Topic:- OR MPHIL S2N

1) **Let the feasible region of a linear programming problem be given by a polyhedral set $P_F = \{X \in R^n: AX = b, X \geq 0, b \geq 0\}$. Then the problem has a bounded feasible region, if there exists_____ such that for every $X \in P_F$ we have_____.**

[Question ID = 11062]

1. a positive constant M, $|X| \leq M$

   [Option ID = 44242]
2. a positive constant M, $|X| = M$

   [Option ID = 44243]
3. a negative constant M, $|X| = M$

   [Option ID = 44244]
4. a negative constant M, $|X| \geq M$

   [Option ID = 44245]

Correct Answer :-

- a positive constant M, $|X| \leq M$

  [Option ID = 44242]

2) **In R^3, a polytope has_____ like shape.**

[Question ID = 11063]

1. circle

   [Option ID = 44246]
2. triangle

   [Option ID = 44247]
3. prism

   [Option ID = 44248]
4. ellipse

   [Option ID = 44249]

Correct Answer :-

- prism

  [Option ID = 44248]

3) **The vertices of a bounded closed set may be_____.**

[Question ID = 11064]

1. finite [Option ID = 44250]
2. infinite [Option ID = 44251]
3. indefinite [Option ID = 44252]
4. countable [Option ID = 44253]

Correct Answer :-

- infinite [Option ID = 44251]

4) **The redundant constraint among the constraints $x_1 - x_2 + 2x_3 = 4, 2x_1 + x_2 - x_3 = 3, 5x_1 + x_2 = 10, x_j \geq 0, j = 1,2,3$ is**

[Question ID = 11065]

1. $x_1 - x_2 + 2x_3 = 4$

   [Option ID = 44254]
2. $2x_1 + x_2 - x_3 = 3$

   [Option ID = 44255]
3. $5x_1 + x_2 = 10$

[Option ID = 44256]

Correct Answer :-

- $2x_1 + x_2 - x_3 = 3$

[Option ID = 44255]

5) The dual problem of the primal linear programming problem $\max z = 4x_1 - 3x_2 \text{ s.t. } x_1 - x_2 \leq 1, -x_1 + x_2 \leq -2,\ x_1 \geq 0,\ x_2 \geq 0$ has _____.

[Question ID = 11066]

1. a feasible solution

   [Option ID = 44258]
2. no feasible solution

   [Option ID = 44259]
3. a unique solution

   [Option ID = 44260]
4. unbounded solution

   [Option ID = 44261]

Correct Answer :-

- no feasible solution

  [Option ID = 44259]

6) Applications of assignment problem may include

[Question ID = 11067]

1. matching personnel to jobs [Option ID = 44262]
2. assigning machines to tasks [Option ID = 44263]
3. designing buses routes [Option ID = 44264]
4. all of these [Option ID = 44265]

Correct Answer :-

- all of these [Option ID = 44265]

7) The transportation method assumes that_____.

[Question ID = 11068]

1. the number of occupied cells in any solution must be equal to the number of rows plus the number of columns plus 1 [Option ID = 44266]
2. the number of dummy sources equals the number of dummy destinations [Option ID = 44267]
3. there are no economies of scale if large quantities are shipped from one source to one destination [Option ID = 44268]
4. none of these [Option ID = 44269]

Correct Answer :-

- there are no economies of scale if large quantities are shipped from one source to one destination [Option ID = 44268]

8) In a balanced transportation problem with two sources and three destinations and availabilities 15 at each source and demand 10 at each destination, the dual variables in the optimal table corresponding to sources and destinations are 1, -2 and 1, 1, 1, respectively. Then the optimal objective value of the transportation problem is

[Question ID = 11069]

1. 45 [Option ID = 44270]
2. 20 [Option ID = 44271]
3. 10 [Option ID = 44272]
4. 15 [Option ID = 44273]

Correct Answer :-

- 15 [Option ID = 44273]

9) The linear programming problem $\max z = 2x_1 + 3x_2 \text{ s.t. } x_1 + x_2 \geq 4, x_1 - x_2 \leq 2,\ x_1 \geq 0,\ x_2 \geq 0$ has

[Question ID = 11070]

1. alternate optimal solution

   [Option ID = 44274]
2. unique optimal solution

   [Option ID = 44275]
3. unbounded solution

   [Option ID = 44276]
4. none of these

Answer :-

- unbounded solution

[Option ID = 44276]

10) The stationary point of the function $f(\chi) = 2 + 2\chi_1 + 3\chi_2 - \chi_1^2 - \chi_2^2, X = (\chi_1, \chi_2) \in R^2$ is _____.

