

Ex/PRN/PC/B/T/424/2025
B.E. Printing Engineering Fourth Year Second Semester Exam 2025
Quality Control n Printing Industry

Total Marks:100

Time: 3 hrs

CO1/CO2/CO4 Group A answer two following questions

1. A flexible packaging company wants to reduce material waste during changeovers. Describe how SIPOC and Fishbone diagrams can help in optimizing the process. A label printing company produces 10,000 labels per day. Each label has 3 critical quality checkpoints (registration, color density, adhesive strength). During inspection, 90 defects were found in total. Calculate DPMO (Defects Per Million Opportunities). How can a histogram be used to evaluate the consistency of ink thickness on a packaging substrate?
(6+6+3 +5=20)

OR

2. An ink manufacturing unit is experiencing inconsistency in viscosity levels in water-based inks. How can Six Sigma's DMAIC approach be used to identify, measure, and stabilize the viscosity? What role do statistical tools play in the "Analyze" and "Control" stages? How can a histogram be used to evaluate the consistency of ink thickness on a packaging substrate?
(10 +5 +5=20)
3. What are CTQs (Critical to Quality)? Identify 3 CTQs for a carton printing job. A gravure press produces 5 samples with print density values:
Sample 1: 1.28, 1.30, 1.27
Sample 2: 1.26, 1.31, 1.29
Sample 3: 1.30, 1.25, 1.28
Sample 4: 1.29, 1.27, 1.32
Sample 5: 1.31, 1.30, 1.26
Calculate the $\bar{X}$ (average) for each sample. Plot a basic control chart. Explain the interpretation of points outside control limits. What actions are taken when a process goes out of control?
(3+5+5+5+2=20)

Or

4. How do you assess solvent purity in printing applications? Write any two standard methods used for this purpose and discuss one method. Define Aniline Point. Why is Aniline Point an important parameter in gravure ink formulation for packaging films like PET and BOPP? What is relative density?
(5+1+5+3+4+2=20)

CO3/CO5/CO6 Group B Answer Any three following questions

5. Explain a standard digital workflow in a packaging prepress setup . What is Preflight in digital prepress? List common errors checked during preflight. Name any two preflight software used in industry.
(10 +4+4+2=20)
6. What is a Raster Image Processor (RIP)? Explain its role in converting artwork into printable data. Short note : Inkjet proofer, Difference between digital proofer and thermal proofer. How does Job Tracking improve efficiency and reduce human error?
(3+4+4+5+4=20)
7. How does poor trapping affect multi-color print quality in offset printing? How can high tack values affect paper picking and dot reproduction? Define viscosity.

[Turn over

Differentiate between Newtonian and non-Newtonian inks with examples. Discuss any one type of viscometers used in the printing industry and their working principles. Discuss the relationship between ink viscosity, yield value, and ink fly. Provide practical examples from offset or gravure printing scenarios. (2+3+4+5+3+3=20)

8. Explain any three print performance tests conducted to evaluate ink and substrate compatibility. Write short notes on: i) Ink drying time ii) Ink density measurement iii) Gloss evaluation. Explain how the curl test is conducted and discuss two reasons why curl is problematic in high-speed printing or converting processes. Why is grease resistance test important for food packaging applications like butter wraps or snack pouches? (6+6+5+3=20)