In the Name of Allāh, the Most Gracious, the Most Merciful

Paper Pattern

MCQS 40   each 1 mark
Short 4   each 2 marks
Short 4   each 3 marks
long 4   each 5 marks

Question No : 1 of 52   Marks: 1 (Budgeted Time 1 Min)

The cost matrix in assignment problem is always diagonal matrix

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Answer (Please select your correct option)

○ square matrix   correct

○ identity matrix

○ zero matrix

Made by: Waqar Siddhu

Question No : 2 of 52   Marks: 1 (Budgeted Time 1 Min)

Which of the following binary operation in assignment problem among all the elements in the given profit matrix from the highest element in the matrix

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Answer (Please select your correct option)

○ Subtraction   correct

○ Division

○ Multiplication

○ Addition

Made by: Waqar Siddhu

During a replacement if the value of money decreases at the rate of 3% then the present worth factor of unit amount to be spent after one year is given by

Answer (Please select your correct option)

○ 0.25

○ 0.333

○ 0.9708   correct

○ 4

In sequencing problems, the Johnson's algorithm in finding the optimal ordering of n jobs through 3 machines can be applied, if the problem is converted into following number of machines problems

Answer (Please select your correct option)

○ $3n$ correct

○ $3n!$

○ $2 \times 3 = 6$

○ 2

If the money carries a rate of interest of 12% per year, the present worth factor of one rupee due in one year is

Answer (Please select your correct option)

○ 0.08333

○ 0.89285   correct

○ 0.0769

○ 13

During a replacement if the value of money decreases at the rate of 3% then the present worth factor of unit amount to be spent after one year is given by

Degeneracy in a 5×6 transportation problem occurs when the number of occupied cell is less than

Answer (Please select your correct option)

○ 20 but greater than 10

○ 10   correct

○ Zero

○ Infinity

We go in probabilistic replacement model when period between installation and failure is

Answer (Please select your correct option)

○ varying exponentially

○ varying linearly   correct

○ Constant

○ is not constant (varying arbitrarily)

Any set of non negative allocations $(X_{ij} > 0)$ which satisfies the row and column sum is called a _____ solution.

Answer (Please select your correct option)

○ feasible

○ non basic feasible

○ basic infeasible

○ optimal   correct

If a basic feasible solution contains less than "$m + n - 1$" (Here m is the number of rows, n is the number of columns in transportation problem) non negative allocation, then it is said to be

Answer (Please select your correct option)

○ Degenerate   correct

○ Multiple Solutions

○ Non degenerate

○ Alternative Optima

Consider the following cost table:

		Destinations			
		D1	D2	D3	Supply
Source	S1	5	1	2	25
	S2	7	2	4	

Answer (Please select your correct option)

○ 10

○ 15

○ 25

○ 5   correct

Source	S1	5	1	2	25
	S2	7	2	4	10
	S3	3	3	5	15
	Demand	10	20	20	

Answer (Please select your correct option)

○ 10

○ 15

○ 25

○ 5   correct

		Destinations			
Source		D1	D2	D3	Supply
	S1	5	1	2	25
	S2	7	2		

Answer (Please select your correct option)

- ○ I, II and III
- ○ I only
- ○ II only
- ○ III only
- ○ I and II only — correct

S3	10	3	3	5	15
Demand		10	20	20	

Using Vogel's Approximation Method:
These below are the three cells which can be next cell:

Answer (Please select your correct option)

- ○ I, II and III
- ○ I only
- ○ II only
- ○ III only
- ○ I and II only

I. $S3 \rightarrow D2$
II. $S2 \rightarrow D2$
III. $S1 \rightarrow D3$

Which one is the correct option?

Answer (Please select your correct option)

- ○ I, II and III
- ○ I only
- ○ II only
- ○ III only
- ○ I and II only

We go in probabilistic replacement model when period between installation and failure is

Answer (Please select your correct option)

○ varying exponentially

○ varying linearly

correct

○ Constant

○ is not constant (varying arbitrarily)

If the mean arrival and mean service rates are **4** and **7** respectively in a queue then expected waiting time in the system is

Answer (Please select your correct option)

○ $\frac{1}{3}$ **correct**

○ 3

○ 28

○ $\frac{7}{4}$

In a bank, every 15 minutes one customer arrives for cashing the cheque. The staff in the payment counter takes only 10 minutes for serving a customer on an average, then the service rate " μ " = _____.

