

21AD62-DATA SCIENCE AND APPLICATIONS
ANSWER KEY
IAT-1

3a)	<p>Describe dispersion and variance and write the python code to compute the variance.</p> <p>Answer-</p> <p>Dispersion- it is used to measure how spread the data is +Example----(2M)</p> <p>Variance-Definition +Formula-----(2M)</p> <p>Python code:----- (2 M)</p> <pre>def variance(x): n=len(x) d=mean(x) return sumofsquares(d)/n-1</pre>	6	1	L3
3b)	<p>Illustrate central limit theorem with a neat diagram.</p> <p>Answer-</p> <p>Central limit theorem –2 M</p> <p>It states that the sample mean distribution of a random variable will assume a near normal or normal distribution if the sample size is enough though -sample size-distribution variation</p> <p>Diagram—2 M</p>	4	1	L2
4a)	<p>Explain the following with example, i) Null and Alternative Hypothesis ii) p-value iii) Type I Error. iv) Level of significance v) A/B Testing</p> <p>Answer-</p> <p>Definition +Example 2M each</p> <p>i) Null hypothesis -statement about a population that is believed to be true and Alternative Hypothesis -statement that is contradictory to the null hypotheses</p> <p>Example</p> <p>ii) p-value -The probability value obtained after the experiment. It is calculated from the Z value. It is compared with the level of significance to accept or reject null hypothesis-Conditions specify.+Example</p> <p>iii) Type I Error.-Its when your null hypothesis is true but we reject it in order to support the alternative hypothesis.+Example</p> <p>iv) Level of significance- parameter used in hypothesis testing to determine the threshold inorder to accept or reject the null hypothesis.+Example</p> <p>v) A/B Testing-Its is used to compare two products to find which is more efficient-method-example</p>	10	2	L2
5a)	<p>Explain the following with an example a) Named Tuple b) Data classes</p> <p>Answer-</p> <p>a) Named Tuple</p> <p>Definition +Example 3M</p> <p>b) Data classes</p> <p>Definition +Example 3M</p>	6	2	L2
5b)	<p>Write a python code for the probability density function of a Beta distribution.</p> <p>Answer-</p> <pre>def B(alpha, beta): return math.gamma(alpha) * math.gamma(beta) / math.gamma(alpha + beta) def beta_pdf(x, alpha, beta): if x < 0 or x > 1: return 0 return x ** (alpha - 1) * (1 - x) ** (beta - 1) / B(alpha, beta)</pre>	4	2	L3

6a)	Explain how gradient descent is used to fit parameterized models. Answer- Use of Gradient descent-2M How it is determined-2M Linear regression-how theta are adjusted-6M	10	2	L2
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