[Question ID = 11071]

1. local maximum

[Option ID = 44278]

2. local minimum

[Option ID = 44279]

3. neither a local maximum nor a local minimum

[Option ID = 44280]

4. none of these

[Option ID = 44281]

Correct Answer :-

- local maximum

[Option ID = 44278]

11) The function $f(x) = x_1^2 + (x_2 - x_3)^2, X = (x_1, x_2, x_3) \in R^3$ is _____.

[Question ID = 11072]

1. positive definite

[Option ID = 44282]

2. negative definite

[Option ID = 44283]

3. positive semi-definite

[Option ID = 44284]

4. negative semi-definite

[Option ID = 44285]

Correct Answer :-

- positive semi-definite

[Option ID = 44284]

12) The solution to the dual linear programming problem

[Question ID = 11073]

1. presents the marginal profits/costs of each additional unit of a resource

[Option ID = 44286]

2. can always be derived by examining the z_j row of the primal problem's optimal simplex tableau

[Option ID = 44287]

3. is better than the solution to the primal problem

[Option ID = 44288]

4. all of these

[Option ID = 44289]

Correct Answer :-

- presents the marginal profits/costs of each additional unit of a resource

[Option ID = 44286]

13) Which of the following is not a direct inventory?

[Question ID = 11074]

1. Work-in-process inventories [Option ID = 44290]
2. Spare parts inventories [Option ID = 44291]
3. Waste inventories [Option ID = 44292]
4. Fluctuation inventories [Option ID = 44293]

Correct Answer :-

- Fluctuation inventories [Option ID = 44293]

14) Jessica Choi works in her bakery for 6 days a week for 49 weeks a year. Flour is delivered directly with a charge of Rs.

or each delivery, Jessica uses an average of 10 sacks of whole-grain flour a day, for which she pays Rs. 12 a sack. She ...overdraft at the bank which costs 12 per cent a year, with spillage, storage, loss and insurance costing 6.75 per cent ... What is the economic choice Jessica use?

[Question ID = 11075]

1. 160 units [Option ID = 44294]
2. 140 units [Option ID = 44295]
3. 142 units [Option ID = 44296]
4. none of these [Option ID = 44297]

Correct Answer :-

- 140 units [Option ID = 44295]

15) _____ are of the nature, if they are not available, they will not stop the system from working nor they reduce the efficiency of the system.

[Question ID = 11076]

1. Vital items [Option ID = 44298]
2. Essential items [Option ID = 44299]
3. Important items [Option ID = 44300]
4. Desirable items [Option ID = 44301]

Correct Answer :-

- Desirable items [Option ID = 44301]

16) The ordering cost is Rs.10 per order for a certain type of commodity whose holding cost per unit is Rs. 2 per year. If the annual demand is 4,000 units and the replacement is instantaneous and no shortages are allowed then the EOQ is_____.

[Question ID = 11077]

1. 200 units [Option ID = 44302]
2. 800 units [Option ID = 44303]
3. 550 units [Option ID = 44304]
4. 450 units [Option ID = 44305]

Correct Answer :-

- 200 units [Option ID = 44302]

17) A producer has to supply 12,000 units of a product per year to his customer. The demand is fixed and known and shortages are not allowed. The inventory holding cost is Rs.0.20 per unit per month and the set up cost per run is Rs. 350. The optimum scheduling period is _____.

[Question ID = 11078]

1. 1.87 month [Option ID = 44306]
2. 1.5 month [Option ID = 44307]
3. 2 month [Option ID = 44308]
4. 1 month [Option ID = 44309]

Correct Answer :-

- 1.87 month [Option ID = 44306]

18) The common basic queuing models assume that arrival rate follows the _____ and that service times follow _____.

[Question ID = 11079]

1. Poisson distribution, negative exponential distribution [Option ID = 44310]
2. normal distribution, Poisson distribution [Option ID = 44311]
3. Poisson distribution, exponential distribution [Option ID = 44312]
4. Beta distribution, normal distribution [Option ID = 44313]

Correct Answer :-

- Poisson distribution, negative exponential distribution [Option ID = 44310]

19) A product manufacturing plant at a city distributes its products by trucks, loaded at the factory warehouse. It has its own fleet of trucks plus trucks of a private transport company. This transport company has complained that sometimes its trucks have to wait in line and thus the company loses money paid for a truck and driver of waiting truck. The company has asked the plant manager either to go in for a second warehouse or discount prices equivalent to the waiting time. The data available is: Average arrival rate of all trucks = 3 per hour, Average service rate = 4 per hour. The transport company has provided 40% of the total number of trucks. Assuming that these rates are random according to the Poisson distribution, the expected waiting time of company trucks per day is_____.

