

**FACULTY OF ENGINEERING**  
**B.E III / IV (Civil) II - Semester (NON-CBCS) (Backlog) Examination,**  
**March / April 2022**  
**Subject: Steel Structures**

Time: 3 Hours

Max. Marks: 75

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

**PART – A**

**Note: Answer all questions.**

**(25 Marks)**

- 1 What are the advantages of structural steel in the field of construction?
- 2 Calculate the safe load transmitted by a welded joint if size of weld is 5mm, length 200mm.  $P_q = 108 \text{ N/mm}^2$ .
- 3 Distinguish between web buckling and web crippling
- 4 Give four practical examples where tension rods are used.
- 5 Define pitch of rivets with the help of a sketch
- 6 Briefly explain the design of tension members with working stress method of design as per IS 800-2007.
- 7 List out the steps for design of compression member
- 8 Why battens and laces are provided to built-up columns.
- 9 Sketch any three typical welded column bases
- 10 Discuss the various loads considered in the design of roof truss?

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

11. (a) Discuss in detail the various design philosophies with codal specifications.  
(b) List various types of joints. Explain each with a neat sketch.
12. (a) Describe the factors affecting strength of tension members.  
(b) A tie member ISA 80 mm x 50 mm x 8mm of Fe410 grade is welded to a 12mm thick gusset plate at site. Assuming welds on two sides, design the welds to transmit a load equal to the design strength of the member.
13. A tension member ISA 100 x 75 x 8mm is connected to a 10mm thick course plate the longer leg is connected to the plate 4 Nos. of M20 bolts of 4.6 grade. Find the load the member can carry.
14. Design a splice to connect two Nos. ISHB 400@806.40N/m. the column carries a factored load of 800KN and a factored moment of 40kN-m. Show details through a neat sketch.
15. A simply supported beam of span 6m carries a UDL of 80kN/m. Design the beam if it is laterally supported and carry-out the necessary checks. Take grade of steel as Fe 410. Use limit state method.

16. Design a slab base for a column ISHB 350 to carry a factored load of 1200kN. Assume the load is transferred to base by welded connections; and the column end and base are not machined for bearing. Take Fe410 grade steel and M25 grade concrete. Use limit state method.
17. The trusses for a factory building are spaced at 5m c/c and the purlins are spaced at 2m c/c. The pitch of truss is  $\frac{1}{4}$  and span of roof is 12m. The vertical load from roof sheets is 200 N/m<sup>2</sup> and wind load normal to roof is 1400N/m<sup>2</sup>, Design a channel section purlin.

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**FACULTY OF ENGINEERING**

**B.E. III / IV (EEE) II -Semester (NON-CBCS) (Backlog) Examination,  
March / April 2022**

**Subject: Electrical Machinery - III**

**Time: 3 Hours**

**Max. Marks: 75**

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

**PART – A**

**Note: Answer all questions.**

**(25 Marks)**

- 1 What are different types of armature windings of synchronous generator?
- 2 What are the advantages of short pitch winding?
- 3 What are the conditions to be satisfied for synchronizing an alternator to an infinite bus?
- 4 What are direct axis and quadrature axis reactances?
- 5 List the different types of starting a synchronous motor.
- 6 What are the applications of synchronous motor?
- 7 What are the three reactances of alternator during a 3ph symmetrical short circuit?
- 8 Why damper winding is used in Synchronous machines?
- 9 Why a single phase ac motor is not self starting?
- 10 What are the applications of single phase ac motors?

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

- 11 a) What are the distribution factor and the winding factor of armature winding of alternator.  
b) Derive the expression for the emf generated in a synchronous generator.
- 12 a) Describe the determination of the O.C.C and S.C.C of a 3 phase alternator.  
b) Explain the synchronization of an alternator with an infinite bus using any method.
13. Explain with circuit diagram the starting of the synchronous motor.
- 14 a) Explain the operation of hysteresis motor.  
b) Draw the current waveforms of an alternator for 3phase symmetrical short circuit.
- 15 Explain the operation of the Linear Induction motor.
16. Explain the operation of the stepper motor.
- 17 a) Explain hunting in a synchronous machine and how it can be prevented.  
b) Explain armature reaction at different power factors in Synchronous generators.

