FACULTY OF ENGINEERING
B.E. (ECE) III - Semester (AICTE) (Main) (New) Examination, March / April 2022

Subject: DIGITAL ELECTRONICS

Time: 3 Hours   **Max. Marks: 70**

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Questions carries 14 Marks.

     (ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.

     (iii) Missing data, if any, may be suitably assumed.

1.
   (a) Compare different types of digital hardware chips.

   (b) State De-Morgan's Theorem.

   (c) What is PAL?

   (d) Write Verilog code for OR and NAND gates.

   (e) What is LUT? Draw the diagram of 2-input LUT.

   (f) What is a sequential circuit? Give an example.

   (g) What are ASM charts?

2. (a) Find the minimal SOP for the expression $f(x1, x2, x3) = \Sigma\ m\ (1, 2, 4, 7)$ by using K-maps and realize the logic circuit.

   (b) Specify and Explain different Boolean algebra Axioms, theorems.

3. (a) Compare encoders and decoders with neat diagrams.

   (b) Design full adder circuit.

4. (a) What is FPGA? Explain the advantages of FPGA over PLDs.

   (b) Write Verilog code for full adder.

5. (a) What is Race Around condition? How it can be avoided using master-slave flip-flop?

   (b) Define Register? Explain Parallel Access Shift Register.

6. (a) What is SR latch? Explain gated SR latch.

   (b) Explain in detail D and T flip flops.

7. (a) Explain in detail Mealy model of finite state machine.

   (b) Explain Partitioning Minimization procedure.

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FACULTY OF ENGINEERING
B.E. (MECH/PROD/AE) III – Semester (AICTE) (Main) (New) Examination, March / April 2022

Subject: Engineering Mechanics - I

Time: 3 Hours   **Max. Marks: 70**

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.

(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.

(iii) Missing data, if any, may be suitably assumed.

1.
 (a) Calculate the mass moment of inertia of a grinding wheel of diameter 90cm and mass 165.4kg about the axis of rotation.
 (b) State Pappus theorems?
 (c) Two like parallel forces of 5N and 15N are acting at a distance of 240mm.Find the magnitude and position of resultant?
 (d) What are the different conditions of equilibrium?
 (e) A load 250N is to be raised by a screw jack with a helix angle 3^0. Find the effort required if the co-efficient of friction between screw and nut is 0.025?
 (f) State Principle of Virtual Work? State its principle.
 (g) Turning the cap of a pen is an example of__
   (a) Couple (b) Moment (c) Force d) impulse

2. Three cylinders are piled in a rectangular ditch as shown in Figure 1. Determine the reaction between cylinder A and Vertical wall.

3. Find the centroidal axis of the lamina shown in Figure 2 parallel to the base. Find the moment if inertia about the centroidal axis.

4. Determine the forces in all the members of Truss shown in Figure 3.

5. Determine the least value of the force P to cause the motion to impend rightward. Assume co-efficient of friction under the blocks to be 0.2 and the pulley to be frictionless. Figure 4.

6. Two beams 'AC' and 'CD' of length 9m and 10m respectively are hinged at 'C'. These are supported on rollers at the left and right ends (A&D). A hinged support is provided at 'B'.7m from 'A'. Using principle of virtual work, Determine the reactions at the hinge 'C' and the support 'B' when load of 700N acts at a point 6m from 'D'.

7. For forces of magnitude 16N,11N,9N and 8N acts at the corners of a square of side 50mm as shown in Figure 5. Calculate the magnitude, direction and position of relative corner 'A' of their resultant.
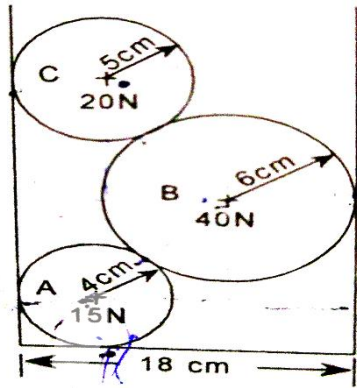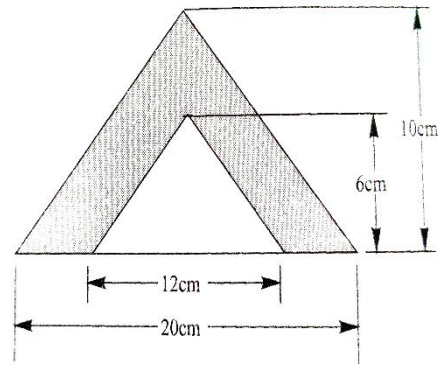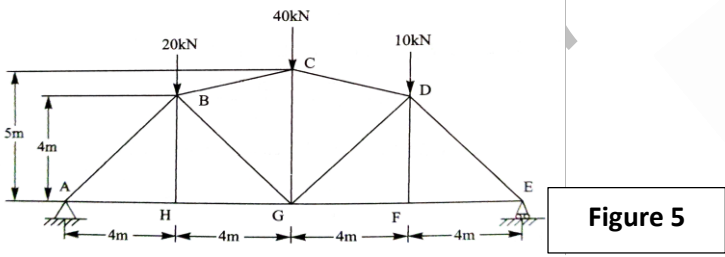

