

Amul - Sri Vasani ①

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
Test - 3, May 2017 (Research Scholars)

Course Code: 10P1NGE201

Course Name: Research Methodology and Computational Techniques

Max Marks: 35

Course Credit: 3

Max. Time: 2 Hrs

Note: Answer all questions. Carrying of mobile phone in the examination hall will be treated as a case of unfair means.

Module 1 - HSS (For All Students) - (12 Marks)

1. Define IPR. Briefly discuss its broad categories. What is its importance for a researcher? (6)
2. What do you understand by Trade Secret? How can you protect it? (2)
3. Differentiate between Qualitative and Quantitative method of research. Briefly discuss the cases in which these methods may be used. (4)

Module 2 - Maths (For All Students) - (11 Marks)

1. Suppose you roll a fair die twice and sum the numbers that show. You win \$20 if a 7 or 11 shows up. You lose \$10 if a 2, 3, or 12 shows up. For anything else that shows up, you lose \$5. Let X be the amount that you win (or loss) in one play of this game. (2 Marks)

(a) Specify the range of values of random variable X .

(b) Obtain the probability distribution of X .

2. Mean of a *binomial* distribution is 3 and variance is 4. Find the value of q . (1 Marks)

3. Haverty's Furniture is a family business that has been selling to retail customers in the Chicago area for many years. The company advertises extensively on radio, TV, and the Internet, emphasizing low prices and easy credit terms. The owner would like to review the relationship between sales and the amount spent on advertising. Below is information on sales and advertising expense for the last four months. (4 Marks)

Month	Advertising Expense (\$ million)	Sales Revenue (\$ million)
July	2	7
August	1	3
September	3	8
October	4	10

- (a) The owner wants to forecast sales on the basis of advertising expense. Which variable is the dependent (y) variable? Which variable is the independent (x) variable?
 - (b) Determine the regression equation.
 - (c) Estimate sales when \$3 million is spent on advertising.
4. A farmer is trying out a planting technique that he hopes will increase the yield on his pea plants. The average number of pods on one of his pea plants is 145 pods with a standard deviation of 100 pods. This year, after trying his new planting technique, he takes a random sample of his plants and finds the average number of pods to be 147. He wonders whether or not this is a statistically significant increase. (4 Marks)

(a) What are his hypotheses and the test statistic?

(b) Conduct a single-tailed hypothesis test using a 0.05 significance level.

P.T.O.

Module 3 (Department Specific) - (12 Marks)

For Civil Engineering Students Only

1. Empirical research in India in particular creates so many problems for the researchers". State the problems that are usually faced by such researchers. (6)
2. "A research scholar has to work as a judge and derive the truth and as a pleader who is only eager to prove his case in favour of his plaintiff". Discuss the statement pointing out objectives of research. (6)

For BI/BT Students Only

1. What do you understand by structured abstract or unstructured abstract. Which one is more informative? (2)
2. Elaborate on the significance of graphical abstract in the journals. (2)
3. Discuss the significance of following in the publications: (6)
 - a) Conflict of interest
 - b) Statement about funding
 - c) Ethical statement
 - d) Plagiarism
 - e) Authorship claims
 - f) Keywords
4. What are the important challenges in Mentor-Trainee relationship? How these challenges may impact the final research plan? Make your suggestions to resolve these challenges. (3)
5. What are the differences between editorials and short communications types of manuscript. (2)

For ECE Students Only

What is Graph cut theory and how is it important for segmentation? With respect to Graph Cut theory elaborate the following

- i. Compare Directed and Undirected graphs.
- ii. What is $s-t$ cut?
- iii. How to Find the Minimum cut?
- iv. What is max flow algorithm?
- v. Explain energy minimization in graph cut?

OR

Explain block diagram of signal analysis system using LLFE design? What are invasive and non-invasive methods? Explain Booth-Encoded Wallace tree Multiplier for FFT computation in Biomedical Applications.

For PMS Students Only

- Q1. (a) For a material synthesis of your choice, discuss briefly the following: (1) process controls (2) variables (3) experimental design specifics (4) relevant characterization tools. (2x4=8 marks)
- (b) In case of synthesis failures, what strategy would you adopt? (2 marks)
- Q2. What are the steps you would follow for the documentation of (a) satisfactory and (b) unsatisfactory research results? (2x1=2 marks)

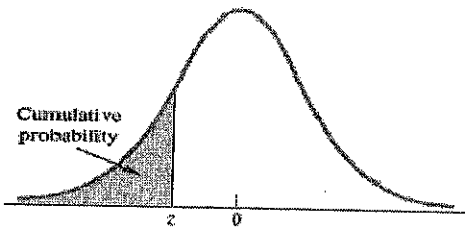
For CSE Students Only

1. Being a computer science scholar how will you address the following issues:
 - a. Pick a topic
 - b. Identify the research question(s)
 - c. Check the literature
 - d. Identify your philosophical stance
 - e. Identify appropriate theories
 - f. Choose the method(s)
 - g. Design the study
2. How will you review the literature for computer science research problem in terms of:
 - a. Finding literature for identified objectives in high impact factor journals.
 - b. Identifying the motivation and novelty in a research paper.
 - c. Find the possible extension part in the existing research work.
 - d. Criticizing the current work with proposed idea.
 - e. Identification of open source tools for simulation.
 - f. Contribution of proposed work in society.

What is the difference between Validity and Reliability? Explain the different types of validities. (4)

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(Standard) Normal probability table to compute $P(Z \leq z)$:



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
-3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
-3.2	.0007	.0007	.0006	.0005	.0005	.0006	.0006	.0005	.0005	.0005
-3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
-3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
-2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
-2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
-2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
-2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
-2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
-2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
-2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
-2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
-2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
-2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
-1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
-1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
-1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
-1.6	.0548	.0537	.0526	.0515	.0505	.0495	.0485	.0475	.0465	.0455
-1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
-1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
-1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
-1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
-1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
-1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
-0.9	.1844	.1814	.1786	.1757	.1736	.1711	.1685	.1660	.1635	.1611
-0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
-0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
-0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
-0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
-0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
-0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
-0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
-0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
-0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641