Answer (Please select your correct option)

○ 6 per hour   **correct**

○ 4 per hour

○ 10 per hour

○ 1/6 per hour

A duplicating machine maintained for office use is used and operated by people in the office who need to make copies. Since the work to be copied varies in length (number of pages of the original) and copies required, the service rate is randomly distributed, the arrival rate is 5 per hour and the service rate is 10 per hour then the equipment utilization "ρ" is equal to

Answer (Please select your correct option)

- 0.50   **correct**
- 0.20
- 5
- 2

A repairman services three machines. For each machine the time between service requirements is 8 hours following exponential distribution. The time of repair also has the same distribution with a mean of 2 hours. Then the average rate "λ" is

Answer (Please select your correct option)

- $1/8 = 0.125$ **correct**
- 8
- 4
- $\frac{1}{4} = 0.25$

A repairman services three machines. For each machine the time between service requirements is 8 hours following exponential distribution. The time of repair also has the same distribution with a mean of 2 hours. Then the mean service time "μ" is

Answer (Please select your correct option)

- $\frac{1}{2} = 0.5$ **correct**
- 4
- $\frac{1}{4} = 0.25$
- 2

If "N_i" be the Number of replacement made at the end of the ith week and "P_j" be the probability of failure during the ith week, then $N_1 =$ -------------------.

Answer (Please select your correct option)

○ $N_0 P_1$ **correct**

○ $N_1 P_1$

○ $N_0 P_0$

○ $N_1 P_2$

The present worth of a rupee to be spent after a year is denoted by v and given by

Answer (Please select your correct option)

○ $v = 1/(1+r)$ **correct**

○ $v = (1+r)$

○ $v = (1+r)/10$

○ $v = (1/r)$

Formula for a geometric series "$x + vx + v^2 x + ... + v^{n-1} x$" is

Answer (Please select your correct option)

○ $P(n) = x \dfrac{1 - v^n}{1 - v}$ **correct**

○ $P(n) = \dfrac{1 - v^n}{1 - v}$

○ $P(n) = x \dfrac{1 - v}{1 - v^n}$

○ $P(n) = \dfrac{1 - v}{1 - v^n}$

Product of 'item cost' and 'ordered item' is

Answer (Please select your correct option)

○ Crash cost

○ Cost period   correct

○ Set up cost

○ Shortage cost

Standard Deviation (S.D.) = _____ MAD

Answer (Please select your correct option)

○ $\sqrt{\dfrac{2\pi}{3}}$

○ $\sqrt{\dfrac{2}{\pi}}$

○ $\sqrt{\dfrac{\pi}{2}}$ correct

○ $\sqrt{\dfrac{3\pi}{2}}$

MAD = --------- S.D.

Answer (Please select your correct option)

○ $\sqrt{\dfrac{2}{\pi}}$ correct

○ $\sqrt{\dfrac{\pi}{2}}$

○ $\sqrt{\dfrac{2\pi}{3}}$

○ $\sqrt{\dfrac{3\pi}{2}}$

The following network is an example of
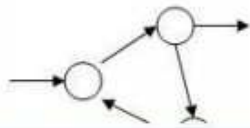
Answer (Please select your correct option)

○ Redundancy

○ Dangling

correct

○ Cycling

○ Dummy

For any activity backward pass computations provide its

Answer (Please select your correct option)

○ Earliest start times

○ Latest start times

correct

○ Moderate start times

○ Completion time

Best possible time estimate that a given activity would take under normal conditions which often exist, is called

Answer (Please select your correct option)

○ Most Likely time estimate

○ Pessimistic time estimate

correct

○ Smallest time estimate

○ Activity time estimate

In PERT, activity time estimates are distributed according to

Answer (Please select your correct option)

○ Beta Distribution   correct

○ Normal Distribution

○ Poisson distribution

○ Binomial Distribution

Solution region for the constraint $y \leq 0$ is the

Answer (Please select your correct option)

○ Half plane below y-axis

○ Half plane below the line: $y = 0$

○ Set of all those points where ordinates are non-positive

○ All are equivalent   correct

In a linear Programming Problem (LPP), which of the following must be hold?

