

PREVIEW QUESTION BANK

Module Name : Agricultural Statistics - 68-ENG
Exam Date : 29-Jun-2024 Batch : 14:30-16:30

Sr. No.	Client Question ID	Question Body and Alternatives	Marks	Negative Marks
Objective Question				
1	201	Movement of DNA from one bacterium to another through a tubular bridge or pilus: 1. Conjugation 2. Transposition 3. Transfection 4. Transduction A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
2	202	Which of the following is responsible for eliminating toxic oxygen by-products from cells? 1. Mitochondria 2. Golgi complex 3. Peroxisomes 4. Chloroplasts A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
3	203	A form of multiple parasitism in which a parasite preferentially attacks a host that is already parasitized by another species is known as 1. Cleptoparasitism 2. Ectoparasitoid 3. Obligate parasitism 4. Superparasitism A1 : 1	4.0	1.00

		A2 : 2		
		A3 : 3		
		A4 : 4		
Objective Question				
4	204	For mass multiplication of DD-136 nematode, the common host used is 1. Silk moth 2. Fruit sucking moth 3. Codling moth 4. Lesser wax moth A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
5	205	Chlorpyrifos methyl is effective against stored product insects except 1. <i>Rhizopertha dominica</i> 2. <i>Tribolium castaneum</i> 3. <i>Caryedon serratus</i> 4. <i>Oryzaephilus surinamensis</i> A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
6	206	Which of the following insects often cause inhalational allergies in human following large emergence of adult insects 1. Stick insects 2. May flies 3. Ear wigs 4. Preying mantis A1 : 1 A2 : 2	4.0	1.00

A3 : 3

A4 : 4

Objective Question

7	207		4.0	1.00
Given below are two statements: Statement (I): Climate is a weather condition related to smaller areas at a given place and at a given time, Statement (II): Weather is a condition of atmosphere at a given place and at a given time In light of the above statements, choose the <i>most appropriate</i> answer from the options given below. 1. Both Statement (I) and Statement (II) are correct. 2. Both Statement (I) and Statement (II) are incorrect. 3. Statement (I) is correct but Statement (II) is incorrect. 4. Statement (I) is incorrect but Statement (II) is correct. A1 : 1 A2 : 2 A3 : 3 A4 : 4				

Objective Question

8	208		4.0	1.00
The local name of cyclone in Phillippines is 1. Hurricane 2. Cyclone 3. Baquio 4. Typhoon A1 : 1 A2 : 2 A3 : 3 A4 : 4				

Objective Question

9	209		4.0	1.00

Which one of the following are secondary tillage implements?

- (A). Subsoiler
- (B). Cultivator
- (C). Disc harrow
- (D). Wetland plough

Choose the **correct** answer from the options given below:

- 1. (A), (B) and (D) only.
- 2. (B) and (C) only.
- 3. (B), (C) and (D).
- 4. (B) and (D) only.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

10	210	_____ is the most suitable, drought resistant and persistent grass?	4.0	1.00
		1. <i>Alyosia sp.</i> 2. <i>Cenchrus ciliaris</i> 3. <i>Stylosanthes hamata</i> 4. <i>Sorghum bicolor</i>		
		A1 : 1		
		A2 : 2		
		A3 : 3		
		A4 : 4		

Objective Question

11	211	The rainfed area in India is approximately	4.0	1.00
		1. 30 mha 2. 40 mha 3. 57 mha 4. 70 mha		
		A1 : 1		
		A2 : 2		

A3 : 3

A4 : 4

Objective Question

12	212	Which nutrient is often a limiting factor in agricultural production? 1. Nitrogen 2. Carbon 3. Oxygen 4. Hydrogen A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

13	213	What is a potential disadvantage of agroforestry systems? 1. Increased soil erosion 2. Decreased carbon sequestration 3. Reduced biodiversity 4. Enhanced susceptibility to pests A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

14	214	Pungency in mustard oil is due to 1. Amino acid 2. Allyl isothiocyanate 3. Erusic acid 4. Oxalic acid A1 : 1 A2 : 2	4.0	1.00
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		A3 : 3		
		A4 : 4		
Objective Question				
15	215	Sesamum belongs to the family 1. Chenopodiaceae 2. Papilionaceae 3. Leguminosae 4. Pedaliaceae A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
16	216	Dark period is critical in which type of plant? 1. Short day plant 2. Long day plant 3. Day neutral plant 4. All the options A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
17	217	Which of the following is NOT a significant contributor to greenhouse gas emissions from livestock farming? 1. Carbon dioxide 2. Methane 3. Nitrous oxide 4. Ammonia A1 : 1 A2 : 2 A3 : 3	4.0	1.00

A4 : 4

Objective Question

18	218	Fe deficiency is mostly seen in crops growing on 1. Calcareous or alkaline soils 2. Salt affected soils 3. Acidic soils 4. Neutral soils A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

19	219	EDV (Essentially Derived Varieties) are those which are derived from: 1. crossing two commercially known varieties 2. hybrid introduced from other countries 3. existing variety through genetic engineering or mutation 4. crossing commercially known variety with its wild relative A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

20	220	What is the role of "companion planting" in agriculture? 1. Enhancing soil fertility through crop rotation 2. Growing different crop species together to deter pests 3. Cultivating plants in hydroponic system 4. Increasing soil compaction through cover cropping A1 : 1 A2 : 2 A3 : 3	4.0	1.00
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		A4 : 4		
Objective Question				
21	2901	If the correlation coefficient between body weight of full sibs is 0.25, then the heritability of this trait in this population is 1. less than 0.25 2. 0.35 3. 0.50 4. 0.75 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
22	2902	At what allelic frequency is the heterozygous genotype (Aa) twice as frequent as the homozygous genotype (aa) in a Hardy-Weinberg population? 1. $p = 0.2$; $q = 0.8$ 2. $p = 0.3$; $q = 0.7$ 3. $p = 0.4$; $q = 0.6$ 4. $p = 0.5$; $q = 0.5$ A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
23	2903	If $X \sim N(0,1)$ and $Y = X^2$, then the correlation between X and Y is 1. -1 2. 0 3. 0.5 4. 1 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00