Figure 1

Figure 3

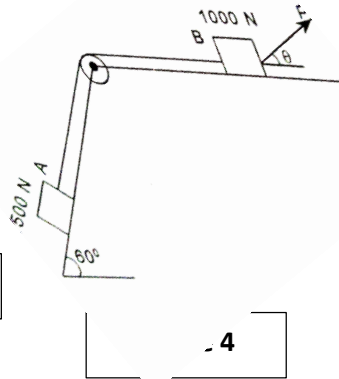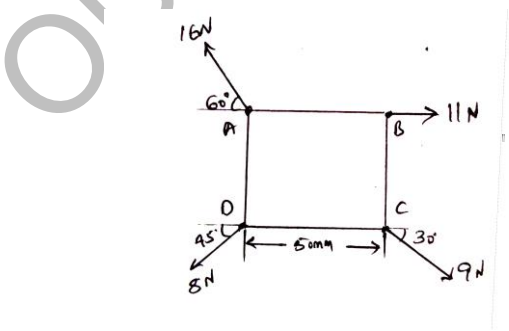**Figure 2**

Figure 5

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FACULTY OF ENGINEERING
BE (CSE/IT) III – Semester (AICTE) (Main) (New) Examination, March / April 2022

Subject: Digital Electronics

Time: 3 Hours   **Max. Marks: 70**

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Questions carries 14 Marks.
       (ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
       (iii) Missing data, if any, may be suitably assumed.

1. (a) State and prove DeMorgan's theorem.
   (b) Represent the Boolean expression in k-map b'+ac'+a'cd.
   (c) Draw a circuit of full adder using half adders.
   (d) Write the comparision between CPLD and FPGA.
   (e) Design 4X16 decoder using 2X4 decoders.
   (f) Write the excitation table of RS and JK FF.
   (g) What is state assignment?

2. (a) Simplify the Boolean function to a minimum no. of literals
   i) xy+x'z+yz   ii) ABC+A'B+ABC'
   (b) Simplify the function using k-map
   $F(V,W,X,Y,Z)= \sum m(0,2,4,6,9,11,13,15,17,21,25,27,29,31)$
   Realize the circuit using NAND gates.

3. (a) Design a BCD –to-Decimal code converter with circuit diagram.
   (b) Define magnitude comparator. Draw the block diagram and truth table of a one-bit magnitude comparator. Show the implementation using logic gates.

4. (a) With a neat diagram explain FPGA architecture.
   (b) Realize the given logic functions using PAL
   $F1= x_1x_2x_3'+x_1'x_2x_3$
   $F2=x_1'x_2'+x_1x_2x_3$

5. (a) Construct a 4-bit shift register with parallel load facility.
   (b) Show that a SR FF can be converted to JK FF.

6. (a) Explain the steps required to design synchronous sequential circuits.
   (b) Implement the function $F(A,B,C,D)= \sum m(1,3,4,11,12,13,14,15)$ using
   i) 8:1 MUX and ii)16:1 MUX.

7. (a) Simplify using Quine Mc Cluskey tabular method
   $F(A,B,C,D)=\sum m(0,2,4,6,7,9)+\sum d(10,11)$
   (b) Write the Verilog code for 3X8 decoders.

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FACULTY OF ENGINEERING
B.E. (CME) III – Semester (AICTE) (Main) (New) Examination, March / April 2022

Subject: Digital Electronics

Time: 3 Hours   Max. Marks: 70

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.
       (ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
      (iii) Missing data, if any, may be suitably assumed.