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**FACULTY OF ENGINEERING**  
**BE III / IV (EIE) II - Semester (NON-CBCS) (Backlog) Examination,**  
**March / April 2022**  
**Subject: Process Control**

**Time: 3 Hours**

**Max. Marks: 75**

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

**PART – A**

**Note: Answer all questions.**

**(25 Marks)**

1. What are the Elements of Process Dynamics?
2. Explain flow process.
3. Define Integral Controller Mode
4. Explain the function of Single Speed Floating Controller
5. What is meant by Tuning of controller?
6. What is the necessity of an Actuator in final Control Analysis?
7. Elaborate the selection of Control valve
8. Write the advantages of Hydraulic Actuator
9. Draw the Basic structure of PLC
10. Write the Ladder Logic for an "OR" Gate

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

11. a. With a schematic diagram explain Thermal Processes.  
b. With a neat diagram explain Pressure Element Lag.
12. a. Explain PID Controller with analytic expression.  
b. The input error signal for PI Controller is sinusoidal in nature. Prove that Phase Lag is a function of reset time
13. a) Explain Static error, Offset error and Velocity error  
b) In the application of Ziegler Nichols method oscillations are observed in the process with proportional band set to 400/01 in the time period of 10 minutes. Find the setting of Three Controller mode?
14. a. With a Schematics diagram explain Solenoid Valve  
b. Explain the Characteristics of Control Valve.
15. a. With a neat diagram explain PLC operations.  
b. Draw the Ladder Diagram for the following function when PBI is pressed the Red light turns ON, when PB2 is pressed the Green light turns ON alone, and when both the buttons are pressed neither of the light turns ON.
16. a. Explain the PLC Software Function with an example  
b. With a neat diagram explain pneumatic valve positioner
17. Write a short note on
  - a. Characteristics of Physical System
  - b. Derivative Controller
  - c. Valve Limits Switch

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**FACULTY OF ENGINEERING**

**B.E. III / IV (ECE) II - Semester (NON-CBCS) (Backlog) Examination,  
March / April 2022**

**Subject: Digital Signal Processing**

**Time: 3 Hours**

**Max. Marks: 75**

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

**PART – A**

**Note: Answer all questions.**

**(25 Marks)**

1. List out the five properties of DTFT.
2. How many multiplication and additions are required to compute N point DFT using radix 2 FET?
3. What is prewarping? Why is it needed?
4. Define Bilinear Transformation.
5. Define Finite word length effects.
6. List out the characteristics of Rectangular window.
7. Give the applications of Multirate signal processing.
8. What is the use of anti-aliasing filter in decimation?
9. Write the features of TMS320C54xx processors
10. What are the addressing modes available in TMS320C5X processors?

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

11. (a) Find the Linear Convolution of the following sequences using DFT method  
 $x(n) = \{1, 0, 2\}$ ,  $h(n) = \{1, -1, 1, -1\}$ .  
 (b) State and prove any two properties of DFT.
12. (a) For the analog transfer function  $H(s) = 2 / (s+1)(s+3)$ . Determine  $H(z)$  using bilinear transformation. With  $T = 0.1$  sec.  
 (b) Design a digital Chebyshev low pass filter satisfying the following specifications  
 $0.707 \leq |H(e^{j\omega})| < 1$ ,  $0 \leq \omega \leq 0.2\pi$   
 $|H(e^{j\omega})| \leq 0.1$ ,  $0.5 \leq \omega \leq \pi$  with  $T = 1$  sec.
13. (a) Compute 8-point DFT of the discrete time signal  
 $x(n) = \{1, -1, -1, -1, 1, 1, 1, -1\}$  using DIT- FFT algorithm.  
 (b) Compute 8-point DFT of the discrete time signal  $x(n) = \{1, -1, -1, -1, 1, 1, 1, -1\}$  using DIT- FFT algorithm.
14. Design a high pass filter of length 7 with cutoff frequency of 2 rad/sec using Hamming window.
15. (a) With help of equation explain sampling rate conversion by a rational factor I/D.  
 (b) Derive an expression for the spectrum of output signal of an decimator.
16. (a) What are the various addressing modes used in the TMS320C54XX processor?  
 (b) What are the different buses of TMS320C5x and their functions?
17. Design a Butterworth filter for the following specification using impulse Invariance method.  
 $H(e^{j\omega}) \leq 0.2$  for  $0 \leq \omega \leq 0.2\pi$   
 $0.8 \leq H(e^{j\omega}) \leq 1$  for  $0.6\pi \leq \omega \leq \pi$ .