Objective Question					
24	2904		If an individual of genotype AaBbCcDd is testcrossed, how many different phenotypes can appear in the progeny? 1. 16 2. 32 3. 64 4. 256 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question					
25	2905		If in the analysis of variance of a completely randomized design, the d.f. for the treatment sum of squares is 4 and the mean sum of squares due to error is 2, while the observed F-value for testing significance of treatment differences is 12.5, then which one of the following represents correctly the treatment sum of squares? 1. 25 2. 50 3. 75 4. 100 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question					
26	2906		If two Latin squares each of the same order are such that when one is superimposed over the other, each symbol of one falls on each symbol of the other once and only once, then the two Latin squares are said to be 1. Conjugate 2. Self-conjugate 3. Orthogonal 4. Reduced A1 : 1 A2 : 2 A3 : 3	4.0	1.00

		A4 : 4																		
Objective Question																				
27	2907	The following is a BIBD with parameters $v = 4, b = 4, k = 3, r = 3, \lambda = 2$ <table><tr><td>Block 1</td><td>1</td><td>3</td><td>4</td></tr><tr><td>Block 2</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Block 3</td><td>1</td><td>2</td><td>4</td></tr><tr><td>Block 4</td><td></td><td></td><td></td></tr></table> Block 4 contains 1. 1 4 2 2. 2 4 3 3. 2 3 1 4. 4 1 3 A1 : 1 A2 : 2 A3 : 3 A4 : 4	Block 1	1	3	4	Block 2	2	3	4	Block 3	1	2	4	Block 4				4.0	1.00
Block 1	1	3	4																	
Block 2	2	3	4																	
Block 3	1	2	4																	
Block 4																				
Objective Question																				
28	2908	A coin is tossed until a head appears. What is the expectation of the number of tosses required? 1. 0.5 2. 1 3. 2 4. 4 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00																
Objective Question																				
29	2909		4.0	1.00																

Of the 36 accounts drawn randomly from a very large number of accounts in a certain bank, 12 had a deposit of less than Rs. 1500. The estimated standard error for the estimate of the proportion of accounts having a deposit of less than Rs. 1500 is

1. $\frac{2}{105}$

2. $\frac{2}{315}$

3. $\frac{1}{3} \sqrt{\frac{2}{35}}$

4. $\frac{1}{9\sqrt{2}}$

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

30 2910

Two samples of size n are selected, one according to SRSWR and the other according to SRSWOR. Under SRSWR, V_1 stands for variance of sample mean based on all units while V_2 stands for the variance of sample mean based on distinct units. V_3 stands for the variance of sample mean based on SRSWOR. Which one of the following holds ?

1. $V_1 \geq V_2 \geq V_3$

2. $V_2 \geq V_1 \geq V_3$

3. $V_3 \geq V_2 \geq V_1$

4. $V_3 \geq V_1 \geq V_2$

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0 1.00

Objective Question

31 2911

A simple random sample of 4 households was drawn from a village containing 120 households. The number of persons per household in the sample were 6, 4, 7 and 3. The estimate of the total number of people in the village is

1. 20

2. 80

3. 600

4. 2400

A1 : 1

A2 : 2

A3 : 3

4.0 1.00

		A4 : 4		
Objective Question				
32	2912	If the events $A_1, A_2, \dots, A_n$ are independent and $P(A_i) = \frac{1}{1+i}$ for $1 \leq i \leq n$, then the probability that none of these n events occurs is 1. $1/(n+1)$ 2. $\frac{1}{(n+1)!}$ 3. $n/(n+1)$ 4. $1 - \frac{1}{(n+1)!}$ A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
33	2913	A committee of 4 people is to be appointed from 3 officers of the production department, 4 officers of the purchase department, 2 officers of the sales department and 1 chartered accountant. The probability that the chartered accountant must be in the committee is: 1. 8/70 2. 1/14 3. 13/14 4. 2/5 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
34	2914	In an experiment, the experimenter observes proportion of individuals affected by a disease in each of the plots by examining a random sample of individuals within each plot. If p is the observed proportion, then the appropriate variance stabilizing transformation in this case will be 1. Square root transformation 2. Sine inverse transformation 3. Logarithmic transformation 4. Fisher's z-transformation A1 : 1	4.0	1.00

		A2 : 2		
		A3 : 3		
		A4 : 4		
Objective Question				
35	2915	The Neyman-Pearson fundamental lemma gives the method of construction of 1. Uniformly most powerful test 2. Most powerful test 3. Randomized test 4. Unbiased test A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
36	2916	Which one of the following non-parametric tests is analogous to Chi-square test of goodness of fit? 1. Median test 2. Kolmogorov-Smirnov test 3. Mann-Whitney Test 4. Wilcoxon Test A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
37	2917		4.0	1.00

Which of the following statement(s) are correct?

- (A). Mean and variance are equal for Poisson distribution.
- (B). Mean is greater than variance for binomial distribution.
- (C). Mean is less than variance for Chi-square distribution.

Choose the **correct** answer from the options given below:

1. (A) and (B) only.
2. (B) and (C) only.
3. (A) and (C) only.
4. (A), (B) and (C) .

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

38	2918	In a Chi-square test, the contingency table has 5 rows and 5 columns. What is the number of degrees of freedom? 1. 10 2. 12 3. 16 4. 25 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

39	2919		4.0	1.00
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Match **List-I** with **List-II**

List-I	List-II
(A). Internal level	(I). Represents the overall logical structure of the entire database.
(B). Conceptual level	(II). Defines individual user views or schemas
(C). External level	(III). Hides the physical details of the database from users
(D). Data abstraction	(IV). Describes how data is physically stored in the database.

Choose the **correct** answer from the options given below:

1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (IV), (B) - (I), (C) - (II), (D) - (III)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

40 2920

4.0 1.00

Which of the following is NOT a bioinformatics database?

1. GenBank
2. UniProt
3. Sequin
4. PDB (Protein Data Bank)

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

41 2921

4.0 1.00

The term "phylogenetic tree" is used in:

1. Genome assembly
2. Evolutionary biology
3. Protein structure prediction
4. Statistical genomics

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

42 2922

What is a common application of bioinformatics in personalized medicine?

1. Genome-wide association studies
2. Protein crystallization
3. Virus isolation
4. mRNA isolation

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0

1.00

Objective Question

43 2923

The central dogma of molecular biology states that:

1. DNA is transcribed into RNA, which is translated into proteins
2. Proteins are transcribed into RNA, which is reverse-translated into DNA
3. DNA directly produces proteins in a cell
4. Only RNA is involved in gene expression

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0

1.00

Objective Question

44 2924

4.0

1.00

In bioinformatics, the term "homology" refers to:

1. Two proteins with different functions
2. Similarity in DNA sequences due to convergent evolution
3. Evolutionarily related genes or proteins
4. Unrelated genetic sequences

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

45 2925

Which of the following is an example of a bioinformatics algorithm used for sequence alignment?

