

National Testing Agency

Question Paper Name :	Biostatistics and Mathematical Biology 28th August 2021 Shift 2
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Biostatistics and Mathematical Biology

Group Number :	1
Group Id :	9409185
Group Maximum Duration :	0
Group Minimum Duration :	120
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	100
Is this Group for Examiner? :	No

Biostatistics and Mathematical Biology-1

Section Id :	9409189
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory

Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	20
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	9409189
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 940918275 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Anti-vaccination camps saying "You don't care about autistic children. As you don't care about autistic children, vaccines are bad". This is an example of:

1. Texas Sharpshooter Fallacy
2. Straw Man Fallacy
3. Anchoring
4. Placebo effect

Options :

940918961. 1

940918962. 2

940918963. 3

940918964. 4

Question Number : 2 Question Id : 940918276 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Claiming something to be scientific and factual in the absence of evidence is known as:

1. Pseudoscience
2. Falsifiability
3. Paradigm
4. Anthropocentrism

Options :

- 940918965. 1
- 940918966. 2
- 940918967. 3
- 940918968. 4

Question Number : 3 Question Id : 940918277 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which of the following tests can be performed for elevation expressed as Above Sea Level?

- 1. Chi square
- 2. ANOVA
- 3. Standard Deviation
- 4. Average

Options :

- 940918969. 1
- 940918970. 2
- 940918971. 3
- 940918972. 4

Question Number : 4 Question Id : 940918278 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which of the following can be used to summarize Gregor Mendel's data of dihybrid cross?

- 1. Contingency table
- 2. Histogram
- 3. XY Scatterplot
- 4. Empirical Frequency Distribution (EFD)

Options :

- 940918973. 1
- 940918974. 2
- 940918975. 3

940918976. 4

Question Number : 5 Question Id : 940918279 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which among the following graphs can reveal bimodal distribution?

1. Box and whisker plot
2. Contour plot
3. Histogram
4. Bubble chart

Options :

940918977. 1

940918978. 2

940918979. 3

940918980. 4

Question Number : 6 Question Id : 940918280 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which among the following is used to depict process of evolution?

1. 3 D doughnut plots
2. Surface plots
3. Dynamite plunger plot
4. Phylogenetic tree

Options :

940918981. 1

940918982. 2

940918983. 3

940918984. 4

Question Number : 7 Question Id : 940918281 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which among the following is the best point estimate if reciprocal transformation normalizes the dataset?

1. Arithmetic Mean
2. Geometric Mean
3. Harmonic Mean
4. 95% CI about the sample mean

Options :

940918985. 1

940918986. 2

940918987. 3

940918988. 4

Question Number : 8 Question Id : 940918282 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Peakedness of the distribution is quantified by which of the following?

1. Skewness
2. Kurtosis
3. D'Agostino-Pearson omnibus K2 normality test
4. ROUT method

Options :

940918989. 1

940918990. 2

940918991. 3

940918992. 4

Question Number : 9 Question Id : 940918283 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If the Grubb's test detect one outlier in the dataset:

1. Outlier should be removed before further analysis
2. Outlier should be checked for possible reasons for extraordinary value
3. Before proceeding for outlier removal, ROUT Method test should be conducted
4. Shapiro-Wilk test should be conducted

Options :

940918993. 1

940918994. 2

940918995. 3

940918996. 4

Question Number : 10 Question Id : 940918284 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

When the null hypothesis is true, decision of statistical test is to reject the null hypothesis to conclude statistical significance. This type of error is called:

1. Type I error
2. Type II error
3. Type III error
4. False Negative

Options :

940918997. 1

940918998. 2

940918999. 3

9409181000. 4

Question Number : 11 Question Id : 940918285 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Changing objectives of PhD thesis after results are known is an example of:

1. Stargazing
2. P Hacking
3. HARK
4. Data torture

Options :

9409181001. 1

9409181002. 2

9409181003. 3

9409181004. 4

Question Number : 12 Question Id : 940918286 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A high statistical power is obtained:

1. When Sample Size is small
2. When Standard Deviation is large
3. When looking for large effect
4. When prior probability is large

Options :

9409181005. 1

9409181006. 2

9409181007. 3

9409181008. 4

Question Number : 13 Question Id : 940918287 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which of the following tests compare sample group means to infer whether infinite population group means are significantly different or not?

1. One-way ANOVA
2. Two-way ANOVA
3. Type-II ANOVA
4. Random effects ANOVA

Options :

9409181009. 1

9409181010. 2

9409181011. 3

9409181012. 4

Question Number : 14 Question Id : 940918288 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Tukey's HSD depends on:

1. MSwithin
2. dfwithin
3. Total number of groups
4. All of these

Options :

9409181013. 1

9409181014. 2

9409181015. 3

9409181016. 4

Question Number : 15 Question Id : 940918289 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

To indicate the risk of contracting a disease which among the following measure is used?

1. Sensitivity
2. Specificity
3. Disease incidence
4. Disease prevalence

Options :

9409181017. 1

9409181018. 2

9409181019. 3

9409181020. 4

Question Number : 16 Question Id : 940918290 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which of the following tests is used to bring out patterns of clustering if you have a very large number of variables?