**FACULTY OF ENGINEERING**

**B.E. III / IV (MECH) II - Semester (NON-CBCS) (Backlog) Examination,  
March / April 2022**

**Subject: Metal Cutting and Machine Tool Engineering**

**Time: 3 hours**

**Max. Marks: 75**

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

**PART – A**

**Note: Answer all questions.**

**(25 Marks)**

- 1 List the essential properties of materials used for making cutting tools.
- 2 Neatly draw a drilling and a broaching tool and label its angle and parts.
- 3 Define Machinability Index.
- 4 What is meant by BUE and under what conditions it is formed?
- 5 Express the specification of a lathe.
- 6 What is tool life? Discuss.
- 7 How the grinding wheel is specified?
- 8 Recall the principle of Lapping process.
- 9 List the merits and demerits of AJM.
- 10 Label the usage of jigs and fixtures in Industry.

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

- 11 a) Describe the geometry of single point cutting tool by ASA method.  
b) In a orthogonal cutting the following data is observed. Back rake angle= $10^{\circ}$ , Feed=0.2 mm/rev, chip thickness=0.4mm, Cutting force=100 kgf, Feed force=80 kgf, determine shear force, frictional force, coefficient of friction.
- 12 a) Explain the sources of heat generation during metal cutting.  
b) Explain the role and applications of cutting fluids.
- 13 a) Give an expression for Taylor's tool life and discuss the various parameters that effect the tool life in general.  
b) Explain the differences between shaper and planer.
- 14 Explain the process of EDM in detail and discuss its advantages, disadvantages and applications.
- 15 a) What are the different operations that can be performed on lathe, explain.  
b) Explain locating devices used in development of jigs and fixtures.
- 16 a) Explain the different types bonds used in making grinding wheels.  
b) What are the different gear manufacturing processes, draw and explain.
- 17 Write short noted on:
  - a) Thread rolling process
  - b) External centerless grinding process.

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Code No. D-3158/NON-CBCS

**FACULTY OF ENGINEERING**  
**B.E. III / IV (PROD) II - Semester (NON-CBCS) (Backlog) Examination,**  
**March / April 2022**  
**Subject: Metal Casting & Welding**

**Time: 3 hours**

**Max. Marks: 75**

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

**PART – A**

**Note: Answer all questions.**

**(25 Marks)**

- 1 State the elements of gating system.
- 2 Distinguish between pattern and casting.
- 3 What is chaplet, when and where it is suitable for usage?
- 4 State four reasons for selecting slush casting over other processes.
- 5 In which welding process flux is used in the form of granules.
- 6 What is groove weld?
- 7 State the differences between brazing and soldering.
- 8 Mention applications of plastic process.
- 9 What are MEMS applications?
- 10 State the mechanical properties of thermosetting materials.

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

- 11 a) Explain the steps involved in investment mould casting process in detail.  
b) Distinguish between progressive and directional solidification.
- 12 The welding power generated in a particular arc-welding operation is 3000W. This is transferred to the work surface with a heat transfer factor is 0.9. The metal to be welded is copper whose melting point is 3250K, assume the melting factor 0.25. A continuous fillet weld is to be made with a cross-sectional area of 15mm<sup>2</sup>. Determine the travel speed at which the welding operation can be accomplished.
- 13 a) Describe GMAW process with neat sketch and give its applications.  
b) Describe the oxy-acetylene welding process and sketch different types of flames.
- 14 a) Sketch and explain Resistance Seam Weld process with temperature generation.  
b) Explain working process of injection molding with sketch.
- 15 A sand core located inside a mold cavity has a volume of 157.0cm<sup>3</sup>. It is used in the casting of cast iron pump housing. Determine the buoyance force (N) that will tend to lift the core during pouring. The density of cast iron is 7.16g/cm<sup>3</sup>.
- 16 a) Explain Non-Destructive testing using ultrasonic method to detect weld defects.  
b) Explain the parameters affecting pressure thermo forming process.
- 17 Write short notes on:  
a) Plastic extrusion      b) Straight polarity in arc welding.