1. Smith-Waterman algorithm
2. PCR amplification
3. Southern blotting
4. Protein purification

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0

1.00

Objective Question

46 2926

Computational biology involves the use of:

1. Microscopes for protein visualization
2. Computer algorithms to analyze biological data
3. Molecular cloning techniques
4. Gel electrophoresis for DNA separation

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0

1.00

Objective Question

47 2927

4.0

1.00

Which one of the following is an example of primary database?

1. KEGG
2. EMBL
3. RefSeq
4. CATH

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

48 2928

4.0 1.00

Given below are two statements regarding substitution matrices:

Statement (I): The PAM substitution matrices were derived using local multiple alignments.

Statement (II): The BLOSUM matrices were derived using substitution frequencies derived from sets of closely related protein sequences.

In light of the above statements, choose the *most appropriate* answer from the options given below.

1. Both Statement (I) and Statement (II) are correct.
2. Both Statement (I) and Statement (II) are incorrect.
3. Statement (I) is correct but Statement (II) is incorrect.
4. Statement (I) is incorrect but Statement (II) is correct.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

49 2929

4.0 1.00

Consider the following terminologies used in phylogenetic analysis:

(A). The lines in a tree are called branches or edges.

(B). Internal branch is located between two nodes.

(C). Root is the common ancestor of all taxa.

Choose the **correct** answer from the options given below:

1. Only (A) and (B) are true.
2. Only (A) and (C) are true.
3. Only (B) and (C) are true.
4. All (A), (B) and (C) are true.

		A1 : 1		
		A2 : 2		
		A3 : 3		
		A4 : 4		
Objective Question				
50	2930	The number of possible unrooted trees for 5 operational taxonomic units is 3 15 105 954 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
51	2931	Given below are two statements regarding protein structure prediction methods: Statement (I): <i>Ab initio</i> method predicts protein structures based on sequence homology with known structures. Statement (II): Homology modeling, also known as comparative modeling attempts to produce all-atom protein models based on sequence information alone without the aid of known protein structures. In light of the above statements, choose the <i>most appropriate</i> answer from the options given below. - Both Statement (I) and Statement (II) are true. - Both Statement (I) and Statement (II) are false. - Statement (I) is true but Statement (II) is false. - Statement (I) is false but Statement (II) is true. A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
52	2932		4.0	1.00

Match **List-I** with **List-II**

List-I	List-II
(A). Procheck	(I). Multiple sequence alignment program
(B). ClustalW	(II). Software to check the stereochemical quality of a protein structure
(C). Swiss-Model	(III). Molecular visualization software
(D). Cn3D	(IV). Automated, flexible docking program
(E). Affinity	(V). An automated comparative protein modeling server

Choose the **correct** answer from the options given below:

- (A) - (II), (B) - (I), (C) - (V), (D) - (III), (E) - (IV)
- (A) - (III), (B) - (I), (C) - (V), (D) - (II), (E) - (IV)
- (A) - (III), (B) - (IV), (C) - (V), (D) - (II), (E) - (I)
- (A) - (II), (B) - (I), (C) - (IV), (D) - (III), (E) - (V)

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

53 2933

Consider the following statements regarding various functions used in Perl:

- (A). The splice() function is a general purpose function to add or remove array elements.
- (B). The push() function may be used to append a list of items to the beginning of an array.
- (C). The unshift() function prepends a list of items to the end of an array.

Choose the **correct** answer from the options given below:

- Only (A) is true.
- Only (A) and (B) are true.
- Only (A) and (C) are true.
- Only (B) and (C) are true.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0 1.00

Objective Question				
54	2934	Which of the following is not a supervised learning method? 1. Support vector machine 2. K-means clustering 3. Decision tree 4. Linear regression A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
55	2935	In Artificial Intelligence, an environment is uncertain if it is 1. Not fully observable and not deterministic 2. Not fully observable or not deterministic 3. Fully observable but not deterministic 4. Not fully observable but deterministic A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
56	2936	Choose the one which is not an Ensemble Modeling Technique: 1. Bagging 2. Boosting 3. Blending 4. Stacking A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00

Objective Question				
57	2937	Software does not wear-out in the traditional sense of the term, but software does tend to deteriorate as it evolves, because: 1. Software suffers from exposure to hostile environments. 2. Defects are more likely to arise after software has been used often. 3. Multiple change requests introduce errors in component interactions. 4. Software spare parts become harder to order A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
58	2938	Which statement is correct about the Multiplexer? 1. Produces multiple output signals 2. Produces single output signal 3. Encodes the input signals 4. Decodes the input signals A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
59	2939	Which one of the following is a FIFO data structure 1. Stacks 2. Linked List 3. Queues 4. Graphs A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				

60	2940	Thomson Reuters was created by the Thomson Corporation's purchase of the -----company, Reuters Group. 1. German 2. Canadian 3. French 4. British A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
61	2941	Following is used for storing a single Bit in Computer : 1. Multiplexer 2. Encoder 3. Flip Flop 4. Decoder A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
62	2942	Which of the following is not an application software? 1. Windows 10 2. WordPad 3. Photoshop 4. MS-excel A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
63	2943		4.0	1.00

The maximum number of processes that can be in ready state for a computer system with n CPUs is :

1. n
2. n^2
3. 2^n
4. Independent of n

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

64 2944

4.0 1.00

Consider the process given below:

Process	Arrival time	Service Time
P1	0.000	3
P2	1.001	6
P3	4.001	4
P4	6.001	2

What is the waiting time of process P3 using shortest job first (pre-emptive)?

1. 1
2. 3
3. 2
4. 0

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

65 2945

4.0 1.00

Which of the communication modes support two way traffic but only one direction at a time?

1. Simplex
2. Half Duplex
3. Three-quarter's duplex
4. Full duplex

A1 : 1

		A2 : 2		
		A3 : 3		
		A4 : 4		
Objective Question				
66	2946	The loss in signal power as light travels down the fibre is called: 1. Attenuation 2. Propagation 3. Scattering 4. Interruption A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
67	2947	_____ of a set of n elements is an arrangement of the elements in a given order: 1. Combination 2. Permutation 3. Exponent 4. Logarithm A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
68	2948		4.0	1.00

Which of the following are non linear type of data structure?

- (A).Tree
- (B).Graphs
- (C).Hash tables
- (D).List

Choose the **correct** answer from the options given below:

1. (A), (B) and (C) only.
2. (B), (C) and (D) only.
3. (A), (C) and (D).
4. All (A), (B), (C) and (D).

