

# University of Mumbai

## Examination 2020 under cluster 4 (PCE)

Program: BE Biomedical Engineering

Curriculum Scheme: Rev2012

Examination: Third Year Semester VI

Course Code: BMC602 and Course Name: Biostatistics

Time: 1 hour

Max. Marks: 50

Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	Most frequently repeated observation in an expt is called
Option A:	mean
Option B:	median
Option C:	mode
Option D:	instant value
Q2.	What is the value of $P(-1.96 < Z < 1.96)$ ? A
Option A:	0.601
Option B:	0.205
Option C:	0.95
Option D:	0.75
Q3.	Height of TE Engineering student follows which distribution
Option A:	binomial
Option B:	Poisson
Option C:	Gaussian
Option D:	Chi-square
Q4.	For a normal population $(n-1)s^2/\sigma^2$ follows which distribution
Option A:	F-distribution
Option B:	Poisson
Option C:	Gaussian
Option D:	Chi-square
Q5.	Suppose that the ages at time of onset of a certain disease are approximately normally distributed with a mean of 11.5 years and a SD of 3 years. A child has just come down with the disease. Probability that the child is under 12 is ?
Option A:	0.5675
Option B:	1.5675
Option C:	-1.5675
Option D:	2.5675
Q6.	Given a normally distributed population with a mean 75 and variance of 625, find: $P(50 \leq x \leq 100)$
Option A:	0.6826
Option B:	1.6826
Option C:	2.6826
Option D:	.6826

**University of Mumbai**  
**Examination 2020 under cluster 4 (PCE)**

Q7.	If n, p are the parameters of the Binomial distribution then mean of the binomial distribution is .....
Option A:	$\sqrt{np}$
Option B:	$np$
Option C:	$npq$
Option D:	$\sqrt{npq}$
Q8.	Increase in false positive decreases which of the following of a test
Option A:	sensitivity
Option B:	specificity
Option C:	accuracy
Option D:	precision
Q9.	For a false NULL hypothesis, failure to reject gives rise to which of the following error
Option A:	Type-I
Option B:	Type-II
Option C:	$\alpha$
Option D:	$\beta$
Q10.	Formula for test of significance of difference between sample mean and population mean for small sample if standard deviation of population is given is -- -----
Option A:	$t = \frac{\bar{x} - \mu}{s/\sqrt{n-1}}$
Option B:	$t = \frac{\bar{x} - \mu}{\sigma/\sqrt{n-1}}$
Option C:	$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$
Option D:	$Z = \frac{\bar{x} - \mu}{s/\sqrt{n-1}}$
Q11.	The following are the systolic blood pressure of 10 patients undergoing during therapy for hypertension 183, 152, 178, 194, 163, 144, 114, 178, 118, 158, Can we conclude on the basis of these data that the population mean is less than 165 To arrive at conclusion required to use which formula?
Option A:	$t = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$
Option B:	$t = \frac{\bar{x} - \mu}{\rho/\sqrt{n-1}}$
Option C:	$t = \frac{\bar{x} - \mu}{s/\sqrt{n-1}}$
Option D:	$t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$
Q12.	Uniform distribution for N observations with bin range of N/10 is characterized by expected frequency of
Option A:	1
Option B:	5

**University of Mumbai**  
**Examination 2020 under cluster 4 (PCE)**

Option C:	10																
Option D:	N																
Q13.	<p>Two batches are taken for the test of inoculation, one batch was inoculated and the other batch was not inoculated. The numbers of dead and surviving animals are given in the following table for both cases. Can the inoculation be regarded as effective against the disease?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Dead</th> <th>survived</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Inoculated</td> <td>200</td> <td>60</td> <td>260</td> </tr> <tr> <td>Non-inoculated</td> <td>100</td> <td>30</td> <td>130</td> </tr> <tr> <td>Total</td> <td>300</td> <td>90</td> <td>390</td> </tr> </tbody> </table> <p>In above example calculated value of <math>\chi^2</math> is?</p>		Dead	survived	Total	Inoculated	200	60	260	Non-inoculated	100	30	130	Total	300	90	390
	Dead	survived	Total														
Inoculated	200	60	260														
Non-inoculated	100	30	130														
Total	300	90	390														
Option A:	2																
Option B:	1																
Option C:	0																
Option D:	3																
Q14.	<p>Weights in Kg of 10 students are given below 38, 40, 45, 53, 47, 43, 55, 48, 52, 49. Find the confidence interval of the standard deviation of the population at 5% level. To solve the above example we can use</p>																
Option A:	F-Test																
Option B:	t-Test																
Option C:	Z-Test																
Option D:	Chi-square -Test																
Q15.	<p>Mean of the population can be estimated from which of the following parameters of the sample</p>																
Option A:	average																
Option B:	proportion																
Option C:	confidence level																
Option D:	dispersion																
Q16.	<p>5% level of significance corresponds to which confidence interval</p>																
Option A:	99%																
Option B:	95%																
Option C:	97.50%																
Option D:	90%																
Q17.	<p>Mean and SD values of serum Fe are 120 and 14.14 <math>\mu\text{gm}</math> per 100 ml respectively. What is the probability of a random sample of 50 normal men yielding a mean between 115 and 125 <math>\mu\text{gm}</math> per 100 ml</p>																
Option A:	0.982																
Option B:	0.95																
Option C:	0.7134																
Option D:	0.5																
Q18.	<p>A sample of 101 light bulbs yielded a standard deviation of 85 burning hours. Find 90% confidence interval for the standard deviation. To solve given example</p>																

