SH-V/Com. Sc.-503-DSE-I(PR)/19

B.Sc. 5th Semester (Honours) Practical Examination, 2019-20

COMPUTER SCIENCE

Course ID : 51526 **Course Code : SH/CSC-503-DSE-I**

Course Title: Operational Research(Lab)

Time: 2 Hours **Full Marks: 15**

The figures in the right hand side margin indicate full marks.

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

1. Perform *any one* experiment: 10×1=10

(a) Use simplex method to verify that the following problem has no finite optimal solution:

Max $z = 2x_1 + x_2$ subject to

$x_1 - x_2 - x_3 \leq 1$

$x_1 - 2x_2 + x_3 \leq 2$

$x_1, x_2, x_3 \geq 0$

(b) Solve the following problem using simplex method:

Max $z = 5x_1 + 3x_2 + x_3$ subject to

$2x_1 + x_2 + x_3 = 3$

$-x_1 + 2x_3 = 4$

$x_1, x_2, x_3 \geq 0$

(c) Solve the following problem by solving its trial:

Min $z = x_1 + x_2$ subject to

$2x_1 + x_2 \geq 8$

$3x_1 + 7x_2 \geq 21$

$x_1, x_2 \geq 0$

(d) Solve the following problem by the dual simplex method:

Min $z = 2x_1 + 3x_2$ subject to

$2x_1 + 3x_2 \leq 30, x_1 + 2x_2 \geq 10, x_1 \geq 0, x_2 \geq 0$

(e) Solve the following problem by revised simplex method:

Min $z = -5x_1 + x_2 - x_3 + 10x_4 - 7x_5$ subject to

$$\begin{bmatrix} 3 & -1 & -1 & 0 & 0 \\ 1 & -1 & 1 & 1 & 0 \\ 2 & 1 & 2 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{bmatrix} = \begin{bmatrix} 4 \\ 1 \\ 7 \end{bmatrix}, x \geq 0$$

B.Sc. 5th Semester (Honours) Practical Examination, 2019-20

COMPUTER SCIENCE

Course ID : 51526 **Course Code : SH/CSC-503-DSE-I**

Course Title: Numerical Methods(Lab)

Time: 2 Hours **Full Marks: 15**

The figures in the right hand side margin indicate full marks.

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

1. Perform *any one* experiment: 10×1=10

(a) Using Newton's Forward interpolation formula find the polynomial $f(x)$ satisfying the following data:

x	0	5	10	15
$f(x)$	14	379	1444	3584

(b) The following data are taken from the stream table:

Temperature (°C)	140	150	160	170	180
Pressure (kg/cm^2)	3·685	4·854	6·302	8·076	10·22

Find pressure at temperature 175°C.

(c) Find the quadratic polynomial that fits $f(x) = x^4$ at $x = 0, 1, 2$ using Lagranges interpolation formula.

(d) Using Taylor's series find y at $x = 0{\cdot}1$ if $\frac{dy}{dx} = x^2y - 1$, given that $y(0) = 1$.

(e) Use Euler method to approximate y when $x = 0{\cdot}1$, given that $\frac{dy}{dx} = \frac{y-x}{y+x}$ with $y = 1$ for $x = 0$.