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

69 2949

Which of the following is a type of polymorphism in JAVA Programming?

1. Multiple Polymorphism
2. Compile Polymorphism
3. Multilevel Polymorphism
4. Execution time polymorphism

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0 1.00

Objective Question

70 2950

Using which of the following keywords can an exception be generated?

1. Threw
2. Throws
3. Throw
4. Catch

A1 : 1

A2 : 2

4.0 1.00

A3 : 3

A4 : 4

Objective Question

71	1003551	If A and B throw with one die for a stake of Rs. 44 which is to be won by the player who first throws 2. If A Starts playing first, the expectations of A and B are respectively 1. 12 and 32 2. 24 and 20 3. 28 and 16 4. 26 and 18 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

72	1003552	If X and Y are independent Poisson variates with parameters m and n, respectively, then the conditional distribution of X given X+Y is 1. Poisson 2. Normal 3. Binomial 4. Cauchy A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

73	1003553	Minimum Variance Unbiased estimators through sufficient statistic is obtained using 1. Central Limit theorem 2. Cramer-Rao inequality 3. Rao-Blackwell theorem 4. Neyman-Pearson lemma A1 : 1 A2 : 2	4.0	1.00
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A3 : 3

A4 : 4

Objective Question

74	1003554	Probability of accepting Null hypothesis H_0 when it is false is termed as 1. Power of a test 2. Type I error 3. Critical region 4. Type II error A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

75	1003555	Mode of F distribution with V_1 (>2) and V_2 degrees of freedom is given as 1. $[V_2(V_1-2)]/[V_1(V_2+2)]$ 2. $[V_1(V_2-2)]/[V_1(V_2+2)]$ 3. $[V_2(V_1-2)]/[V_2(V_1+2)]$ 4. $[V_2(V_1+2)]/[V_1(V_2-2)]$ A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

76	1003556	If X and Y are two independent standard normal variates, then the distribution of Y/X is 1. Weibull 2. Gamma 3. Standard Cauchy 4. Standard Normal A1 : 1 A2 : 2	4.0	1.00
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A3 : 3

A4 : 4

Objective Question

77	1003557	Given below are two statements: Statement (I): Likelihood Ratio test is generally an UMP if an UMP test at all exists Statement (II): In a Likelihood Ratio test, probability of type I error is controlled by effectively choosing a suitable cutoff point In light of the above statements, choose the <i>most appropriate</i> answer from the options given below. - Both Statement (I) and Statement (II) are correct. - Both Statement (I) and Statement (II) are incorrect. - Statement (I) is correct but Statement (II) is incorrect. - Statement (I) is incorrect but Statement (II) is correct. A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

78	1003558	In 100 set of ten tosses of unbiased coin, in how many cases, seven heads and three tails are expected by the experimenter. 12 17 10 14 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

79	1003559		4.0	1.00
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Given below are two statements:

Statement (I): In a negative binomial distribution, mean never exceeds variance

Statement (II): Negative binomial distribution is a generalised form of geometric distribution

In light of the above statements, choose the *most appropriate* answer from the options given below.

1. Both Statement (I) and Statement (II) are correct.
2. Both Statement (I) and Statement (II) are incorrect.
3. Statement (I) is correct but Statement (II) is incorrect.
4. Statement (I) is incorrect but Statement (II) is correct.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

80	1003560	In case of a normally distributed data sets, which of the following relationship pertaining to QD:MD:SD holds good 1. 10:12:15 2. 12:10:15 3. 15:12:10 4. 12:15:10 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

81	1003561	Given below are two statements: Statement (I): In a discriminant analysis, dependent variable is parametric and the independent variable is categorical Statement (II): Discriminant analysis minimizes the variance within a class and maximizes it between class In light of the above statements, choose the <i>most appropriate</i> answer from the options given below. 1. Both Statement (I) and Statement (II) are correct. 2. Both Statement (I) and Statement (II) are incorrect. 3. Statement (I) is correct but Statement (II) is incorrect. 4. Statement (I) is incorrect but Statement (II) is correct. A1 : 1	4.0	1.00
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A2 : 2

A3 : 3

A4 : 4

Objective Question

82	1003562	Given below are two statements: Statement (I): Principal Component Analysis is a supervised learning method Statement (II): Principal Component Analysis is a dimension reduction method In light of the above statements, choose the <i>most appropriate</i> answer from the options given below. - Both Statement (I) and Statement (II) are correct. - Both Statement (I) and Statement (II) are incorrect. - Statement (I) is correct but Statement (II) is incorrect. - Statement (I) is incorrect but Statement (II) is correct. A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

83	1003563	Minimum cost solution to a transportation problem is obtained by - North West corner cell method - Vogel's approximation method - Stepping stone method - Modified distribution method A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

84	1003564		4.0	1.00
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Identify the incorrect measure of multi collinearity in a regression model

1. Kappa Stat > 20
2. VIF > 5
3. Eigen value near to zero
4. Coefficient of determination > 0.7

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

85 1003565

4.0 1.00

If a constant C is deducted from each of the values of both the independent and dependent variables, then the regression coefficient

1. Increases by C
2. Decreases by C
3. Remains unchanged
4. Becomes 1/C of original regression coefficient

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

86 1003566

4.0 1.00

If there are X sources and Y destinations in a transportation problem, the total number of basic variables in a basic feasible solution is

1. $X+Y-1$
2. $X-Y$
3. $X+Y$
4. X

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

87	1003567	In a Linear Programming Problem, the restrictions included in the objective function to be optimized is known as 1. Constraints 2. Decision variables 3. Objective function 4. Finiteness A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

88	1003568	In a regression analysis, overall strength of the model is measured by 1. Coefficient of partial correlation 2. Coefficient of determination 3. Coefficient of partial regression 4. Eigen value A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

89	1003569	Optimum number of clusters in a cluster analysis is judged based on the following 1. Scree plot 2. Scatter plot 3. Biplot 4. Normal probability plot A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

90	1003570	Which one of the following test is used for testing the homoscedasticity of errors in a regression model 1. Run test 2. White test 3. Durbin-Watson test 4. Shapiro-Wilk test A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

91	1003571	Identify the best test to be adopted for testing the equality of mean thrips incidence in a set of same samples before and after spray of a treatment 1. Independent t-test 2. Analysis of Variance 3. Paired t-test 4. Chi-square test A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

92	1003572	Indicate the distribution free method used for testing K matched samples based on ordinal level of measurement 1. Sign test 2. Friedman's test 3. McNemar's test 4. Cochran Q test A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