1.
   (a) Express the function in canonical product of sum $F(A, B, C) = A(A+C)$.
   (b) Explain 2's complement addition with a suitable example.
   (c) Explain the structure of Field Programmable Gate Array.
   (d) Distinguish between Latches and Flip Flops.
   (e) Define algorithmic state machine chart and its components.
   (f) Implement $F = x'y + xy' + z$ using NAND gates.
   (g) Convert the decimal number $(47.625)_{10}$ into binary, octal and hexadecimal.

2. (a) Simplify the following function into sum-of-Product and Product-of-sums terms $F(A, B, C, D) = \Sigma m(2,3,5,7,8,10,12,13)$.

   (b) Distinguish between Minterms and Maxterms with example.

3. (a) Design a Binary to BCD code converter and realize with minimum no. of gates.

   (b) Design a multiplexer and explain types of multiplexer.

4. (a) Design SR & JK Flip Flop with excitation table & Characteristic table.

   (b) Explain Verilog code for basic gates.

5. (a) Explain the excitation table for any three flip flops.

   (b) Define register and explain serial in parallel out shift register and serial in serial out shift register.

6. (a) What is an algorithmic state machine chart? Design using Moore machine.

   (b) Design 0111 sequence detector, using Mealy and Moore machine.

7. (a) Define code converter and Design BCD to gray code converter.

   (b) Define finite state machine with example.

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FACULTY OF ENGINEERING
B.E. (AI & DS) III – Semester (AICTE) (Main) (New) Examinations, March / April 2022

Subject: Digital Electronics

Time: 3 Hours   **Max. Marks: 70**

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.

    (ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.

    (iii) Missing data, if any, may be suitably assumed.

1.

(a) Simplify the following Boolean expression to a required no. of literals
   (i) $BC+AC'+AB+BCD$
   (ii) $(A+C+D)(A+C+D')(A+C'+D)(A+B')$.

(b) Distinguish between Decoder and demultiplexer.

(c) Write the comparison between a PLA and PAL?

(d) Distinguish between a Latch and Flip-flop.

(e) Distinguish between Moore and Mealy Finite state machine.

(f) Implement $F=AB'+A'B$ using NAND Gates.

(g) Explain notation of an ASM chart?

2. (a) Determine the prime implications of the function $(W,X,Y,Z) = \Sigma(1,4,6,7,8,9,10,11,15)$.

(b) State and prove De Morgan's laws and show their implementation using fundamental gates.

3. (a) Explain programmable logic array with $Y1 = \Sigma m(4,5,7)$, $Y2 = \Sigma m(3,5,7)$.

(b) Design and explain a 2 - 4, 3 - 8 decoders & also draw the logic diagram.

4. (a) Design the Structure of CPLDs and FPGAs.

(b) Design Programmable Logic Devices and its Types.

5. (a) Design a T flip-flop, D flip-flop and a JK flip-flop using an SR flip-flop.

(b) Discuss about Registers & Counters.

6. (a) Design the components of Algorithmic state machine using Mealy & Moore machine.

(b) Discuss the method for Reduction of state Tables & state Assignment with example.

7. (a) Implement 4 to 16 line decoder using 2 to 4 line decoder.

(b) Define Arithmetic Comparators.

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FACULTY OF ENGINEERING
B.E. (AI & ML) III - Semester (AICTE) (Main) (New) Examination, March / April 2022

Subject: DIGITAL ELECTRONICS

Time: 3 Hours   Max. Marks: 70

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Questions carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1.
   (a) What is simulation?
   (b) Simplify the following three variable Boolean expressions using Boolean algebra.
      (i) . F (a, b, c) = $\sum m$ (0, 1, 3, 4, 7)   (ii). G (a, b, c) = πM (1, 3, 5, 7)
   (c) Given the two binary numbers X = 1010100 and Y = 1000011, perform the subtraction.
      i) X – Y
      ii) Y - X using 2's complement and 1's complement.
   (d) Write the classification of PLDs.
   (e) Draw the 1-bit comparator logic circuit with truth table.   .
   (f) List out the classification of shift registers.
   (g) Compare between the Mealy and Moore model.

