FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF APPLIED SCIENCE AND HUMANITIES
(4th SEMESTER) B.TECH PROGRAMME
PROBABILITY, STATISTICS AND NUMERICAL METHODS (203191251)
ACADEMIC YEAR 2021-2022

Assignment 4

Q-1	Write Null and Alternative hypothesis for the following Problems.
1	It is believed that a textile factory produces 300 shirts on an average . But a worker claims that the machines after maintenance no longer makes 300 shirts.
2	Doctors believe that people after age of 70 sleeps longer than 12 hours on an average per day but researchers claims that they do not sleep more than 12 hours.
Q-2	A sample of 400 students have a mean height of 171.38 cms. Can it be reasonably regarded as a random sample from large population with mean height 171.17 and standard deviation of 3.3 cms ?
Q-3	A random sample of 400 items gave mean 4.45 and variance 4.Can the sample be regarded as drawn from a normal population with mean 4?
Q-4	The average daily wage of 1000 labourers of a factory A is Rs 47 with S.D of Rs 28. The average daily wage of 1500 labourers of a factory B is Rs 49 with S.D of Rs 40 can it be said that the average daily wage of factory B is more than the average daily wage of factory A.
Q-5	The mean of a random sample of 1000 units is 17.6 and the mean of another random sample of 800 units is 18. Can it be concluded that both the samples come from the same population with S.D=2.6
Q-6	The average life of 150 electric bulbs of a company A is 1400 hours with a S.D of 120 hours while the average life of 200 electric bulbs of company B is 1200 hours with a S.D of 80 hours.Is the difference between the average lives of the bulbs significant?
Q-7	The information regarding marks of boys and girls of a college is given below. Sample | Mean | S,D | Sample Size Boys | 83 | 10 | 121 Girls | 81 | 12 | 81 Test whether the difference in standard deviation is significant.
Q-8	In a large consignment of apples , 64 fruits out of a sample of 400 fruits are found to be bad. Test the hypothesis that the population proportion of bad apples in the consignment is 20%(Use 1% level of significance)
Q-9	In a big city , 480 man out of sample of 800 man are smokers. Does this information support the hypothesis that the majority of the man in city are smokers.
Q-10	A machine produce 16 defective articles in a batch of 500 articles .After renovation

<table>
<tr><td></td><td>each produce 3 defective articles in a sample of 100 articles . Has the machine improved?</td></tr>
<tr><td>Q-11</td><td>Ten individuals are chosen at random from a population and their heights are found to be in inches as
63,63,66,67,68,69,70,70,71,71
In the light of this data, test the hypothesis that the mean height of the population is 66.</td></tr>
<tr><td>Q-12</td><td>A machine is designed to produce insulating washers for electrical devices of average thickness of 0.025 cms. A random sample of 10 washers was found to have an average thickness of 0.024 cms with a standard deviation of 0.02 cms. Test the significance of the deviation .</td></tr>
<tr><td>Q-13</td><td>Two horses A and B were tested for running in particular track. The time (in seconds) taken by them are given below
<table>
<tr><td>Horse A</td><td>28</td><td>30</td><td>32</td><td>33</td><td>33</td><td>29</td><td>34</td></tr>
<tr><td>Horse B</td><td>29</td><td>30</td><td>30</td><td>24</td><td>27</td><td>29</td><td>-</td></tr>
</table>
Can it be concluded that horse A is faster than horse B .</td></tr>
<tr><td>Q-14</td><td>A drug is given to 10 patients and the increments in their blood pressure were recorded as 8, 3, 6, 10, 2, 3, 0, , 1
Is it reasonable to believe that the drug has no effect on change of blood pressure ?</td></tr>
<tr><td>Q-15</td><td>The following information is obtained for two samples drawn from two normal populations.
<table>
<tr><td>Sample</td><td>Size</td><td>Mean</td><td>S.D</td></tr>
<tr><td>I</td><td>10</td><td>12</td><td>3.162</td></tr>
<tr><td>II</td><td>12</td><td>15</td><td>5.115</td></tr>
</table></td></tr>
<tr><td>Q-16</td><td>A die is thrown 300 times and the following distribution is obtained. Can the die be regarded unbiased.
<table>
<tr><td>No. on the dice</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>Frequency</td><td>41</td><td>44</td><td>49</td><td>53</td><td>57</td><td>56</td></tr>
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