93	1003573		4.0	1.00
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Non parametric measure of association used in case of categorical level of measurement is

1. Cramer coefficient
2. Kendal rank coefficient
3. Gamma stat
4. Spearman rank coefficient

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

94 1003574

4.0 1.00

In drawing a sample of size n from a finite population of size N using Simple Random Sampling With Replacement (SRSWR), the probability that a specified unit is included in the sample is

1. $1/N$
2. n/N
3. $1-[1-(1/N)]^n$
4. $[(N-1)/N]^n$

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

95 1003575

4.0 1.00

For estimating population mean $\bar{Y}$ of a study variable Y using double sampling, information on an auxiliary variable X was collected from a large preliminary sample of size n' units of a population in which X alone was measured to furnish an estimate $\bar{x}'$ of population mean of X , as the information about X of the population was not readily available. From this large preliminary sample, a smaller sample of size n was selected and the information on the main variable Y was collected and sample means $\bar{y}$ and using corresponding values of X , the sample mean $\bar{x}$ was computed. In both the phases, SRSWOR was done. The estimates were then used to obtain an estimator $\hat{Y}_d = \frac{\bar{y}}{\bar{x}} \bar{X}$ of the population mean Y . While deriving the variance of this ratio type mean estimator, the following expressions were considered:

$\epsilon_0 = \frac{\bar{y} - \bar{Y}}{\bar{Y}}$; $\epsilon_1 = \frac{\bar{x} - \bar{X}}{\bar{X}}$; $\epsilon_2 = \frac{\bar{x}' - \bar{X}}{\bar{X}}$. Then, if S_x^2 is the population variance of X , $E(\epsilon_1 \epsilon_2)$ is

1. $\left(\frac{1}{n'} - \frac{1}{N}\right) \frac{S_x^2}{\bar{X}^2}$
2. $\left(\frac{1}{n'} - \frac{1}{N}\right) S_x^2$
3. $\left(\frac{1}{n} - \frac{1}{n'}\right) \frac{S_x^2}{\bar{X}^2}$
4. $\left(\frac{1}{n} - \frac{1}{n'}\right) S_x^2$

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

96

1003576

4.0

1.00

A sample of 100 employees is to be drawn from a population divided into two strata. The strata population sizes N_i , population means (Pop. M_i) and the population mean squares (Pop. MS_i) of their monthly wages (in some units) are given below:

Stratum	N_i	Pop. M_i	Pop. MS_i
1	300	25	25
2	200	50	100

Then the sample sizes using proportional and Neyman allocations are given by

	Stratum i	Proportional	Neyman
1.	1	50	43
	2	50	57
	Stratum i	Proportional	Neyman
2.	1	60	43
	2	40	57
	Stratum i	Proportional	Neyman
3.	1	43	60
	2	57	40
	Stratum i	Proportional	Neyman
4.	1	60	57
	2	40	43

		A1 : 1		
		A2 : 2		
		A3 : 3		
		A4 : 4		

Objective Question

97

1003577

4.0

1.00

Consider the problem of estimating the total number of palm trees on 100 islands in a tropical paradise. The area of each island is known and it is reasonable to think that the number y_i of palm trees on each island is approximately proportional to the size of the island. The total size of these 100 islands is 100 square miles. Let the units selected with replacement in 4 independent draws be the islands numbered 1, 29, 36 and 29 with information details as follows:

island i	size of island i (in square miles)	y_i
1	1	14
29	5	50
36	2	25
29	5	50

Then the Horwitz Thompson estimate for estimating the total number of trees is

1. $\frac{14}{1-(1-0.01)^3} + \frac{100}{1-(1-0.05)^2} + \frac{25}{1-(1-0.02)^3}$
2. $\frac{14}{1-(1-0.01)^3} + \frac{50}{1-(1-0.05)^2} + \frac{25}{1-(1-0.02)^3}$
3. $\frac{14}{1-(1-0.01)^4} + \frac{100}{1-(1-0.05)^4} + \frac{25}{1-(1-0.02)^4}$
4. $\frac{14}{1-(1-0.01)^4} + \frac{50}{1-(1-0.05)^4} + \frac{25}{1-(1-0.02)^4}$

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

98	1003578		4.0	1.00
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Consider the following statements to estimate the total marine fish landings of our country:

(A). Even though the sampling design adopted for the purpose is 'stratified multistage random sampling' and stratification being done over space and time, cluster sampling and double sampling are also involved for selecting first stage units.

(B). A month is divided into 3 groups of 10 consecutive days. Suppose that the 4th date (day) was selected from the group of first 10 days of a month. Then 6 consecutive days from the selected day will be 4, 5, 6, 7, 8, 9 and these days are grouped into 3 clusters of 2 consecutive days, i.e., dates (4 and 5) will form one cluster, while (6 and 7) and (8 and 9) will form the other two clusters. From the 2nd group of 10 days, 6 days are systematically selected with a sampling interval of 10 days from the first date selected from the group of first ten days. Thus 6 days in the 2nd group will be 14, 15, 16, 17, 18 and 19 forming 3 clusters of dates (14 and 15), (16 and 17) and (18 and 19). From the 3rd group, 6 days are selected with the sampling interval of 10 days from the first day selected in the 2nd group, i.e., the dates will be 24, 25, 26, 27, 28 and 29 whose clusters are (24 and 25), (26 and 27), (28 and 29). Thus there are 9 clusters of two days each in a month.

(C). Each maritime state is divided into several zones on the basis of geographical consideration and fishing practices. Nine landing centres are selected at random from each zone for recording fish landings. Then 9 clusters, formed by a certain procedure involving systematic sampling also within a month, are allotted randomly to the 9 selected landing centres.

(D). On the first day of observation data are collected from 6 AM to 12 Noon and in the next day, 12 Noon to 6 PM. The data on night landings are collected by enquiry covering the period from 6 PM of the first day to 6 AM of the next day. Thus a 24 hour period is covered for a landing centre. This forms the 'landing centre day' and is the first stage sampling unit.

