccharides.

Q.9 Fill up the blanks (10)

1. Amino-acids have at least two ionizable groups ..... and .....
2. Sugars related to nucleic acids are ..... and .....
3. Lactose is a disacharide of ..... and .....
4. Fats are esters of saturated fatty acid ..... with glycerol .....
5. Waxes are esters of long chain fatty acid ..... with glycerol .....

Q.10 State true or false (10)

1. Amylose is component of starch.
2. Ninhydrin is a powerful oxidizing agent.
3. Arginine is an aromatic amino acid.
4. Nitroprusside test is possitive for the amino acid cysteine.
5. Oils are liquids at 30°C.
6. Phospho-lipidsare esters of fatty acids and nitrogen containing base.
7. The deficiency of biotin may result from the adequate intake of raw egg white which contains the protein Avidin
8. Vitamin B-12 deficiency causes anaemia.
9. Vitamin C E is anti oxidant.
10. Renitol deficiency causes right blindness. Thiamine

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MAHARASHTRA AGRILCULTURAL UNIVERSITIES EXAMINATION BOARD
AKOLA.

SEMESTER - END EXAMINATION
B.TECH. (AGRIL. ENGG.)

SEMESTER : III (NEW) ACADEMIC YEAR : 2000-2001
COURSE NO. : APE - 232 TITLE : HEAT AND MASS TRANSFER
CREDITS : 3 (2+1) **Time:9.00 to 11.00**
DAY & DATE : **MON. 6.11.2000** TOTAL MARKS : 80

Note : a) Solve ANY FIVE questions from Section `A'.
b) All questions from Section `B' are compulsory.
c) All questions carry equal marks.
d) Draw a neat diagram wherever necessary.

SECTION `A'

Q. 1. A furnace wall is made up of three layers, one of fire brick, one of insulating brick and one of red brick. The inner and outer surface are at 870°C and 40°C respectively the respective co-effecients of thermal conductivities of the layer are 1.0, 0.12 and 0.75 W/m-°K and the thicknesses are 22 cm, 7.5 cm and 11 cm. Assuming close bending of the layer at their interfaces, find the rate of heat loss per square meter per hour.

Q. 2. Using Newton-Rikhman Law ; prove that

$$\frac{1}{U} = \frac{1}{hi} + \frac{\Delta x}{K} + \frac{1}{ho}$$

Q. 3. Exchaust gases flowing through the tubular heat exchanger at the rate of 30 kg/min are cooled from 500°C to 200°C by water initially at 30°C. The specific heat of gases may be taken as 1.13 kJ/kg-°K and overall heat transfer co-efficient may be taken as 140 W/m²-°K. Calculate the surface area needed if the water flow is 35 kg/min for parllel flow and counter flow. Take specific heat of water as 4.186 KJ/kg °C.

Q.4. a) Describe the mechanism of boiling and enlist its type.
b) Give the classfication of bodies according to their radiation properties.

Q. 5. Derive the equation for overall thermal resistance to heat flow through hollow cylinder.

Q. 6.a) The interior wall of a furnace is maintained at temperature of 800 °C. The wall is 70 cm thick, 1 m wide and 1.5 m broad of material whose thermal conductivity is 0.4 W/m-°K. The temperature of the outside surface of the wall is 150°C Determine the heat flow through the wall.

b) Enlist the different types of heat exchanger and explain any one in detail.

Q. 7. Write short notes on:
1) Fouling factors of heat transfer
2) Radiation heat transfer
3) Flat plate collector
4) Fourier's law of heat conduction

SECTION = B

Q. 8. Define the following.
1) Transmissivity
2) Forced convection
3) Mass transfer
4) Condensation
5) Emmissivity

Q. 9. State whether True or False

1) For turbulent flow, Reynold number is greater than 2100.
2) Heat transfer by conduction follows the Stefan's Law.
3) Heat transfer is constant when temperature remains constant with time.
4) If thermal resistance of wall is 1°K/W then thermal conductivity will be 1.5 W/°K.
5) In cross flow heat exchanger, the fluids flows in opposite direction to each other.
6) Radiator of car is an example of heat exchanger.
7) Mass transfer occurs due to concentration gradient.
8) According to Fick's Law of diffusion, mass flux of an element per unit area is not proportional to concentration gradient.
9) The heat transfer by radiation takes place by means of electromagnetic waves.
10) Glass wool is an example of good conductor.