1. Pearson's Correlation
2. Simple linear regression
3. Nonlinear regression
4. Principal Component Analysis

Options :

9409181021. 1

9409181022. 2

9409181023. 3

9409181024. 4

Question Number : 17 Question Id : 940918291 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Out of 5 candidate brown algal species, 3 are being selected for anticancer drug screening. In how many ways these 3 species can be selected if order is not important?

1. 10
2. 60
3. 125
4. 15

Options :

9409181025. 1
9409181026. 2
9409181027. 3
9409181028. 4

Question Number : 18 Question Id : 940918292 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

How many ways 5' end of CRISPR-Cas9 sequence be modified? 5' end has gRNA (Guide RNA) with a length of 20 nucleotides, that can be modified to target genomic region for genome editing. Clue: Order matters and repetitions are allowed.

1. 20^4
2. $20! / 16!$
3. $20! / 16! \times 4!$
4. 4^{20}

Options :

9409181029. 1
9409181030. 2
9409181031. 3
9409181032. 4

Question Number : 19 Question Id : 940918293 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

1% of women have breast cancer in Bathinda. 80% of mammograms detect breast cancer when it is there (and therefore 20% miss it). 9.6% of mammograms detect breast cancer when it's not there (and therefore 90.4% correctly return a negative result). Now suppose you get a positive test result. What are the chances you have cancer?

1. 8%
2. 80%
3. 98%
4. 89%

Options :

9409181033. 1

9409181034. 2

9409181035. 3

9409181036. 4

Question Number : 20 Question Id : 940918294 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

While reading scholarly literature scientists often look at the graphs to see the statistical significance without bothering to read the finer details including the exact P value. This is called :

1. Star gazing
2. GIGO principle
3. Statistical confounding
4. Simpson's paradox

Options :

9409181037. 1

9409181038. 2

9409181039. 3

9409181040. 4

Biostatistics and Mathematical Biology-2

Section Number :	2
Section type :	Offline
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	10
Section Marks :	30
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	94091810
Question Shuffling Allowed :	No

Question Number : 21 Question Id : 940918295 Question Type : SUBJECTIVE

Correct Marks : 3

Briefly explain Permutation vs. Combination.

Question Number : 22 Question Id : 940918296 Question Type : SUBJECTIVE

Correct Marks : 3

Briefly explain Standard deviation.

Question Number : 23 Question Id : 940918297 Question Type : SUBJECTIVE

Correct Marks : 3

Briefly explain Cherry picking.

Question Number : 24 Question Id : 940918298 Question Type : SUBJECTIVE

Correct Marks : 3

Briefly explain Placebo effect.

Question Number : 25 Question Id : 940918299 Question Type : SUBJECTIVE

Correct Marks : 3

Briefly explain Contour plot.

Question Number : 26 Question Id : 940918300 Question Type : SUBJECTIVE

Correct Marks : 3

Briefly explain Stem-and-leaf diagram.

Question Number : 27 Question Id : 940918301 Question Type : SUBJECTIVE

Correct Marks : 3

Briefly explain Randomized Control Trials.

Question Number : 28 Question Id : 940918302 Question Type : SUBJECTIVE

Correct Marks : 3

Briefly explain Statistical confounding.

Question Number : 29 Question Id : 940918303 Question Type : SUBJECTIVE

Correct Marks : 3

Briefly explain Type 2 error.

Question Number : 30 Question Id : 940918304 Question Type : SUBJECTIVE

Correct Marks : 3

Briefly explain Bonferroni Adjustment.

Section Id :	94091811
Section Number :	3
Section type :	Offline
Mandatory or Optional :	Mandatory
Number of Questions :	7
Number of Questions to be attempted :	5
Section Marks :	50
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	94091811
Question Shuffling Allowed :	No

Question Number : 31 Question Id : 940918305 Question Type : SUBJECTIVE

Correct Marks : 10

Explain the following test with an example, test's utility and interpretation of test's P values.

Dependent t-Test

Question Number : 32 Question Id : 940918306 Question Type : SUBJECTIVE

Correct Marks : 10

Explain the following test with an example, test's utility and interpretation of test's P values.

Non-linear regression

Question Number : 33 Question Id : 940918307 Question Type : SUBJECTIVE

Correct Marks : 10

Explain the following test with an example, test's utility and interpretation of test's P values.

ANOVA

Question Number : 34 Question Id : 940918308 Question Type : SUBJECTIVE

Correct Marks : 10

Explain the following test with an example, test's utility and interpretation of test's P values .

Kruskal-Wallis Test

Question Number : 35 Question Id : 940918309 Question Type : SUBJECTIVE

Correct Marks : 10

Explain the following test with an example, test's utility and interpretation of test's P values .

Spearman's Rank Correlation Test

Question Number : 36 Question Id : 940918310 Question Type : SUBJECTIVE

Correct Marks : 10

Explain the following test with an example, test's utility and interpretation of test's P values.

Linear regression

Question Number : 37 Question Id : 940918311 Question Type : SUBJECTIVE

Correct Marks : 10

Explain the following test with an example, test's utility and interpretation of test's P values.

Pearson's correlation