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**FACULTY OF ENGINEERING**

**B.E. III / IV (CSE) II - Semester (NON-CBCS) (Backlog) Examination,  
March / April 2022**

**Subject: Design and Analysis of Algorithms**

**Time: 3 hours**

**Max. Marks: 75**

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

**PART – A**

**Note: Answer all questions.**

**(25 Marks)**

- 1 What is Heap? Write the time complexity of Heap Sort.
- 2 Write the UNION algorithm using weighing rule.
- 3 Write the control abstraction of Divide and Conquer strategy.
- 4 Explain optimal merge pattern with an example.
- 5 Differentiate between Greedy and Dynamic programming approaches.
- 6 Define merge and purge rules.
- 7 State Graph coloring problem.
- 8 Differentiate between explicit and implicit constraints.
- 9 State Cook's theorem.
- 10 Discuss Node cover decision problem.

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

- 11 (a) Sort the elements using Merge Sort 10, 30, 15, 45, 25, 30, 35, 20, 30, 40, 50.  
(b) Write the algorithm for merge sort and derive its time complexity.
- 12 (a) Write Kruskal's algorithm to find minimum spanning tree. Derive its time complexity.  
(b) Consider the Knapsack instance  $n = 4$ ,  $M = 21$ ,  $(P_1, P_2, P_3, P_4) = (2, 5, 8, 1)$   $(W_1, W_2, W_3, W_4) = (10, 15, 6, 12)$ . Find the optimal solution using Greedy Strategy.
- 13 (a) Explain forward and backward approaches of problem solving in dynamic programming.  
(b) Construct OBST for the following data using Dynamic Programming Strategy.  $N=4$ ,  $(a_1, a_2, a_3, a_4)=(end, goto, print, stop)$   $P(1:4) = (1/20, 1/5, 1/10, 1/20)$ ,  $q(0 : 4) = (1/5, 1/10, 1/5, 1/20, 1/20)$ . Where  $p$ 's are probability of successful search and  $q$ 's are probability of unsuccessful search.
- 14 (a) Solve 8 Queens problem using backtracking approach.  
(b) What is Branch and Bound strategy? Explain.
- 15 (a) With a neat diagram, explain the relevance of NP-hard and NP-complete problems.  
(b) Explain the Clique problem and write the algorithm for the same.
- 16 (a) What is Hamiltonian cycle? Explain with example using backtracking.  
(b) Design a 3 stage system with device types D1, D2, D3. The Costs are Rs. 30, Rs.15 and Rs. 20 respectively. The costs of the system not more than 105. The reliability of each devise type is 0.9, 0.8 and 0.5 respectively.

17 Write notes on:

- (a) Optimal Storage on tapes      (b) Multi Stage graphs.

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**FACULTY OF ENGINEERING**

**B.E. III / IV (IT) II - Semester (NON-CBCS) (Backlog) Examination,  
March / April 2022**

**Subject: Data Warehousing and Data Mining**

**Time: 3 Hours**

**Max. Marks: 75**

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

**PART – A**

**Note: Answer all questions.**

**(25 Marks)**

- 1 What are the applications of data mining?
- 2 What is the need for preprocessing of data?
- 3 Define enterprise warehouse and data mart.
- 4 Define the following (i) Market basket analysis (ii) Strong association rule.
- 5 What is meant by supervised and unsupervised learning?
- 6 Define a Bayesian belief network. Give an example.
- 7 Define min-max normalization and give an example.
- 8 What is the difference between noise and an outlier?
- 9 How do you handle missing values?
- 10 Define multimedia data mining.