Q. 10. Fill in the blanks.

1) Nusselt number is a function of .....
2) Mean radius of heat transfer for hollow sphere having r1 as inner radius and r2 an outer radius is given by .....
3) Logarithmic mean temperature difference for heat exchanger is given by.....
4) The term $\frac{Cp \cdot \mu}{K}$ is called.....
5) Thermal conduction of a plane homogeneous wall is expressed as .....
6) In condensation, phase changes from ..... to ....
7) In steady state process, heat flux always remains .. with time.
8) As the thickness of insulation increases the rate of heat flow .....
9) In mass transfer, the diffusion rate is given by .....
10) Transfer of heat energy between adjacent molecules of solid is called .....

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MAHARASHTRA AGRICULTURAL UNIVERSITY EXAMINATION BOARD ,AKOLA
SEMESTER END EXAMINATION B.TECH (AGRICULTURAL ENGINEERING)

Day & Date :-THU, 9-11-2000 **Time :-9.00 to 11.00**

SEMESTER III (Old) ACADEMIC YEAR 2000-01
COURSE NO: BSCT235 COURSE: MATHEMATICS-III
CREDITS 2(1+1) TOTAL MARKS 80

Note: 1) Solve Any 5 qns from Section A
2) All questions from Section B are compulsory

Section A

Q1 A. State the Clairaut's equation and show that its solution can be obtained by putting p=c in the equation (5)

B. Solve $(p^2 - 3p + 2) = 0$ (5)

Q2 A. Prove the Linearity property of Laplace transforms. (6)

B. Find the Laplace transforms of
$e^{3t} \sin 4t$, $\sin 2t \cos 3t$ (4)

Q3 Solve the initial value problem (10)

$$\frac{d^2x}{dt^2} + 9x = 0 \quad , \quad x(0) = 0, \quad \frac{dx}{dt}(0) = 1$$

Q4 Solve $\frac{dy}{dx} + \frac{y}{x} = x^3$ (10)

Q5 Solve the partial differential equation (10)

$$x\,dx + y^2\,dy = z\,dz$$

Q6 . Find Laplace inverse of (10)

$$\frac{4s + 2}{(s-1)(s-2)(s+2)}$$

Q7 State the steps involved in the Charpit's method of solving a partial differential equation. (10)

Section B

Q8 State/Define (10)

1. Laplace transform
2. inverse Laplace transform.
3. Necessary and Sufficient conditions for a Equation to be exact..
4. Bernoulli's equation.
5. Gamma function.

Q9 Fill in the blanks (10)

1. $\mathcal{L}(e^{3t}) =$ _____, $\mathcal{L}(2\cos 2t) =$ _____
2. $\mathcal{L}^{-1}(1/s) =$ _____ , $\mathcal{L}^{-1}(1/(s+2)) =$ _____
3. If $y'' + y' + y = 0$ then order = _____ degree = _____
4. One dimensional wave equation is _____
5. $\frac{1}{(1-s)(1+s)} = \frac{\quad}{(1-s)} + \frac{\quad}{(1+s)}$

Q10 State True/False (10)

1. $\mathcal{L}(\sin t \cdot \cos 2t) = \mathcal{L}(\sin t)\,\mathcal{L}(\cos 2t)$
2. $\mathcal{L}(1 + 2t) = 1/s + 4/s^2$
3. The first shifting theorem states that $\mathcal{L}(e^{at} f) = e^{at}$ times the transform of f.
4. General solution of a third order equation contains four arbitrary constatnts.
5. Charpits method is used to solve ordinary differential equation of nonlinear type.
6. Linearity property of Laplace transform holds for the inverse transforms also.
7. Wave equation , and heat diffusion equation are ordinary differential equations.
8. Integrating factor converts a non exact equation into an exact differential equation.
9. $y = 4x + b$ satisfies the equation $y' = 4$. Hence is a solution of the equation.
10. Bernoulli's equation cannot be converted into a linear first order equation.