[Question ID = 11080]

1. 7.2 hours per day [Option ID = 44314]
2. 5 hours per day [Option ID = 44315]
3. 3 hours per day [Option ID = 44316]
4. 7 hours per day [Option ID = 44317]

Correct Answer :-

- 7.2 hours per day [Option ID = 44314]

company has recorded the following list of service rates (customers/hour) for one of its servers as 5, 9, 4, 6, 5, 4, 8, 7. Their mean service time for this server is___.

[Question ID = 11081]

1. 0.22 minutes [Option ID = 44318]
2. 10.71 minutes [Option ID = 44319]
3. 11.33 minutes [Option ID = 44320]
4. 4.5 minutes [Option ID = 44321]

Correct Answer :-

- 10.71 minutes [Option ID = 44319]

21) Consider the case when several customers may collaborate and only one of them may stand in the queue. Such a customer behavior can be classified as_____.

[Question ID = 11082]

1. Balking [Option ID = 44322]
2. Jokeying [Option ID = 44323]
3. Collusion [Option ID = 44324]
4. none of these [Option ID = 44325]

Correct Answer :-

- Collusion [Option ID = 44324]

22) Assume that system failure rate (λ) = 0.005 failures per hour, rate of system down for preventive maintenance (λ_p) = 0.008 per hour, system repair rate (μ) = 0.009 repairs per hour, and rate of system preventive maintenance performance (μ_p) = 0.009 per hour. The system steady state availability is _____.

[Question ID = 11083]

1. 41% [Option ID = 44326]
2. 40% [Option ID = 44327]
3. 50% [Option ID = 44328]
4. 51% [Option ID = 44329]

Correct Answer :-

- 41% [Option ID = 44326]

23) A system was observed over a period of time and the following data is obtained: downtime per breakdown or failure ($T_b = 0.1\ month$), downtime per inspection ($T_i = 0.05\ month$), a constant associated with the system (c=3). The optimal number of inspections per month is

[Question ID = 11084]

1. 2 [Option ID = 44330]
2. 1 [Option ID = 44331]
3. 1.5 [Option ID = 44332]
4. 0 [Option ID = 44333]

Correct Answer :-

- 2 [Option ID = 44330]

24) The constant part of the bath-tub hazard rate called as the "useful period" begins just after the _____ and ends just before the _____.

[Question ID = 11085]

1. infant mortality period, wear-out period [Option ID = 44334]
2. debugging period, break-in period [Option ID = 44335]
3. burn-in period, debugging period [Option ID = 44336]
4. break-in period, wear-out period [Option ID = 44337]

Correct Answer :-

- infant mortality period, wear-out period [Option ID = 44334]

25) Let the reliability of a system is defined by $R(t) = e^{-\lambda t}$ where λ =0.0004 failures per hour. Then the Mean time to Failure (MTTF) is

[Question ID = 11086]

1. $2500\ hours$ [Option ID = 44338]
2. $2400\ hours$ [Option ID = 44339]
3. $2300\ hours$

[Option ID = 44341]

Correct Answer :-

- 2500 *hours*

[Option ID = 44338]

26) The probability of Mr. X living 20 years more is 1/5 and that of Mr. Y is 1/7. Then the probability that at least one of them will survive 20 years hence is_____.
[Question ID = 11087]

1. 12/35 [Option ID = 44342]
2. 1/35 [Option ID = 44343]
3. 11/35 [Option ID = 44344]
4. 13/35 [Option ID = 44345]

Correct Answer :-

- 11/35 [Option ID = 44344]

27) For the given mid values 25, 34, 43, 52, 61, 70, the first class of the distribution is_____.
[Question ID = 11088]

1. 24.5-34.5 [Option ID = 44346]
2. 25-34 [Option ID = 44347]
3. 20-30 [Option ID = 44348]
4. 20.5-29.5 [Option ID = 44349]

Correct Answer :-

- 20.5-29.5 [Option ID = 44349]

28) Which of the following example does not constitute an infinite population?
[Question ID = 11089]