Choose the **correct** statements from the options given below:

1. (A) and (B) only.
2. (A) and (D) only.
3. (B) and (C) only.
4. (C) and (D) only.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

99 1003579

Consider the population $U = \{1, 2, 3\}$ with $P(\{1, 2\}) = 1/2$; $P(\{1, 3\}) = 1/4$; $P(\{2, 3\}) = 1/4$. Then if π_k denotes the first order inclusion probability of the k -th unit ($k=1, 2, 3$), which of the following is NOT true:

1. $\pi_1 = 3/4$
2. $\pi_3 = 1/2$
3. $\pi_1 + \pi_2 + \pi_3 = 1$
4. $\pi_1 - \pi_2 = 0$

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0 1.00

Objective Question

100	1003580	A village has 10 orchards numbered 1 to 10 containing 150, 50, 80, 100, 200, 160, 40, 220, 60, 140 trees respectively. It is desired to select a sample of 4 orchards PPS With Replacement to the number of trees in the orchard. By cumulative total method, if the random numbers chosen in the successive draws are 600, 650, 850 and 300, 1. then the orchards selected are 5, 3, 5, 7 2. then the orchards selected are 6, 4, 6, 8 3. then the orchards selected are 7, 5, 7, 9 4. then the orchards selected are 4, 2, 4, 6 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

101	1003581	Based on past experience, it is known that standard deviation of weight of one year old rohu fish is 25 g. If it is decided to estimate mean weight within 5 units of true value in either direction with confidence coefficient of 0.95 (note that the standard normal variate Z takes the value $1.96 \simeq 2$ approximately, at this 95% confidence level), then if the sampling is done with SRSWR and that the finite population correction is ignored, the required sample size is approximately 1. 20 2. 125 3. 50 4. 100 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

102	1003582		4.0	1.00
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Consider the following statements:

(A). Suppose the N units of a population are numbered 1 to N in some order. Suppose further that N is expressible as a product of two integers n and k such that $N = nk$. Select a number between 1 to k. Suppose it is i (this i can be any of numbers 1, 2, ..., k). Select the first unit, whose serial number is i. Select every k-th unit thereafter till the required sample size of n is taken. Then the last unit will be $i + (k-1)n$ for $i = 1, 2, \dots, k$

(B). Suppose the N units of a population are numbered 1 to N in some order. Suppose further that N is expressible as a product of two integers n and k such that $N = nk$. Select a number between 1 to k. Suppose it is i (this i can be any of numbers 1, 2, ..., k). Select the first unit, whose serial number is i. Select every k-th unit thereafter till the required sample size of n is taken. Thus there are k possible systematic samples. In other words, a systematic sample is a simple random sampling of one cluster unit from a population of k cluster units each of size n.

(C). Higher heterogeneity within the units of a systematic sample makes the mean estimator more efficient.

(D). Systematic sampling is more efficient than Simple Random Sampling (SRS) if the variation within the units in the systematic sample is less than the variation within the units of the SRS sample.

Choose the **correct** answer from the options given below:

1. (A) and (B) only.
2. (A) and (D) only.
3. (B) and (C) only.
4. (B) and (D) only.

- A1 : 1
- A2 : 2
- A3 : 3
- A4 : 4

Objective Question

103	1003583		4.0	1.00
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A medical device manufacturer produces vascular grafts. These grafts are produced by extruding polytetrafluoroethylene resin into tubes. Some tubes are produced defective which are called 'flicks'. He suspects that extrusion pressure is a factor for such flicks. He also suspects that there may be significant batch-to-batch variation. He decides to investigate the effect of four different levels of extrusion pressure on flicks using a randomized block design (RBD) considering batches of six resins as blocks. The usual randomization and replication principles of designed experiment are applied. The response variable is the percentage of tubes in the production run that did not contain any flicks which are tabulated as follows:

Extrusion Pressure	Batch of resin (Block)						Treatment
	R1	R2	R3	R4	R5	R6	Total
T1	90.3	89.2	98.2	93.9	87.4	97.9	556.9
T2	92.5	89.5	90.6	94.7	87.0	95.8	550.1
T3	85.5	90.8	89.6	86.2	88.0	93.4	533.5
T4	82.5	89.5	85.6	87.4	78.9	x	423.9+x
Block Total	350.8	359.0	364.0	362.2	341.3	287.1+x	2064.4+x

It can be seen that one of the observation x is missing in the above table. The value of x by employing missing plot technique in RBD set up is

1. 88.62
2. 91.27
3. 95.70
4. 90.25

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

1041003584

4.01.00

A varietal trial on Wheat crop was conducted using a two-associate Partially Balanced Incomplete Block Design (PBIBD). Using standard notations, the parameters of the design are $v=b=9$; $r=k=3$; $\lambda_1 = 1$; $\lambda_2 = 0$; $n_1 = 6$; $n_2 = 2$ and p_{jk}^i ($i, j, k = 1, 2$), where p_{jk}^i is the number of 'symbols' that are j -th associate of α and k -th associate of β , for any two symbols α and β that are i -th associates and is independent of the pairs of i -th associates α and β . In such a two-association scheme, the values of p_{jk}^i written as P^i ($i=1, 2$) for the following PBIBD with aforesaid parameters are

Blocks	Treatments		
I	3	8	4
II	2	7	4
III	1	7	5
IV	7	8	9
V	4	5	6
VI	3	9	5
VII	1	8	6
VIII	2	9	6
IX	1	2	3

1. $P^1 = \begin{pmatrix} 3 & 2 \\ 2 & 1 \end{pmatrix}$ and $P^2 = \begin{pmatrix} 5 & 0 \\ 0 & 1 \end{pmatrix}$
2. $P^1 = \begin{pmatrix} 3 & 2 \\ 2 & 0 \end{pmatrix}$ and $P^2 = \begin{pmatrix} 6 & 0 \\ 0 & 1 \end{pmatrix}$
3. $P^1 = \begin{pmatrix} 3 & 1 \\ 2 & 0 \end{pmatrix}$ and $P^2 = \begin{pmatrix} 6 & 1 \\ 0 & 1 \end{pmatrix}$
4. $P^1 = \begin{pmatrix} 2 & 2 \\ 2 & 0 \end{pmatrix}$ and $P^2 = \begin{pmatrix} 6 & 1 \\ 1 & 1 \end{pmatrix}$

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

105	I003585		4.0	1.00
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An experiment was conducted using Randomized Block Design with 5 treatments and 4 replications and some columns of the ANOVA for the same are given below:

Source	Sum of Squares	Mean Sum of Squares
Blocks	60	20
Treatments	1000	250
Error	216	18
Total	1276	

Let the means of the treatments T1, T2, T3, T4 and T5 to be compared are 65, 28, 25, 18 and 9 respectively. Suppose the F value obtained from ANOVA for Treatment effect is significant. Then the value of critical difference and the treatment groups that are significantly different from each other are [Given the tabulated values of t at 5% for a two tail test: 2.18 and 2.13 at 12 and 15 degrees of freedom respectively]