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

11. (a) Explain the process of KDD with a neat sketch.  
(b) What are the data preprocessing techniques? Explain briefly.
12. (a) Explain the snowflake schema in data warehouse.  
(b) Write the differences between OLAP and OLTP systems.
13. (a) Explain classification by decision tree induction.  
(b) Write short notes on Bayesian Belief Networks.
14. (a) Explain Apriori algorithm for frequent item set generation with an example.  
(b) Explain how you measure the accuracy of a classifier.
15. (a) Write the Naïve Bayesian classification algorithm.  
(b) What are the metrics for evaluating classifier performance?
16. (a) Explain the attribute selection measures in decision tree induction.  
(b) Write short notes on SVM classification.
17. Write short notes on
  - (a) Web Mining.
  - (b) Spatial mining
  - (c) Text mining

**FACULTY OF ENGINEERING**

**BE (Civil) VI - Semester (CBCS) (Backlog) Examination, March / April 2022**

**Subject: Structural Engineering Design and Detailing – I (Concrete)**

**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. When is a trapezoidal combined footing necessary?
2. Mention the use of shear key in Retaining wall?
3. Write the expression for active earth pressure?
4. What is the need of design of bracings in water tanks?
5. What are different forces acting on water tanks?
6. Explain the forces acting on the conical dome of an Intze tank?
7. Explain the importance of elastic design?
8. What are different types of bridges? How are they classified according to classes?
9. What is the advantage of effective width method?
10. What is the maximum load considered under class B loading?

**PART – B (50 Marks)**

**Note: Answers any three questions. Selecting any one from each unit.**

**Unit – I (15 Marks)**

11. Design a combined rectangular footing for two R.C.C columns separated by a distance of 3metres centre to centre carry an axial load of intensities 1100KN each, Safe bearing capacity of soil is 200KN/m<sup>2</sup> and width of the footing is restricted to 2metres. Draw neat sketches showing reinforcement details?

**OR**

12. A cantilever retaining wall which is required to support a bank of earth 4.5metre above the ground level. Consider the backfill surface to be subjected to a traffic load of 10KN/m<sup>2</sup>. SBC=150KN/m<sup>2</sup>, unit weight of soil is 18KN/m<sup>3</sup>. Take coefficient of friction  $\mu = 0.5$  and angle of repose  $\phi = 30^\circ$ . Design stem, toe and heel slab and check for sliding and if required provide a key.

**Unit – II (15 Marks)**

13. An overhead rectangular water tank 9x4x3metres is supported on staging. Design side walls of the water tank and draw neat reinforcement details? Use suitable grades?

**OR**

14. Design a circular water tank with fixed base for a capacity of 4,00,000 litres, the depth of the water is to be 4metres including a free board of 220mm. Use suitable grades and draw neat reinforcement details?

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**Unit – III (20 Marks)**

15. Design a deck slab bridge of effective span 5metres and carriage way of width 7metres. It is subjected to a two lane class B loading. Design the bridge and draw neat sketches showing reinforcement details?

**OR**

16. Design an interior panel of a T- beam bridge for the following data:

Effective span = 15m, Carriage way width = 7m,

Live load = Class A loading (IRC), Spacing of longitudinal girders = 2m c/c,

Spacing of cross girders = 4m c/c.

Use M 20 concrete and Fe500 grade steel

Average thickness of wearing coat = 80 mm, Draw neat reinforcement details.

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**FACULTY OF ENGINEERING**

**B.E. (EEE/EIE) VI – Semester (CBCS) (Backlog) Examination, March / April 2022**  
**Subject: Microprocessors and Microcontrollers**

**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. Indicate the addressing modes of the following instructions  
i) MOV AX, 35H+[BP] ii) MOV DX, 46H+[DI]
2. What is need of memory segmentation in 8086?
3. Write the important features of 8253 interval timer.
4. Give a control of 8255 for configuring port A as input and other ports as output.
5. Mention the six interrupts in 8051.
6. List various special function registers of 8051.
7. Explain implicit addressing mode of 8051 with syntax followed by an example.
8. Give alternate functions of port 3 in 8051.
9. Discuss the function of M/IO in 8086.
10. Explain implicit addressing mode of 8051 with syntax followed by an example.

