Assignment-4 (UNIT-4)
MTH145 Term-2302

<table>
<tr><td>Q.1</td><td>Obtain a relation of the form $y=ab^x$ for the following data by the method of least squares.
<table>
<tr><td>X</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>Y</td><td>8.3</td><td>15.4</td><td>33.1</td><td>65.2</td><td>127.4</td></tr>
</table>
Ans: $y=2.04(1.995)^x$</td><td>CO4</td></tr>
<tr><td>Q.2</td><td>Define method of least square.</td><td>CO4</td></tr>
<tr><td>Q.3</td><td>By method of least squares, find the straight line $y=a+bx$, that best fits the following data.
<table>
<tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>Y</td><td>14</td><td>27</td><td>40</td><td>55</td><td>68</td></tr>
</table>
Ans: $y=13.6x$</td><td>CO4</td></tr>
<tr><td>Q.4</td><td>Fit a straight line $y=a+bx$ by method of least square
<table>
<tr><td>X</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Y</td><td>1</td><td>1.8</td><td>3.3</td><td>4.5</td><td>6.3</td></tr>
</table>
Ans: $y=0.72+1.33x$</td><td>CO4</td></tr>
<tr><td>Q.5</td><td>Find the parabola of the form $y=ax^2+bx+c$ passing through the points (-1,2), (0,1) and (1,4). Ans: $y=1+x+2x^2$</td><td>CO4</td></tr>
<tr><td>Q.6</td><td>Fit the curve $y=ae^{bx}$ for the following data
<table>
<tr><td>X</td><td>2</td><td>4</td><td>6</td><td>8</td><td>10</td></tr>
<tr><td>Y</td><td>4.077</td><td>11.084</td><td>30.128</td><td>81.897</td><td>222.62</td></tr>
</table>
Ans: $y=1.499e^{0.5x}$</td><td>CO4</td></tr>
<tr><td>Q.7</td><td>Define the following:
(a) Statistical hypothesis (b) level of significance (c) critical region (d) Type I-error and Type II-error (e) One tailed and two tailed test</td><td>CO5</td></tr>
<tr><td>Q.8</td><td>Distinguish between Null hypothesis and Alternative hypothesis?</td><td>CO5</td></tr>
<tr><td>Q.9</td><td>What do you mean by 5% level of significance?</td><td>CO5</td></tr>
<tr><td>Q.10</td><td>A manufacturer claims that only 4% of his products supplied by him are defective. A random sample of 600 products contains 36 defectives. Test the claim of manufacturer. [given that $Z_{0.025}=1.96$] Ans: Z-statistic=2.5, H_0 rejected.</td><td>CO5</td></tr>
<tr><td>Q.11</td><td>In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers? [given that $Z_{0.05}=1.645$] Ans: Z-statistic=2.04, H_0 rejected.</td><td>CO5</td></tr>
<tr><td>Q.12</td><td>Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same, at 5% level. [given that $Z_{0.05}=1.96$]Ans: Z-statistic=1.3, H_0 accepted.</td><td>CO5</td></tr>
</table>

Q.13	A company wanted to introduce a new plan of work and a survey was conducted for this purpose. Out of sample of 500 workers in one group 62% favoured the new plan and another group of samples of 400 workers 41% were against the new plan. Is there any significant difference between the two groups in their attitude towards the new plan at 5% level of significance? [given that $Z_{0.025}=1.96$] *Ans: Z-statistic=0.0916, H_0 accepted.*	CO5
Q.14	The average marks in Statistics of a sample of 100 students was 51 with a S.D of 6 marks. Could this have been a random sample from a population with average marks 50? [given that $Z_{0.025}=1.96$] *Ans: Z-statistic=1.67, H_0 accepted.*	CO5
Q.15	A coin was tossed 960 times and returned heads 183 times. Test the hypothesis that the coin is unbiased. Use 5% level of significance. [given that $Z_{0.025}=1.96$] *Ans: Z-statistic=19.17, H_0 rejected.*	CO5
Q.16	In a random sample of 60 workers, the average time taken by them to get to work is 33.8 minutes with a SD of 6.1 minutes. Can we reject the null hypothesis $\mu=32.6$ minutes in favour of alternative hypothesis $\mu>32.6$ at 1% level of significance. [given that $Z_{0.01}=2.58$] *Ans: Z-statistic=1.5238, H_0 accepted.*	CO5
Q.17	The means of two large sample of sizes 1000 and 2000 members are 67.5 inches and 68 inches respectively. Can the samples be regarded as drawn from the same population of SD 2.5 inches. [given that $Z_{0.025}=1.96$] *Ans: Z-statistic=5.16, H_0 rejected.*	CO5
Q.18	Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportion of men and women in favour of the proposal are same, at 5% level. [given that $Z_{0.025}=1.96$] *Ans: Z-statistic=1.3, H_0 accepted.*	CO5