1. Population consisting of odd numbers [Option ID = 44350]
2. Population of weights of newly born babies [Option ID = 44351]
3. Population of heights of 15-year old children [Option ID = 44352]
4. Population of heads and tails in tossing a coin successively [Option ID = 44353]

Correct Answer :-

- Population of heights of 15-year old children [Option ID = 44352]

29) The mean produce of wheat of a sample of 100 fields is 200 lbs per acre with a standard deviation of 10 lbs. Another sample of 150 fields gives the mean of 220 lbs with a standard deviation of 12 lbs. The two samples have been taken from the same population whose standard deviation is 11 lbs. The test statistic z is_____.
[Question ID = 11090]

1. -14.08 [Option ID = 44354]
2. 14.08 [Option ID = 44355]
3. 14.52 [Option ID = 44356]
4. -14.52 [Option ID = 44357]

Correct Answer :-

- -14.08 [Option ID = 44354]

30) The average score in an aptitude test administered at the national level is 80. To evaluate a state's education system, the average score of 100 of the state's students selected on random basis was 75. The state wants to know if there is a significant difference between the local scores and the national scores. In such a situation the null hypotheses may be stated as under:
[Question ID = 11091]

1. $H_o: \mu \neq 75$

   [Option ID = 44358]
2. $H_o: \mu > 80$

   [Option ID = 44359]
3. $H_o: \mu < 75$

   [Option ID = 44360]
4. $H_o: \mu = 80$

   [Option ID = 44361]

Correct Answer :-

- $H_o: \mu = 80$

[Option ID = 44361]

market research survey in which 1000 consumers were contacted states that 64 per cent of all consumers of a certain product were motivated by the product's advertising. Then the lower confidence limit for the proportion of consumers motivated by advertising in the population, given a confidence level equal to 0.95 (corresponding to $z = 1.96$) is

[Question ID = 11092]

1. 52.24% [Option ID = 44362]
2. 75.76% [Option ID = 44363]
3. 50.42% [Option ID = 44364]
4. 45.21% [Option ID = 44365]

Correct Answer :-

- 52.24% [Option ID = 44362]

32) In a random selection of 64 of the 2400 intersections in a small city, the mean number of scooter accidents per year is 3.2 and the sample standard deviation is 0.8. Then the standard error of mean for this finite population is_____.

[Question ID = 11093]

1. 0.097 [Option ID = 44366]
2. 0.08 [Option ID = 44367]
3. 0.064 [Option ID = 44368]
4. 0.001 [Option ID = 44369]

Correct Answer :-

- 0.097 [Option ID = 44366]

33) In case of bivariate population, Correlation can be studied through_____.

[Question ID = 11094]

1. coefficient of correlation [Option ID = 44370]
2. coefficient of partial correlation [Option ID = 44371]
3. cross tabulation [Option ID = 44372]
4. none of these [Option ID = 44373]

Correct Answer :-

- cross tabulation [Option ID = 44372]

34) Kurtosis is the measure of _____of a curve.

[Question ID = 11095]

1. flat-toppedness [Option ID = 44374]
2. skewness [Option ID = 44375]
3. symmetry [Option ID = 44376]
4. non-symmetry [Option ID = 44377]

Correct Answer :-

- flat-toppedness [Option ID = 44374]

35) If the marital status of individuals is recorded as a nominal data using numbers 1,2,3, or 4, then which of following operations are valid for marital status?

[Question ID = 11096]

1. $4 > 2$ or $3 < 4$

   [Option ID = 44378]
2. 3-1 = 4-2

   [Option ID = 44379]
3. $4 \div 2$

   [Option ID = 44380]
4. none of these

   [Option ID = 44381]

Correct Answer :-

- none of these

   [Option ID = 44381]

36) Consider a population of size $N = 9000$ divided into two strata of size 6000 and 3000, respectively. If we draw a sample of size $n = 30$, then the proportion of population included in these strata are _____.

[Question ID = 11097]

1. 20 and 10

   [Option ID = 44382]
2. 9 and 21

4. 15 and 15

[Option ID = 44385]

Correct Answer :-

- 20 and 10

[Option ID = 44382]

37) _____are the random variations in the sample estimates around the true population parameters.

[Question ID = 11098]

1. Sampling errors [Option ID = 44386]
2. Sampling size [Option ID = 44387]
3. Sampling biases [Option ID = 44388]
4. Natural biases [Option ID = 44389]

Correct Answer :-

- Sampling errors [Option ID = 44386]

38) _____concerns with the question of how many items are to be observed and how the information and data gathered are to be analyzed.

