Ex/PRN/PC/B/T/315/2024

B.E. PRINTING ENGINEERING THIRD YEAR FIRST SEMESTER – 2024

FLEXO AND GRAVURE PRINTING

Time : Three hours | Full Marks : 100

Use Separate Answer-scripts for each Part.

PART - I (Marks: 50)

(CO1 & CO2) Answer Any two of the following questions:

1. Explain the key components of a flexographic printing press and their functions. Compare and contrast flexographic printing with other common printing techniques like offset and gravure. A printing company is considering transitioning from a stack to an inline flexographic printing press. Analyze the potential challenges and benefits of this transition, considering factors like efficiency, production speed, and print quality. Discuss the advantages and limitations of each setup. Why is substrate selection critical in flexographic printing? Provide one example of a substrate suitable for high-speed flexographic printing. (3+4+5+3=15)
2. How do variations in doctor blade material and angle affect the flexo printing process? Describe the function and significance of the drying system in a flexographic printing press. Discuss different drying methods used in this process. Briefly Explain the challenges associated with drying water-based flexographic inks. Propose strategies to enhance the drying process without compromising print quality. Discuss the role of anilox rollers in flexographic printing and how they affect print quality. (2+3 +6 +4 =15)
3. Explain how substrate selection influences the quality of flexographic printing. Provide examples of substrates suitable for different applications. Discuss the significance of ink management in Flexographic Printing. Analyze the challenges associated with ink control and propose strategies to maintain consistent ink distribution for optimal print results.. Discuss the environmental impact of solvent-based flexographic inks. Propose alternative solutions for reducing environmental harm without compromising print quality. [4+(3+3) +6=15)
4. Discuss the impact of make-ready time on overall production efficiency in flexographic printing. Propose strategies to minimize make-ready time without compromising print quality. Explain the significance of viscosity in flexographic inks. How does ink viscosity affect the printing process and print quality? Describe the impact of ink transfer on substrate in flexographic printing. Illustrate the role of additives in flexographic inks. Provide examples of additives used and explain how they influence ink properties [(2.5+2.5) +(2.5+2.5) +2+3]

[Turn over

(CO2, CO3 & CO4)Answer Any two of the following questions:

5. A flexographic printing company faces challenges in achieving consistent colors across a large print run. Color variations are noticeable between initial prints and those produced midway through the run. Identify potential reasons causing color inconsistencies during a print run. Propose strategies or adjustments to ensure consistent color reproduction throughout the print run. [5+5=10]
6. A flexographic printing press experiences registration issues leading to misaligned prints, especially noticeable in multi-color jobs. Identify potential causes behind the registration problems observed during the printing process. Suggest measures or modifications to enhance print registration accuracy in multi-color printing. [5+5=10]
7. Explain how solvent selection influences the quality of flexographic printing. Provide examples. Give the composition of solvent-based inks used in flexographic printing. What is the range of viscosity used for flexographic ink? Name of instrument used for viscosity measurement [5+3+2=10]

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PART - II (Marks: 50)

Answer ***question no. 1 and 5*** and any ***two*** from Group-B.

Group - A

1. Describe the gravure printing principle with diagram. Also describe the different cell characteristics. 6+4=10

Group - B

2.a) Discuss the different features which make gravure a natural choice for package printing. 7

b) Discuss criterions which a film positive must meet for gravure cylinder making. 4

c) Discuss different types of base materials and surface materials used in gravure cylinders. 2+2=4

3. Discuss how the gravure cylinders are prepared by using diffusion etch process and electromechanical process. Also discuss briefly each process in the light of their merits and demerits. 15

4.a) Discuss the main wears which are caused by the wiping action of doctor's blade on a gravure cylinder. Also discuss about their probable causes. 2+6=8

b) Discuss how higher pressure of gravure impression roller affects print quality. 3

c) Discuss various ingredients of gravure ink. 4

Group - C

5. Analyze the following gravure printing problems on any *two*: 2x5=10

a) Streaking and bleeding

b) Pinhole and pigment settlement.

c) Cylinder wear and colour strength.