Reg. No. : | | | | | | | | | | |

Question Paper Code: 42915

M.E. DEGREE EXAMINATION, NOVEMBER 2015.

Elective

CAD / CAM

14PCD522 – DESIGN AND ANALYSIS OF EXPERIMENTS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (5 x 1 = 5 Marks)

1. ANOVA technique is suitable for

   (a) game software (b) production software
   (c) forecasting (d) none of the above

2. Find the odd one from quantitative factors

   (a) weight (b) pressure (c) temperature (d) accuracy

3. The experiment suitable for predicting the failure which is based on multi factor is.

   (a) two factor full factorial experiment
   (b) three factor full factorial experiment
   (c) 2K factorial experiments
   (d) none of the above

4. What does PRESS stand for

   (a) predicted end surface stress (b) present error sum of squares
   (c) predicted error sum of squares (d) preset error sum of squares

5. The development of organization mainly depends on

(a) quality (b) management commitment
(c) worker involvement (d) all of the above

PART - B (5 x 3 = 15 Marks)

6. List and contrast the characteristics of population parameters and sample statistics.

7. Define Graceo latin square design.

8. Describe the concept of confounding in factorial experiments?

9. Write down the use of Taguchi experimental design.

10. Write about three basic principles of statistical DOE.

PART - C (5 x 16 = 80 Marks)

11. (a) Explain in detail about ANOVA technique. (16)

Or

(b) Briefly explain about

(i) Sample size. (8)
(ii) Normal probability plot. (8)

12. (a) An experiment was conducted to determine if either firing temperature or furnace position affects baked density of carbon anode. The data are shown below:

	Temperature (°C)		
Position	800	825	850
1	570	1063	565
	565	1080	510
	583	1043	590
2	528	988	526
	547	1026	538
	521	1004	532

Suppose we assume that no interaction exists. Write down statistical model. Conduct the analysis of variance and test hypotheses on the main effects. What conclusions can be drawn? Comment on the model's adequacy. (16)

Or

(b) (i) Describe the analysis of a completely randomized design with k observations per cell. (8)

(ii) Develop the analysis of covariance for randomized block design with one concomitant variable, stating clearly the assumptions. (8)

13. (a) Briefly explain the confounding and blocking in 2K Factorial designs. (16)

Or

(b) In the case of two associate class PBIBD, define the parameters and develop the intra – block analysis using a suitable model. (16)

14. (a) Enlighten first order model of response surface method. Discuss in detail on any two types of RSM design. (16)

Or

(b) List and explain the following models of mixture experiment:

(i) linear model
(ii) quadratic polynomial model
(iii) full cubic model
(iv) special cubic model (16)

15. (a) With a case study, explain the design using orthogonal arrays. (16)

Or

(b) Explain in detail about control and noise factors. (16)

———————