Answer (Please select your correct option)

○ Only objective function is linear

○ Both objective function and constraints are linear   correct

○ Only constraints needs to be linear

○ At least one of objective function or constraint should be linear

If a company manufacture 'x' units of product 'A' and 'y' units of 'B' with associated profits of Rs.5 and Rs.3 then which of the following is the objective function to maximize is the profit?

Answer (Please select your correct option)

○ $z = 15xy$

○ $z = 5x - 3y$

○ $z = 3x - 5y$

○ $z = 5x + 3y$ correct

The _____ variable is chosen by examining the cost coefficents in the objective function.

Answer (Please select your correct option)

○ entering correct

○ leaving

○ positive slack

○ negative slack

While solving a linear programming problem by big M – Method, traditionally the _____ variables are chosen in the initial basic feasible solution.

Answer (Please select your correct option)

○ neagtive slack

○ positive slack

○ entering

○ artificial correct

In the big-M method, if the introduced _____ variables do not leave the basis in the final iteration, then this indicates that the give linear programming problem cant be optimized.

Answer (Please select your correct option)

○ entering

○ positive slack

○ negative slack

○ artificial — correct

Zero valued artificial variables may appear as _____ variables in the final solution, when one or more of the original constraints equations is redundant.

Answer (Please select your correct option)

○ non basic

○ basic — correct

○ slacks

○ surplus

○ artificial

By using Two phase method to solve a linear programming problem, in phase I, a new objective function is formed by assigning on left hand side, zero to every original variable (including slack and surplus variables) and -------- to each of the artificial variables.

Answer (Please select your correct option)

○ M

○ −M — correct

○ +1

○ −1

For the linear programming problem;

$$\text{Max} Z = 2x + 3y$$

Subject to

$$x \geq 2 \quad\quad x - s_1 + A = 2$$
$$y \leq 3 \quad\Rightarrow\quad y + s_2 = 3$$

Answer (Please select your correct option)

○ $\text{Max} Z = 2x + 3y + A$

○ $\text{Min} Z = 2x + 3y + A$

○ $\text{Max} Z = A$

○ $\text{Min} Z = A$

For the linear programming problem;

$$\text{Max} Z = 2x + 3y$$

Subject to

$$x \geq 2 \quad\quad x - s_1 + A = 2$$
$$y \leq 3 \quad\Rightarrow\quad y + s_2 = 3$$

Answer (Please select your correct option)

○ $\text{Max} Z = 2x + 3y + A$

○ $\text{Min} Z = 2x + 3y + A$

○ $\text{Max} Z = A$

○ $\text{Min} Z = A$ correct

$$y \leq 3 \quad\Rightarrow\quad y + s_2 = 3$$
$$x, y \geq 0 \quad\quad x, y, s1, s2, A \geq 0$$

Which of the following is associated objective function of the 1st phase?

Answer (Please select your correct option)

○ $\text{Max} Z = 2x + 3y + A$

○ $\text{Min} Z = 2x + 3y + A$

○ $\text{Max} Z = A$

○ $\text{Min} Z = A$ correct

The inequality $2x + 3y \geq 18$ is equivalent to

Answer (Please select your correct option)

○ $2x + 3y \leq -18$

○ $-2x - 3y \geq 18$

○ $-2x - 3y \geq -18$

○ $-2x - 3y \leq -18$ **correct**

In which of the following models, Simplex algorithm is not preferred to use due to laborious computations?

Answer (Please select your correct option)

○ Transportations models

○ Degenerate Linear models   **correct**

○ Non-degenerate Linear models

○ Dual or unbounded linear models

Transportations models consist of -------- like the production centers and --------- which may be the sales centers.

Answer (Please select your correct option)

○ (sinks, sources)

○ (sources, sinks)   **correct**

○ (origins, sources)

○ (sinks, destinations)

To convert the transportation problem into a maximization model we have to------------.

Answer (Please select your correct option)

○ write the inverse of the coefficient matrix

○ multiply the feasibility condition by −1

○ multiply the coefficient matrix by −1

○ We can't convert the transportation problem into a maximization problem, as it is basically a minimization prob