VIDYASAGAR UNIVERSITY

Question Paper

B.Sc. Honours Examinations 2022
(Under CBCS Pattern)
Semester - VI
Subject : ELECTRONICS
Paper : DSE 4-T
Basic VLSI Design

Full Marks : 40
Time : 2 Hours

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

1. Answer any *four* questions. Each question carries five marks : 5×4=20

   (i)   Draw stick diagram of a NAND gate. 5

  (ii)   What are the small channel geometry effect of MOSFET? 5

 (iii)   Differentiate between voltage scaling and field scaling. 5

 (iv)   Draw transfer characteristics of MOSFET and indicate different region of operation of MOSFET. 5

  (v)   Draw X-OR gate using pass transistor logic. 5

 (vi)   Write short notes on BiCOMOS. 5

2. Answer any *two* questions. Each question carries ten marks :   10×2=20

  (i)   Write principle operation of SRAM using CMOS logic.   10

  (ii)   Design JK flip-flop using CMOS logic and explain its operation.   10

  (iii)   Write basic principle of CMOS inverter circuit.   10

  (iv)   Write short note on stable circuit using MOS.   10

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Or,

Paper - DSE 4-T

Nano Electronics

Full Marks : 40   Time : 2 Hours

1. Answer any *four* questions. Each question carries five marks :   5×4=20

   (i)   Discuss on quantum confinement effect in nanomaterials.   5

   (ii)   Write a short note on carbon nanotube.   5

   (iii) Discuss briefly X-ray spectroscopy.   5

   (iv) Mention the use of nanoparticles for biological application.   5

   (v)   Discuss the impact of nanotechnology on the environment.   5

   (vi) Give a brief discussion on infrared detectors.   5

2. Answer any *two* questions. Each question carries ten marks :   10×2=20

   (i)   Discuss the methods of bottom up and top down approaches of nano materials synthesis.   10

   (ii)   Explain the working principle of Raman spectroscopy.   10

   (iii) Discuss the working principle of transmission electron microscopy (TEM).   10

   (iv) (a)   Explain the quantum confinement effect in nanomaterials.

         (b)   Discuss briefly on ballistic transport.   5+5

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Or,

Paper - DSE 4-T

Embedded Systems

Full Marks : 40   Time : 2 Hours

1. Answer any *four* questions. Each question carries five marks :   5×4=20

    (i)   Write the requirements and applications of embedded systems.   2½+2½

    (ii)   Write applications of RISC and CISC microcontrollers.   2½+2½

    (iii) Write different instruction sets used in AVR RISC microcontrollers.   5

    (iv)   Explain analog comparator.   5

    (v)   Describe system clock used in embedded system.   5

    (vi)   Explain serial peripheral interface.   5

2. Answer any *two* questions. Each question carries ten marks :   10×2=20

    (i)   Explain architecture of AVR RISC microcontrollers.   10

    (ii)   Write embedded software design issues.   10

    (iii) Write short note on analog-to-digital converter.   10

    (iv)   Write short note on universal synchronous and asynchronous serial receiver and transmitter (USART)   10

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Or,
Paper - DSE 4-T
Biomedical Instrumentation

Full Marks : 40   Time : 2 Hours

1. Answer any *four* questions. Each question carries five marks :   5×4=20

   (i)   What is physiological transducer? Describe briefly.   2+3

   (ii)   Write down photoelectirc transducer.   5

   (iii)   Write short note on MEMS based biosensors.   5

   (iv)   Write down the method of monitoring fatal heart rate.   5

   (v)   What is the function of blood gas analyzer?   5

   (vi)   Write down the use of microprocessors in medical instruments.   5

2. Answer any *two* questions. Each question carries ten marks :   10×2=20

   (i)   Write down working principle of X-Ray machine.   10

   (ii)   Write short note on ECG.   10

   (iii)   Write short note on audiometer.   10

   (iv)   Write short note on spirometer.   10

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