1. 6.15 and four groups viz., [T1, (T2, T3), T4, T5]
2. 6.54 and four groups viz., [T1, (T2, T3), T4, T5]
3. 6.15 and five groups viz., [T1, T2, T3, T4, T5]
4. 6.54 and five groups viz., [T1, T2, T3, T4, T5]

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

1061003586

4.01.00

Consider a 2^4 factorial experiment with two blocks within a replication. The experiment is laid with two replications and partial confounding has been done. If 0 and 1 denote the levels of each factor, the layout of the experiment appears as follows:

Replication I		Replication II	
Block 1	Block 2	Block 1	Block 2
0000	0001	0000	0010
0011	0010	0001	0011
0101	0100	0110	0100
0110	0111	0111	0101
1001	1000	1010	1000
1010	1011	1011	1001
1100	1101	1100	1110
1111	1110	1101	1111

The interactions confounded are

- 1. BCD in Replication I and ABCD in Replication II
- 2. ABCD in Replication I and ACD in Replication II
- 3. ABCD in Replication I and ABD in Replication II
- 4. ABCD in Replication I and ABC in Replication II

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

107	1003587		4.0	1.00
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In which of the following (2^5 , 2^3) factorial experiment design layout (one replicate given), the interactions ABC, ADE and hence BCDE are confounded?

1.	Block I	Block II	Block III	Block IV
	00000	10000	00100	00001
	11110	01110	11010	11111
	10011	00011	10111	10010
	10101	00101	10001	10100
	01101	11101	01001	01100
	01011	11011	01111	01010
	00110	10110	00010	00111
	11000	01000	11100	11001
	Block I	Block II	Block III	Block IV
2.	00000	00100	00001	10000
	01111	01011	01110	11111
	10101	10001	10100	00101
	10110	10010	10111	00110
	11010	11110	11011	01010
	11001	11101	11000	01001
	00011	00111	00010	10011
	01100	01000	01101	11100
3.	Block I	Block II	Block III	Block IV
	00000	10000	00001	00010
	00111	10111	00110	00101
	11101	01101	11100	11111
	10100	00100	10101	10110
	11010	01010	11011	11000
	10011	00011	10010	10001
	01001	11001	01000	01010
4.	01110	11110	01111	01100
	Block I	Block II	Block III	Block IV
	00000	10000	00001	01000
	11001	01001	11000	10001
	00101	10101	00100	01101
	01011	11011	01010	00011
	11100	01100	11101	10100
	10010	00010	10011	11010
	01110	11110	01111	00110
	10111	00111	10110	11111

A4 : 4

108	1003588		4.0	1.00
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Consider a paper manufacturer who is interested in three different pulp preparation methods and four different cooking temperatures for the pulp and who wishes to study the effect of these two factors on the tensile strength of the paper. The experimenter decides to conduct the experiment as follows: A batch of pulp is produced by one of the three methods under study. Then this batch is divided into four samples, and each sample is cooked at one of the four temperatures. Thus he made up a batch of pulp and obtained observations for all four temperatures from that batch. Then a second batch of pulp is made up using another of the three methods and the observations were made as mentioned above. The process is then repeated, until all three replicates of the experiment are obtained. The data are filled in the following Table format with Y_{ijk} denoting the observation pertaining to k -th replicate ($k = 1, 2, 3$) of the j -th level of temperature ($j = 1, 2, 3, 4$) within the i -th level of Pulp preparation method ($i = 1, 2, 3$):

		Replicate I			Replicate II			Replicate III		
	Pulp preparation method -->	1	2	3	1	2	3	1	2	3
Temperature ($^{\circ}\text{F}$) -->	200	Y_{111}	Y_{211}	Y_{311}	Y_{112}	Y_{212}	Y_{312}	Y_{113}	Y_{213}	Y_{313}
	225	Y_{121}	Y_{221}	Y_{321}	Y_{122}	Y_{222}	Y_{322}	Y_{123}	Y_{223}	Y_{323}
	250	Y_{131}	Y_{231}	Y_{331}	Y_{132}	Y_{232}	Y_{332}	Y_{133}	Y_{233}	Y_{333}
	275	Y_{141}	Y_{241}	Y_{341}	Y_{142}	Y_{242}	Y_{342}	Y_{143}	Y_{243}	Y_{343}

With the 'Pooled' error found out by combining the (Replication) x (Temperature) and (Replication) x (Pulp preparation method) x (Temperature), some columns of the ANOVA obtained from this designed experiment are given below:

Source	Sum of Squares	Mean Sum of Squares	F value
Replication	78	39	
Pulp preparation method	126	63	C
(Replication) x (Pulp preparation method)	36	9	
Temperature	A	144	D
(Pulp preparation method) x (Temperature)	72	12	E
'Pooled' Error	72	B	
	816		

The values of A, B, C, D and E are respectively

- 432, 6, 10.5, 24, 2
- 432, 4, 15.75, 36, 3
- 432, 6, 7, 24, 2
- 432, 4, 7, 36, 3

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

109

1003589

Consider the following classified design:

Course i -->	1	2	3			
Instructors j -->	1	2	3	4	5	6
Mark scores of Exams, k = 1	69	71	88	92	51	49
k = 2	75	80	90	85	65	71
k = 3	46	77	91	95	57	73

Now, consider the following statements:

(A). In the design given, every level of one factor i.e. Instructor is combined with only one level of another factor i.e. Course and hence it is a nested classified design

(B). Since it is a nested classified design, there is no interaction term between the factors viz., Course and Instructor

(C). For the design given, the error degrees of freedom in its corresponding ANOVA table is 10

(D). The "Instructor (within Course) effect" in ANOVA can be further split into three Sources viz., "Instructor (within Course i) effect" (i = 1, 2, 3)

Choose the **correct** answer from the options given below:

1. (A), (B) and (C) only.

2. (A), (B) and (D) only.

3. (A), (C) and (D) only.

4. (B), (C) and (D) only.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0

1.00

Objective Question

110

1003590

4.0

1.00

Consider the following Lattice design using

1	2	3
4	5	6
7	8	9

as the standard array with $s=3$.

Blocks			
I	1	2	3
II	4	5	6
III	7	8	9
IV	1	4	7
V	2	5	8
VI	3	6	9
VII	1	6	8
VIII	2	4	9
IX	3	5	7
X	1	5	9
XI	2	6	7
XII	3	4	8

Consider the following statements:

(A). As the Lattice design has been constructed by using the complete set of $(s-1 = 2)$ Mutually Orthogonal Latin Squares (MOLS) possible, it is a balanced Lattice.

