

Reg. No

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B

Time : 3 Hours

Maximum Marks:50

(Answer ANY FIVE questions)
Each question carries EQUAL Marks

QUESTIONS													MARKS																										
I.	Compute the correlation coefficient for the following pairs of data.												10																										
<table><tr><td>X</td><td>76</td><td>90</td><td>85</td><td>87</td><td>94</td><td>98</td><td>81</td><td>91</td><td>76</td><td>74</td><td>85</td><td>74</td></tr><tr><td>Y</td><td>55</td><td>65</td><td>55</td><td>70</td><td>65</td><td>70</td><td>55</td><td>70</td><td>50</td><td>55</td><td>65</td><td>50</td></tr></table>													X	76	90	85	87	94	98	81	91	76	74	85	74	Y	55	65	55	70	65	70	55	70	50	55	65	50	
X	76	90	85	87	94	98	81	91	76	74	85	74																											
Y	55	65	55	70	65	70	55	70	50	55	65	50																											
II.	a. Scores of an entrance examination are normally distributed with a mean of 527 and a standard deviation of 112. What is the probability of an individual scoring above 500 on the examination?												5																										
	b. For a certain type of battery, the lifetime is normally distributed with a mean of 50 hours and a standard deviation of 15 hours. What is the probability that a battery runs between 50 and 70 hours?												5																										
III	a. In a certain town, 40% of the eligible voters prefer candidate A, 10% prefer candidate B, and the remaining 50% have no preference. You randomly sample 10 eligible voters. What is the probability that 4 will prefer candidate A, 2 will prefer candidate B, and the remaining 4 will have no preference?												4																										
	b. There are three bags with black and white balls. The first bag contains 2 white and 3 black balls, the second bag contains 4 white and 5 black balls and the third bag contains 3 white and 3 black balls. One ball is drawn at random from one of the bags, and it is found to be black. Find the probability that it was drawn from the first bag.												6																										

IV	<p>The marks of a class of 10 students on the midterm (x) and the final (y) examinations are as follows:</p> <table><tr><td>x</td><td>77</td><td>50</td><td>71</td><td>72</td><td>81</td><td>94</td><td>96</td><td>67</td></tr><tr><td>y</td><td>82</td><td>66</td><td>78</td><td>34</td><td>47</td><td>85</td><td>99</td><td>68</td></tr></table> <p>Estimate the linear regression function. Also estimate the final examination grade of a student who received a grade of 85 on the midterm report.</p>	x	77	50	71	72	81	94	96	67	y	82	66	78	34	47	85	99	68	10
x	77	50	71	72	81	94	96	67												
y	82	66	78	34	47	85	99	68												
V	<p>A random sample of 10 chocolate energy bars of a certain brand has on average 230 calories with a population standard deviation of 15 calories. Construct a 99% confidence interval for the true mean calorie content. Assume that the distribution of calories is approximately normal.</p>	10																		
VI	<p>The content of containers of a particular lubricant is known to be normally distributed with a variance of 0.03 litre. Test the hypothesis that $\sigma^2 = 0.03$ against the alternative that $\sigma^2 \neq 0.03$ for the random sample of 10 containers with contents 10.2, 9.7, 10.1, 10.3, 10.1, 9.8, 9.9, 10.4, 10.3, and 9.8 litres. Use 0.01 level of significance.</p>	10																		
VII	<p>A random sample of 64 bags of calcium carbonate weighed, on average 5.23 kilograms with a standard deviation of 0.24 kilogram. Test the hypothesis that $\mu = 5.5$ kilograms against the alternative hypothesis, $\mu < 5.5$ kilograms at the 0.05 level of significance.</p>	10																		