2. (a) Minimize following function using Tabular minimization. F(A, B, C, D)
      = $\sum m$(6, 7, 8, 9) + $\sum d$(10, 11, 12, 13, 14, 15).
   (b) Simplify the following Boolean expressions using K-map and implement them neither using NOR gates :(i) F (WXYZ) = W'X'Y'Z' + WXY'Z'+W'X'YZ+WXYZ
                                                (ii) F (ABCD) = AB'C'+AC+A'CD'

3. (a) Implement Full adder using two Half adders and one OR gate.
   (b) Design a BCD to 7-segment decoder circuit?

4. (a) Convert the following from one flip-flop to other
         (i) SR flip-flop to JK flip-flop.
         (ii) JK flip-flop to D flip-flop
   (b) Design MOD-6 Asynchronous Up-counter.

5. (a) Design a Bi-directional shift register with necessary diagrams.
   (b) Explain Full subtractor and Half subtractor.

6. (a) Design a 1011 sequence detector using T flip-flop with overlap.
   (b) Explain about FPGA structure with neat diagram.

7. (a) Elaborate the steps involved in the design of synchronous sequential circuits.
   (b) Explain about Carry Look- ahead adder in detail.

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FACULTY OF ENGINEERING
B.E. (IOT) III Semester (AICTE) (Main) (New) Examination, March / April 2022

Subject: Computer Organization

Time: 3 Hours　　　　　　　　　　　　　　　　　**Max. Marks: 70**

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.

(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.

(iii) Missing data, if any, may be suitably assumed.

1.
　(a) Define Status bit.
　(b) What is meant by cycle stealing concept in DMA.
　(c) Derive the match logic for a single word in associative memory.
　(d) Write about Asynchronous communication interface.
　(e) What are the different flag available in status register of 8086.
　(f) A 128 MB main memory has a 64 KB direct-mapped cache with 16 bytes per line. How many liner are there in Cache and show main memory address bits are partitioned.
　(g) What is the use of LOCK bar signal of 8086 microprocessor.

2. (a) Explain interrupt cycle in detail.
　(b) Explain instruction cycle.

3. (a) Explain strobe signal and hand shaking using examples.
　(b) Write about CPU and IOP communication channel.

4. (a) Explain the concept behind virtual memory and List its advantages.
　(b) A two level memory system has 8-virtual pages on disk to be mapped into four page frames in the main memory. A computer programme generates the following page trace: 2,2,1,0,7,6,1,0,5,6,6,3,2,3,7,6 sketch the successive pages residing in four page frames with respect to above page tracing using LRU replacement policy.
　　Compute hit ratio.

5. (a) Explain various special register functions of general purpose registers in 8086.
　(b) Write in detail about evaluation of arithmetic expression in 8086.

6. (a) Write about branch and call instructions in 8086.
　(b) Explain various instruction formats in 8086.

7. Write a short notes on
　(a) Floating point arithmetic.
　(b) Divide Overflow.

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FACULTY OF ENGINEERING
B.E. (Civil/EEE/EI/CSE) III Semester (AICTE) (Backlog) Examination, March / April 2022

Subject: Essence of Indian Traditional Knowledge

Time: 3 hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions   **(10 x 2 = 20 Marks)**

1 What is Sarvodaya?
2 Define Philosophy?
3 Write a note on "Indian Culture'?
4 What is Satyagraha?
5 How many Vedas-Explain in brief.
6 Explain the concept of Indian Architecture?
7 What do you mean by right and good?
8 What is Syadvada?
9 Write a note on Modern Indian Music?
10 What about the aims of Indian Education System?

PART – B

Note: Answer any five questions   **(5 x 10 = 50 Marks)**

11 Explain the source of Indian Philosophy?

12 What are the general characteristics of culture?

13 Explain the Central philosophical themes in Vedas and Upanishads?

14 What is the moral value of Karma according to Buddism?

15 Discuss about the Dance and Drama.

16 What do you mean by duty and Virtue?

17 Write an essay on Indian Scientists of Ancient India?

18 Write an essay on NEP/2020 (National Education Policy).

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FACULTY OF ENGINEERING
B.E. (ECE/MECH/PROD/AE/IT) III - Semester (AICTE) (Backlog) Examination, March / April 2022

Subject: Effective Technical Communication in English

Time: 3 Hours **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)
PART – A

Note: Answer all questions. **(10 x 2 = 20 Marks)**

1. What are the aspects of Technical Communication?
2. What does clarity refer to in technical communication?
3. What are the four tips for writing an effective E-mail?
4. How to write an effective sales letter?
5. Highlight the importance of revising, editing and proofreading while drafting a report?
6. What functions do Progress Report have?
7. What are the principles of a good Manual?
8. Define a Product Manual?
9. List out the various visual aids that can be used in Oral Presentation?
10. Elucidate the importance of facial expressions and eye contact in Oral Presentation?

