Exam on Statistics and Probability

[Time: 1 hr]

[Total Marks: 100]

		Marks
Q1.	From the pack of 52 cards, three cards are drawn randomly without replacement then what is the probability that one card is a diamond, one card is a heart and one is spade?	**[10]**
Q2.	The information was gathered by a survey done by a production company: 42 % of the respondents said that they like action movies, 54 % like comedy movies, 36 % like drama movies, and 12 % like horror movies. If a person is selected at random, find the probability that his or her favourite movie type is either action or drama.	**[10]**
Q3.	An MNC company receives 450 applications from applicants in one hour. Find the probability of a. Receiving 10 applications in 1 minute. b. Receiving at least 17 applications in 2 minutes.	**[10]**
Q4.	The government of state union has declared a free medical insurance for below poverty line population by using following assumptions: a. In every year, there can be at most one patient who needs medical insurance in a family. b. Every year, the probability of a medical emergency is 0.05.** c. The number of patients every year is independent. (Using the assumptions, calculate the probability that there are fewer than 3 patients in a 10 years period in one family**)	**[10]**

<table>
<tr><td>Q5.</td><td>A bag A contains 3 red and 5 black balls and bag B contains 4 white and 7 black balls. A bag is selected randomly and a ball is drawn from it. A drawn ball is observed to be black. Find the probability that bag ‘B’ was selected.</td><td>[10]</td></tr>
<tr><td>Q6.</td><td>data = [152, 153, 154,20,55,26,64,88,150, 151, 155, 156,157,158,159, 250, 158, 22,33,43,159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 355, 174, 175, 176, 177,178, 300]
a) Calculate the mean and standard deviation of these observations and check if calculated Z-statistics can be applied or not.
b) Obtain the descriptive statistics of the data.</td><td>[10]</td></tr>
<tr><td>Q7.</td><td>Identify the outliers from the data and if any present remove it.
Data =[152, 153, 154,20,55,26,64,88,150, 151, 155, 156,157,158,159, 250, 158, 22,33,43,159, 160, 161, 162, 163, 164,165, 166, 167, 168, 169, 170, 171, 172, 355, 174, 175, 176, 177,178, 300].</td><td>[10]</td></tr>
<tr><td>Q8.</td><td>In the population, the mean weight is 82. A team of dietitians wants to test a new protein supplier to see if it has either a positive or negative effect on diet, or no effect at all. A sample of 15 participants who have taken the protein supplier. Did the protein supplier affect diet? Where alpha=0.05.
<table>
<tr><th>Before</th><th>After</th></tr>
<tr><td>90</td><td>85</td></tr>
<tr><td>82</td><td>88</td></tr>
<tr><td>77</td><td>86</td></tr>
<tr><td>81</td><td>80</td></tr>
</table></td><td>[10]</td></tr>
</table>

	98	86	
	100	99	
	111	98	
	84	79	
	85	79	
	81	78	
	81	76	
	73	78	
	81	78	
	89	74	
	83	78	

Q9. Annual project of university done by three groups of students with equal sample sizes. Each group was given a different task. After the final presentation students get the marks. The scores are given below. Find out whether groups performed the same or not. **[10]**

Group1_Marks	Group2_Marks	Group3_Marks
80	96	90
30	77	87
40	65	75
70	88	58
88	74	84
85	83	90

Q10. The number of customers that arrive on different days in a week at the Hotel Taj is given below. Test the claim that the different days of **[10]**

the week have the same frequency of customers. (Use the significance level as 0.1.**)

	Day	No. of Customers
0	Mon	1419
1	Tues	1320
2	Wed	1526
3	Thurs	1289
4	Fri	1620
5	Sat	2067
6	Sun	2055
7	Total	11296