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, AKOLA

SEMESTER -END - EXAMINATION

B.Tech. (Agril. Engg.)

Semester : IIIrd (New) Academic Year : 2000-2001

Course No.: BS MATHS 235 Title : Mathematics III

Credits : 3 (2+ 1) Total Marks : 120

Day and Date : WED,/1-11-2000 Time :- 9.00 to 11.00

Note - 1) Solve any five questions from Section 'A'

2) All questions from Section 'B' are compulsory.

SECTION 'A'

Q.1 : a) Solve the differential equation and find its solution by using Laplace transform method, (8)

$y''+y=t,\ y(0)=1, y'(0)=-2$

b) If z_1 and z_2 are any two complex numbers then show that

$|z_1+z_2|^2 = |z_1|^2+|z_2|^2+2\ Re\ z_1\ \overline{z_2}$ (7)

Q.2 : a) By using Demoivre's theorem prove that

$Cos\ 4\theta = Cos^4\theta - 6\ Cos^2\theta\ Sin^2\theta + Sin^4\theta$ (8)

b) Determine the values of a,b,c,d So that the function

$f(z) = x^2+axy+by^2+ i\ (cx^2+dxy+y^2)$ is analytic. (7)

Q.3 : a) Express $\sqrt{3}+i$ in modulus- amplitude form. (7)

b) If z_1 and z_2 are any two complex numbers then show that $Amp\ (z_1/z_2) = Amp\ z_1 - Amp\ z_2$ (8)

Q.4 : a) If $L\{f(t)\} = \bar{f}(s)$ then prove that

$L\{f(at)\} = \frac{1}{a} f(s/a)$. (8)

b) Find Laplace inverse of $\left\{\frac{3S+7}{S^2-2S-3}\right\}$ (7)

Q.5 : a) Prove that the real and imaginary parts of an analytic function satisfy the Cauchy- Riemann equations. (8)

b) Find the real and imaginary parts, modulus and argument of the complex number z, where $z = \frac{1-i}{1+i}$ (7)

Q.6 : a) State and prove Demoivre's theorem. (8)

b) If $L\{f(t)\} = \bar{f}(s)$ then prove that

$L\{t^n f(t)\} = (-1)^n \frac{d^n}{ds^n}\{f(s)\}$. (7)

Q.7 : a) Find the value of Fourier coefficient b_n (7)

b) Solve the difference equation ;

$y_{n+1} - 3y_n = n^2 \cdot 2^n$ (8)

Cont .2

SECTION 'B'

Q.8 : Fill in the blanks. (15)

1) The function f(x) is said to be an even function if f(x)= _____

2) $L^{-1}\left\{\frac{1}{s-a}\right\}$ = _____

3) If z is any complex number then Cosz = _____

4) $e^{2\pi i}$ = _____

5) A solution which is obtained from the general solution by giving particular values to the arbitrary constants is called _____ ___ solution.

Q.9 : Define/ State the following. (15)

1) Periodic function.
2) Dirichlet's conditions.
3) Difference equation.
4) Half range expansion.
5) Complex number.

Q.10: Select the correct answer from the bracket : (15)

1) f(x)= Cosx is an _____ function.
(a) Odd, (b) even (c) discontinuous (d) none

2) The shift operater E can also be expressed as E= _____
(a) Ey_n (b) $1+\Delta$ (c) $\Delta - 1$ (d) None.

3) $L\{\text{Sinh } at\}$ = _____
(a) $a/(s^2-a^2)$ (b) $s/(s^2-a^2)$ (c) $a/(s^2+a^2)$ (d) None.

4) $\sqrt{4}$ = _____
a) 4! (b) 6 (c) $\sqrt{4+I}$ (d) None.

5) The polar form of complex number z=x+iy is _____
a) $r.e^{i\theta}$ (b) $\cos\theta + i\sin\theta$ (c) Cosx+i siny (d) None.

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