[Question ID = 11099]

1. The statistical design [Option ID = 44390]
2. The observational design [Option ID = 44391]
3. The operational design [Option ID = 44392]
4. The sampling design [Option ID = 44393]

Correct Answer :-

- The statistical design [Option ID = 44390]

39) _____refers to consistency and authenticity in responses.

[Question ID = 11100]

1. Validity [Option ID = 44394]
2. Objectivity [Option ID = 44395]
3. Reliability [Option ID = 44396]
4. Generalization [Option ID = 44397]

Correct Answer :-

- Reliability [Option ID = 44396]

40) Most of the survey types of research designs are_____.

[Question ID = 11101]

1. one-time research [Option ID = 44398]
2. simulation research [Option ID = 44399]
3. interventional research [Option ID = 44400]
4. analytical research [Option ID = 44401]

Correct Answer :-

- one-time research [Option ID = 44398]

41) The ethical issues involved in formulating a research problem include_____.

[Question ID = 11102]

1. the study population may be adversely affected by some of the questions [Option ID = 44402]
2. the study population may expected to be simply experimental 'guinea pigs' [Option ID = 44403]
3. the study population may expected to share sensitive and private information [Option ID = 44404]
4. all of these [Option ID = 44405]

Correct Answer :-

- all of these [Option ID = 44405]

42) For any investigation, the selection of an appropriate _____is crucial in enabling a researcher to arrive at valid findings, comparisons and conclusions.

[Question ID = 11103]

1. research design [Option ID = 44406]
2. research methodology [Option ID = 44407]
3. research question [Option ID = 44408]
4. none of these [Option ID = 44409]

Correct Answer :-

- research design [Option ID = 44406]

43) Quantitative research focuses on _____.

3. reliability and objectivity [Option ID = 44412]
4. all of these [Option ID = 44413]

Correct Answer :-

- all of these [Option ID = 44413]

44) From the view point of application, the research can be broadly categorized as____.

[Question ID = 11105]

1. pure and applied [Option ID = 44414]
2. qualitative and quantitative [Option ID = 44415]
3. descriptive and explanatory [Option ID = 44416]
4. exploratory and correlational [Option ID = 44417]

Correct Answer :-

- pure and applied [Option ID = 44414]

45) Which of the following is not a random sampling technique?

[Question ID = 11106]

1. Purposive sampling [Option ID = 44418]
2. Stratified sampling [Option ID = 44419]
3. Cluster sampling [Option ID = 44420]
4. Systematic sampling [Option ID = 44421]

Correct Answer :-

- Purposive sampling [Option ID = 44418]

46) If the standard error of the population is reduced by 50 per cent, then the sample size_____.

[Question ID = 11107]

1. becomes double

   [Option ID = 44422]
2. increases 6 times

   [Option ID = 44423]
3. increases 4 times

   [Option ID = 44424]
4. increases 2 times

   [Option ID = 44425]

Correct Answer :-

- increases 4 times

  [Option ID = 44424]

47) Consider a population with $N = 200$ and $\mu = 30$. The mean of the sampling distribution of the mean for a sample of size 40 is

[Question ID = 11108]

1. not possible to determine [Option ID = 44426]
2. 30 [Option ID = 44427]
3. 40 [Option ID = 44428]
4. 25 [Option ID = 44429]

Correct Answer :-

- 30 [Option ID = 44427]

48) When sample size increases, _____.

[Question ID = 11109]

1. the standard error remains unchanged [Option ID = 44430]
2. the standard error increases [Option ID = 44431]
3. the standard error decreases [Option ID = 44432]
4. none of these [Option ID = 44433]

Correct Answer :-

- the standard error decreases [Option ID = 44432]

49) Original source from which a researcher directly collects the data that has not been previously collected is _____.

[Option ID = 44434]

2. Primary data

   [Option ID = 44435]

3. Tertiary data

   [Option ID = 44436]

4. none of these

   [Option ID = 44437]

Correct Answer :-

- Primary data

  [Option ID = 44435]

50) 7-point rating scale with end-points associated with bipolar labels that have semantic meaning is referred to as _____.

[Question ID = 11111]

1. Semantic differential scale [Option ID = 44438]
2. Constant sum scale [Option ID = 44439]
3. Graphic rating scale [Option ID = 44440]
4. Likert scale [Option ID = 44441]

Correct Answer :-

- Semantic differential scale [Option ID = 44438]