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VI SEMESTER B.TECH (PRINT AND MEDIA TECHNOLOGY) END SEMESTER EXAMINATIONS, MAY 2016

SUBJECT: PROGRAM ELECTIVE - III

QUALITY MANAGEMENT FOR GRAPHIC ARTS INDUSTRY [PME 322]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- Answer ANY FIVE FULL questions.
- Missing data may be suitable assumed.
- **1A.** Explain **5S** system, its various steps and their importance.
- 1B. Frame six questions using WHY techniques to find the root cause for the following 03 printing problems.
 - a) "In Adhesive label manufacturing the wastage is increased to 10%"
 - b) "Over all equipment effectiveness of 4 color offset machine has come down to 55%"
- 1C. A thermal lamination machine's roller unit is expected to have a life of 3,00,000 ± 04 10000, A3 size laminations. Manufacture's history data says that if the life of the roller unit varies from this expected value by 10000 on either side, then there will be a repairing cost of Rs 13,000/- for the customer. If the roller unit fails after few months and incurs a repairing cost of Rs. 28,000/-, calculate total number of sheets that were laminated using this roller unit before its failure using Taguchi's loss function.
- 2A. What are the basic criteria for Quality action team membership? Explain 03
- **2B.** With a neat diagram differentiate between "Prevention strategy" and "Sort and **03** suffer strategy".
- 2C. In a Thermal Lamination process a study was conducted to evaluate the 04 relationship between temperature of lamination and the peel seal strength of the laminate. The table below shows the data collected for 10 different ranges of lamination temperature and corresponding peal seal strength in kgf. Using

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mathematical regression analysis find the regression equation and the correlation coefficient between these two parameters. Calculate the temperature required to get a peel seal strength of **3.2 kgf.**

Lamination Temp. (^o C)	60	62	64	66	68	70	72	74	76	78
Peel Seal Strength (Kgf)	2.40	2.47	2.50	2.56	2.54	2.57	2.60	2.70	2.65	2.59

- 3A. Define "Process Benchmarking" in Total Quality Management. Explain the 03 different levels of Benchmarking Process.
- **3B.** Define "Cost of Quality" and its different categories with suitable examples.
- 3C. In an Aluminium metalizing process, polyester film is deposited with vaporized 04 aluminium. A study was conducted to measure the capability of the coating unit. A set of 32 aluminium coated samples were randomly selected from the coating process and their coating thickness is measured in microns. The data collected is tabulated as follows. If the coating specification is set at 20±4 microns then calculate the process capability indices and find the percentage of products which fall beyond the specification limit if any.

Test No.	1	2	3	4	5	6	7	8	9	10	11	12
Thickness of the aluminium	20	16	19	17	21	20	22	23	21	18	20	22
coating (Microns)												

Test No.	13	14	15	16	17	18	19	20	21	22	23	24
Thickness of the aluminium	21	19	18	20	17	21	19	20	22	23	21	20
coating (Microns)												

Test No.	25	26	27	28	29	30	31	32
Thickness of the aluminium	19	20	18	21	19	20	23	24
coating (Microns)								

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- **4A.** Explain the followings and their importance in 5S system:
 - a) Red tag area
 - b) Litmus test for 5S
- **4B.** Differentiate between Benchmarking and Kaizen process with examples.
- 4C. In a reputed flexographic printing press, the final inspection department has 04 identified several print related problems in the production of labels. The number of labels being wasted due to various reasons are summarized in the table given below. The production manager wants to analyze and find the root cause for these technical problems. Use Pareto analysis, help him to find the major problem/s that are to be solved first, so that with he can achieve a huge improvement in quality of labels with less time.

SI. No	Name of the problem	Number rejected	of	Labels
1	Adhesion of ink		187	
2	Bleeding of color		154	
3	Color variation		143	
4	Fill in of reverse types		285	
5	Fogging of ink		264	
6	Ghosting		294	
7	Kick out		345	
8	Mottle		124	
9	Pin holes		312	
10	Set off		332	

- 5A. Define Quality Circle. Explain the characteristics and advantages of Quality circle 03 to the organization as whole.
- **5B.** Explain "Scatter diagram" and its various methods in detail.

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5C. In a thermal paper coating plant the quality parameter under observation was the 04 image density of the paper after thermal coating. The quality personnel collected 20 samples randomly from the production and tabulated print density of the thermal paper samples as shown below. Analyze the data using X bar and R chart. What is your conclusion about the thermal coating process?

Test sample No.	1	2	3	4	5	6	7	8	9	10
Print density	1.4	1.25	1.34	1.37	1.47	1.56	1.61	1.34	1.54	1.58

Test sample No.	11	12	13	14	15	16	17	18	19	20
Print density	1.38	1.28	1.38	1.25	1.43	1.54	1.43	1.48	1.61	1.47

- 6A. Explain "Quality Vaccine", its components and importance in printing industry. 03
- **6B.** Explain the following Deming's deadly diseases, sins and their impact on total **03** quality management.
 - a) Overemphasis on visible figures
 - b) Mobility of management (Job hopping)
 - c) Emphasis on short-term profits
- 6C. An order was received to supply 30,000 packages for a Pharmaceutical industry 04 within 15 days. Every day the press produced 2000 packages and out of this 200 packages were subjected to quality test, selecting randomly from the finishing stage. Printing and inspection was carried out for all 15 days to complete the order. The table below gives the summary of the number of defective packages found in each day's inspection. Using number non-confirming chart, decide whether the printing process is in control to meet customer expectations or not. Revise the limits if required.

Day No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of															
defectives	30	45	58	62	48	23	30	42	16	24	18	24	38	46	35
packages															