PART – B

Note: Answer any five questions. **(5 x 10 = 50 Marks)**

11. (a) Explain how general writing differs from Technical Writing.
    (b) Write a note on ABC of Technical Communication.

12. (a) What are the guidelines for writing a memo? Give the structure/layout of a memo.
    (b) As the Purchase Manager of Satyam Computers, Jubilee Hills, Hyderabad – 500007, you had ordered two dozens of Personal Computers from HCL,M.G Road, Bangalore- 500001.When the consignment arrived ,you found some of the PCs in the damaged condition .Write a complaint letter to the sales Manager of the company asking for repair ,replacement or compensation.

13. (a) What are the characteristics of a report? Discuss various types of reports?
    (b) Excel computer manufacturing (ECM), a multinational company wants to improve the existing parking facilities for the two -wheeler and four -wheeler vehicles of its staff. As the Facility Manager of ECM, draft a proposal to be sent to the Secretary, Board of Directors for improving the existing parking facility. Invent necessary details.

14. (a) Define Operations Manual? Give the structure of an Operations Manual.
    (b) Write a set of guidelines about the specific features and usage of the mobile phone.

15. (a) What guidelines do we need to follow while practicing and delivering an Oral Presentation.

  (b) Observe the following bar – graph and prepare a write up of about 150 words describing amount of money spend on two types of electronic device by an XYZ Country.
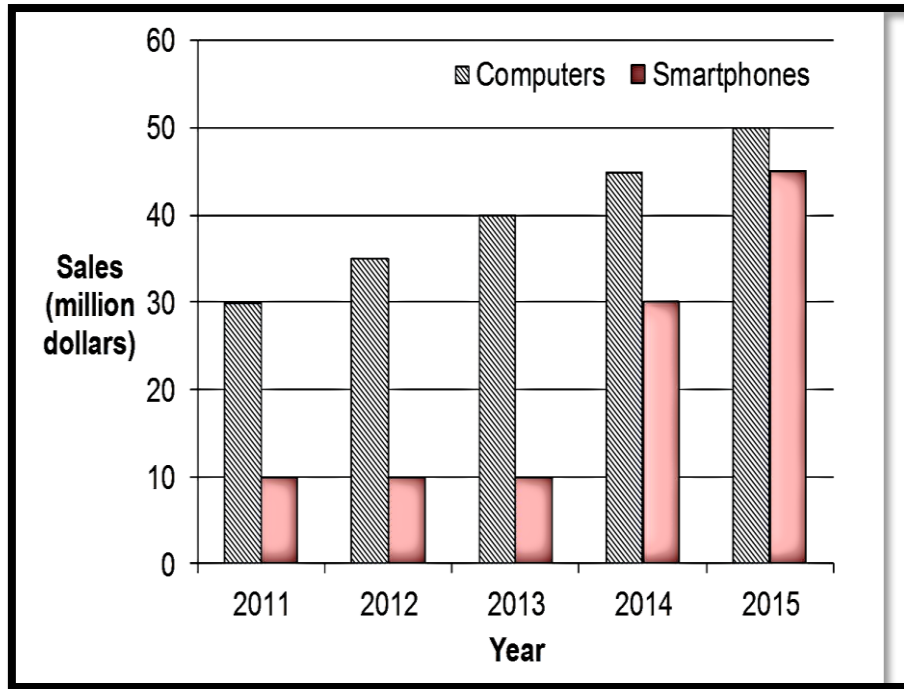
16. (a) Mention few advantages and limitations of an E-mail.

  (b) Draw a pie chart restating the following information about the shares of total world

  food consumption held by each of seven different food types in 2014.Meat is consumed the most, at 31.4 per cent. Fish has the second-highest consumption levels, at 27.9 per cent. Cereals consumption represents 11.7 per cent of the total. Fruits' share of consumption is 10.6 per cent, followed closely by vegetables at 10.5 per cent, and then bread at 5.5 per cent. The smallest food group in terms of world consumption is rice, at 2.4 per cent.

17. (a) What are visual aids? When do we use them?

  (b) Define Non- Verbal communication? Explain its advantages and limitations.

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