Pre. Ph.D. Course Work (2017 Course) SUPPLEMENTARY :
(Common for All Engineering & Technology Faculty: JUNE- 2019

SUBJECT: PAPER-I RESEARCH METHODOLOGY/ CIVIL ENGINEERING/CHEMICAL ENGINEERING/ COMPUTER ENGINEERING/ELECTRICAL ENGINEERING/ ELECTRONICS ENGINEERING MECHANICAL ENGINEERING

Day : Wednesday
Date : 26/06/2019
S-2019-5400
Time : 10.00 AM TO 1.00 PM
Max. Marks: 100

N.B.

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** Marks.

Q.1 What are the various types of research? Clearly indicate the difference between of quantitative and qualitative research? **(10)**

OR

a) Describe the following terminologies and explain their significance in research. **(04)**
   i) Proof
   ii) Hypothesis

b) Explain the rationale behind selecting various types of research approaches in engineering. **(06)**

Q.2 **a)** What are the various steps involved in any research process? Discuss the same related to your research problem statement. **(10)**

OR

What is the criteria of good research? Also explain the problems encountered by researches in India. **(10)**

Q.3 Mention your research problem statement and describe the limitations and assumptions of the identified research problem. **(10)**

OR

What are the steps involved in developing a research plan? Explain in brief. **(10)**

Q.4 Why probability sampling is generally preferred in compassion to non-probability sampling? Explain the procedure of selecting a simple random sample. **(10)**

OR

What are the different methods of collecting data? Explain in brief. Also state which method of collecting data is most suitable for conducting the enquiry regarding family welfare programme in India. Explain its merits and demerits. **(10)**

Q.5 **a)** What are the characteristics of a well formulated hypothesis? **(05)**
b) What do you mean by null and alternative hypothesis? **(05)**

OR

Draw a flow diagram of hypothesis testing and describe the stepwise procedure for the same. **(10)**

Q.6 Use Least square regression to fit a straight line for the following data **(10)**

x	1	3	5	7	10	12	13	16	18	20
y	4	5	6	5	8	7	6	9	12	11

Along with the slope and intercept, compute the standard error of the estimate and the correlation coefficient. Plot the data and the regression line.

OR

Describe the principle component analysis in detail with appropriate examples. **(10)**

(P.T.O.)

Q.7		What is ANOVA? Describe in detail basic principle of ANOVA.	**(10)**
		OR	
	a)	Describe the software tools available for maintaining the literature data.	**(05)**
	b)	How computers are used as a tools in research? Explain giving examples.	**(05)**
Q.8		What are the different types that are involved in writing any research report? Explain in detail.	**(10)**
		OR	
		Describe in detail the layout of research report.	**(10)**
Q.9	**a)**	What is the significance of intellectual property rights?	**(05)**
	b)	What are the plagiarism tools available? Describe its importance.	**(05)**
		OR	
	a)	What do you mean by 'similarity index'? Describe the ethical issues in research.	**(05)**
	b)	What is the importance of technology transfer in research?	**(05)**
Q.10		What should be the design review paper? Describe in detail.	**(10)**
		OR	
		What are the essential contents of abstract and conclusion of journal research paper? Explain in detail with examples.	**(10)**

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