(B). The Lattice design constructed is a BIBD with parameters $v=9$, $b=12$, $r=4$, $k=3$, $\lambda=1$

(C). The blocks X, XI and XII have been constructed by superimposing the following Latin Square arrangement on the standard array:

A	B	C
B	C	A
C	A	B

(D). For the Lattice design, the number of treatments $v = 3^2 = 9$ is a perfect square and its block size is 3, i.e. the square root of this number v .

Choose the **correct** statements from the options given below:

1. (A), (B) and (C) only.
2. (A), (B) and (D) only.
3. (A), (C) and (D) only.
4. (B), (C) and (D) only.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

111 1003591

4.0 1.00

Consider a greenhouse experiment on Tobacco Mosaic Virus (TMV). Each experimental unit was a single leaf on a plant and the data consisted of the number of lesions produced on the leaf by rubbing the leaf with a solution which contained the TMV. Each row of the design was a single plant. The columns were the 'position' from top to bottom, of the four leaves, which were used in each plant. Accordingly, the following Youden square design was constructed:

1	2	3	4	5	6	7
3	4	5	6	7	1	2
6	7	1	2	3	4	5
7	1	2	3	4	5	6

Consider the following statements:

(A). For the Youden Square Design, the rows form an RBD i.e. Randomized Block Design with $v=7$ treatments and $r=4$ replications.

(B). For the Youden Square Design, the columns form a symmetric BIBD i.e. Balanced Incomplete Block Design with $v=b=7$ and $r=k=4$ and $\lambda=1$.

(C). The given Youden Square Design is an incomplete Latin square and rather every Youden Square Design is an incomplete Latin Square Design.

(D). For the Youden Square Design, the 'position' effect is orthogonal to the treatment effect.

Choose the **correct** statements from the options given below:

1. (A), (B) and (C) only.
2. (A), (B) and (D) only.
3. (A), (C) and (D) only.
4. (B), (C) and (D) only.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

112 1003592

4.0 1.00

The base sunflower population has a mean of 100 days to flowering. Two parents were selected that had a mean of 90 days to flowering. The quantitative trait 'days to flowering' has a heritability of 0.2. Then the mean of a population derived from crossing these two parents is

1. 92
2. 96
3. 98
4. 94

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

113	1003593	If a plant with genotype AaBb is self pollinated, where the A and B are not linked, then the probability of getting AABB genotype will be 1. 1/2 2. 1/4 3. 1/8 4. 1/16 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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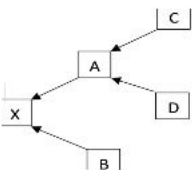
Objective Question

114	1003594	A hetero red eyed female was crossed with a red eyed male. The results are: Red eye observed: 120; White eye observed: 80. Red eyes are sex-linked dominant to white. Then, for performing goodness of fit test, the calculated Chi-square value is 1. 24 2. 6 3. 18 4. 21 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

115	1003595	Body weight of rabbits is determined by pairs of alleles at two loci that are additive and equal in their effects. Rabbits with genotype aabb have average 1 kg body weight, whereas individuals with genotype AABB have animals that average 3.4 kg in weight. A male rabbit with aabb is crossed with a female of genotype AABB. Then the predicted average weight of F1 progeny of this cross is 1. 1.70 2. 2.20 3. 0.85 4. 0.50 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

116	1003596	Consider the following path diagram:  In the above diagram, X is the dependent effect and A, B, C, D are the causes such that there is a chain system of cause and effect relationships in which $X = A + B$ and in turn $A = C + D$. Note here that A and B are independent and so are C and D. Let σ_X^2 be the (total) variance of X and let σ_A^2 be "the variance of X due to the influence of A" and likewise the variances are defined for the three independent causes viz., C and D & also B of the effect X. noting that $X = A + B = C + D + B$. If path coefficient from an independent cause B to X is $p_{X,B} = (\sigma_B / \sigma_X)$ and the degrees of determination of X by the causes A and B are denoted as $d_{X,A} = \frac{\sigma_A^2}{\sigma_X^2}$ and $d_{X,B} = \frac{\sigma_B^2}{\sigma_X^2}$ respectively such that their sum is one, and likewise the notations are similarly defined, then consider the following statements: (A). $d_{X,C} = d_{X,A} d_{A,C}$ (B). $p_{X,C} = p_{X,A} p_{A,C}$ (C). $d_{X,C} = d_{X,A} + d_{A,C}$ (D). $d_{X,A} = d_{X,C} + d_{X,D}$ Choose the correct answer from the options given below: 1. (A), (B) and (C) only. 2. (A), (B) and (D) only. 3. (A), (C) and (D) only. 4. (B), (C) and (D) only. A1 : 1	4.0	1.00
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A2 : 2

A3 : 3

A4 : 4

Objective Question

117 1003597

4.0 1.00

In a particular study, a random sample (assumed to have been taken from a population which follow Normal distribution) was taken. If the sample size was 50, then the standard error of sample mean obtained was found to be 8 units. How much would be the standard error, if the sample size was increased to 200 (assuming that the standard deviation of the sample observations did not change)?

1. 2
2. 4
3. 6
4. 8

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

118 1003598

4.0 1.00

Suppose that the recessive individuals ('aa', like lethal or sterile genes) of a large random mating population are intended to be entirely eliminated from the population and that only the dominants are allowed to mate and reproduce. The zygotic proportions of the various genotypes (AA, Aa, aa) in the population before such a selection (against recessives) are given as (p^2 , $2pq$, q^2) respectively. The frequency of 'A' after such a selection in the next generation is

1. $1/(1 + q)$
2. $q/(1+q)$
3. $-q^2/(1 + q)$
4. $2pq/(p^2 + 2pq)$

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

119 1003599

4.0 1.00

Let the frequency of a particular allele in the donor and the recipient populations, in some initial generation, be p_d and p_o respectively. Also suppose that a proportion 'm' of the genes in the recipient population are replaced in every generation by immigrants. Assuming random mating within the recipient population, the difference in the gene frequency between the donor and recipient populations after one generation of migration is

1. $-m(p_o - p_d)$
2. $(1 - m)^2(p_o - p_d)$
3. $(1 - m)(p_o - p_d)$
4. $2 - m(p_o - p_d)$

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

120	1003600	About 7% of men are color blind in consequence of a sex linked recessive gene. Assuming Hardy Weinberg equilibrium, what percentage of women are expected to be carriers of this gene? 1. 13.51 2. 13.02 3. 0.49 4. 7.00 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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