**University of Mumbai**  
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	required to use																
Option A:	Chi-square -Test																
Option B:	t-Test																
Option C:	F-Test																
Option D:	Z-Test																
Q19.	if <table border="1" style="margin-left: 20px;"> <tr> <td>X</td> <td>5</td> <td>14</td> <td>78</td> <td>96</td> <td>35</td> <td>42</td> <td>87</td> </tr> <tr> <td>Y</td> <td>5</td> <td>14</td> <td>78</td> <td>96</td> <td>35</td> <td>42</td> <td>87</td> </tr> </table> <p>Then value of Karl-Pearson's correlation coefficient is <math>r_{xy}</math> is</p>	X	5	14	78	96	35	42	87	Y	5	14	78	96	35	42	87
X	5	14	78	96	35	42	87										
Y	5	14	78	96	35	42	87										
Option A:	-0.57																
Option B:	1																
Option C:	2																
Option D:	-2																
Q20.	Following table shows scores obtained after three types of training by subjects in 2 age groups. Comment on factorial dependence. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Factor A (Age)</th> <th colspan="3">Training</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>Young</td> <td>15</td> <td>20</td> <td>30</td> </tr> <tr> <td>Old</td> <td>25</td> <td>20</td> <td>15</td> </tr> </tbody> </table>	Factor A (Age)	Training			1	2	3	Young	15	20	30	Old	25	20	15	
Factor A (Age)	Training																
	1	2	3														
Young	15	20	30														
Old	25	20	15														
Option A:	Dose dependent on age																
Option B:	Age is crucial factor																
Option C:	No interaction between age and dose																
Option D:	Interaction present																
Q21.	If <table border="1" style="margin-left: 20px;"> <tr> <td>X</td> <td>5</td> <td>14</td> <td>27</td> <td>30</td> <td>35</td> <td>42</td> <td>48</td> </tr> <tr> <td>Y</td> <td>15</td> <td>20</td> <td>22</td> <td>45</td> <td>50</td> <td>60</td> <td>65</td> </tr> </table> <p>Then value of Spearman's Rank correlation coefficient R is</p>	X	5	14	27	30	35	42	48	Y	15	20	22	45	50	60	65
X	5	14	27	30	35	42	48										
Y	15	20	22	45	50	60	65										
Option A:	-0.57																
Option B:	-1																
Option C:	1																
Option D:	2																
Q22.	Annual income (Rs in Lakhs) and marks of 4 TE students as follows <table border="1" style="margin-left: 20px;"> <tr> <td>Rs in Lakhs</td> <td>2.5</td> <td>3.0</td> <td>3.5</td> <td>4.0</td> </tr> <tr> <td>Marks</td> <td>86</td> <td>84</td> <td>85</td> <td>83</td> </tr> </table> <p>Correlation between the two is between</p>	Rs in Lakhs	2.5	3.0	3.5	4.0	Marks	86	84	85	83						
Rs in Lakhs	2.5	3.0	3.5	4.0													
Marks	86	84	85	83													
Option A:	-1.00 to -0.50																
Option B:	-0.50 to 0.00																
Option C:	0.00 to 0.50																
Option D:	0.50 to 1.00																
Q23.	Test statistic for one way ANOVA is																
Option A:	MSA/MST																
Option B:	MSA/MSW																

**University of Mumbai**  
**Examination 2020 under cluster 4 (PCE)**

Option C:	MSTr/MSBI																								
Option D:	MSTr/MSE																								
Q24.	<p>What do you infer from the following ANOVA table</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Source</th> <th>SS</th> <th>df</th> <th>MS</th> <th>VR</th> <th>p</th> </tr> </thead> <tbody> <tr> <td>Meat type</td> <td>21262</td> <td>3</td> <td>7087</td> <td>27.0</td> <td>0.0001</td> </tr> <tr> <td>Error</td> <td>36747</td> <td>140</td> <td>262</td> <td>----</td> <td></td> </tr> <tr> <td>Total</td> <td>58009</td> <td>143</td> <td>-----</td> <td>----</td> <td></td> </tr> </tbody> </table>	Source	SS	df	MS	VR	p	Meat type	21262	3	7087	27.0	0.0001	Error	36747	140	262	----		Total	58009	143	-----	----	
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Meat type	21262	3	7087	27.0	0.0001																				
Error	36747	140	262	----																					
Total	58009	143	-----	----																					
Option A:	Probability figure is wrong																								
Option B:	All meat types are same																								
Option C:	Significant difference among meat types																								
Option D:	Degrees of freedom not tallying																								
Q25.	You want to evaluate the effect of rain, soil quality, seed quality and fertilizer on the crop yield, how you will proceed																								
Option A:	Linear regression																								
Option B:	Multi variant regression																								
Option C:	Least square fitting																								
Option D:	Two way ANOVA																								

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Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	C
Q2.	C
Q3.	C
Q4	D
Q5	A
Q6	A
Q7	B
Q8.	B
Q9.	B
Q10.	C
Q11.	C
Q12.	C
Q13.	C
Q14.	D
Q15.	A
Q16.	B
Q17.	A
Q18.	A
Q19.	B
Q20.	D
Q21.	C
Q22.	B
Q23.	B
Q24.	C
Q25.	B

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