Ref. No.: Ex/PRN/PE/B/T/421A/2024

B.E. PRINTING ENGINEERING FOURTH YEAR SECOND SEMESTER EXAM 2024

Subject: Specialty Printing

Total Marks: 100 **Time: 3Hr.**

WRITE THE ANSWERS FOR THE QUESTIONS UNDER EACH 'CO' SEPARATELY IN ONE PLACE

CO 1: Describe different types of specialty printing, functions etc. (K1)

Answer any 3 questions (3 x 15 = 45)

1. Describe different types of materials commonly used in 3-D printing. Describe material extrusion, vat polymerization and powder bed fusion process of 3-D printing with required diagram. 6 + 9

2. Describe few applications of 3-D printing. Describe sheet lamination, binder jetting and material jetting process of 3-D printing. Describe the importance of layer height in 3-D printing. 3 + 9 + 3

3. Describe how printed electronics is different from conventional IC manufacturing process. Describe the general composition of stock for preparation of MICR cheque paper. Describe the advantages of barcode. 9 + 4 + 2

4. Describe the density and X-dimension parameter of bar code. Describe any 2 bar coding system from Code 128 family. 5 + 10

CO 2: Discuss currency printing, stamp printing, cheque printing, map printing etc. (K2)

Answer any 1 question (1 x 15 = 15)

5. Briefly discuss fundamental concept of MICR. Discuss the most important characteristics of MICR cheque paper. Discuss the difference between conventional printing and 3-D printing. 3 + 5 + 7

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6. Discuss the charge mobility factor of different semiconductor materials commonly used for printed electronics. Discuss pros and cons of organic materials for printed electronics. Briefly discuss about printed organic small molecular semiconductors. Discuss the use of inkjet printing process in printed electronics. 3 + 3 + 5 + 4

CO 3: Apply MICR, hologram, pcb, semiconductor lithography etc. (K3)

Answer any 2 questions (2 x 10 = 20)

7. Write about screen printing principle and its applications in printed electronics. 10

8. Write about gravure printing principle and its applications in printed electronics. 10

9. Write about pad printing principle and its applications in printed electronics. 10

CO 4: Analyse anti-counterfeiting features (K4)

Answer any 2 questions (2 x 10 = 20)

10. Analyse the different types of sensitivity tests commonly performed in MICR cheque authenticity. Analyse the requirements of conductive polymers to develop PFETs. 6 + 4

11. Analyse any one smart card dimension and any 4 important security features of smart card/credit cards. 4 + 6

12. Analyse following security features; Micro and nano-printing, Guilloche, Tipping and Embossing, Scratch-Off Panels and Magnetic Stripe. Analyse the features of lenticular printing. 7 + 3