**PART - B**

**Note: Answers any five questions.**

**(5 x 10 = 50 Marks)**

11. With an example, explain the following 8086 instructions:  
a) POP b) CMP c) JNZ d) NOT e) SHR
12. a) Write an Assembly Language Program to subtract two 8-bit signed numbers.  
b) Explain the following 8086 Directives  
i) ENDP ii) ASSUME
13. Explain the following 8086 instruction with examples:  
i) Arithmetic and logical instructions ii) Processor control Instructions.
14. Explain the control transfer instructions of 8051 with example for each.
15. With architectural diagram explain the default and Alternate register assignments of 8086
16. a) Explain the architecture of 8255 PPI  
b) Mention the operating modes of 8255
17. Write an ALP to find the maximum number in an array of 10 8 bit numbers of a 8051 microcontroller.

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**FACULTY OF ENGINEERING**

**B.E. (ECE) VI - Semester (CBCS) (BACKLOG) Examination, March / April 2022**

**Subject: Microprocessor and Microcontrollers**

**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 the purpose of instruction queue in 8086?
- 2 What are the functions of CS & SS registers?
- 3 Explain flag register of 8086.
- 4 Mention the advantages of DMA.
- 5 Write important features of 8253 interval timer.
- 6 List the hardware and software interrupts of 8086.
- 7 Describe the following 8051 instructions with an example (a) JNB (b) MOVX.
- 8 Write the following pin functions of ALE, EA.
- 9 Write the following pin functions of 8086 MN/MX, NMI.
- 10 What is stack? Write its role in CALL instruction.

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

- 11 Explain the architecture diagram of 8086 microprocessor.
- 12 (a) Explain operational modes of 8255.  
(b) What is Interrupt Vector Table? Explain its structure.
- 13 (a) Interface keyboard and display unit with 8086.  
(b) Draw the interfacing diagram of 8255 with 8086 and explain.
- 14 (a) Explain the hardware and software interrupt in details.  
(b) Explain physical memory organization of 8086.
- 15 Explain the architecture of 8051 with neat diagram.
- 16 Explain the procedure of interfacing stepper motor interfacing/CCD interfacing using 8051.
- 17 Write short notes on following:  
(a) 8051 timer and counter.  
(b) Instruction format of 8086.

**FACULTY OF ENGINEERING**  
**B.E. (MECH/PROD) VI - Semester (CBCS) (Backlog) Examination,**  
**March / April 2022**  
**Subject: Refrigeration and Air Conditioning**

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 Draw schematic sketch for air refrigeration system working on reversed Brayton cycle or Bell-Coleman cycle along with p-V and T-s diagrams.
- 2 Define Energy Performance Ratio (EPR) and express its relationship with 'COP'.
- 3 What is the effect of delivery pressure and suction pressure on simple vapor compression refrigeration cycle?
- 4 Discuss about flash intercooler.
- 5 Differentiate vapour absorption system with vapour compression refrigeration system.
- 6 Define Peltier and Thompson effect.
- 7 The humidity ratio of atmospheric air at 28°C dry bulb temperature and 760 mm of mercury is 0.016 kg/kg of dry air. Determine (i) partial pressure of water vapour (ii) relative humidity.
- 8 Explain the working of sling psychrometer.
- 9 List the applications of transport and industrial air conditioning.
- 10 Differentiate between nucleate boiling and pool boiling.

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

- 11 In an open cycle air refrigeration machine is drawn from a cold chamber at -5°C and 2 bar and compressed to 11 bar. It is then cooled, at this pressure, to the cooler temperature of 20°C and then expanded in expansion cylinder and return to the cold room. The compression and expansion are isentropic and follows the law  $PV^{1.4} = \text{constant}$ . Sketch the P-V and T-S diagrams of the cycle and for refrigerant of 25 TR.  
Find: (1) Theoretical C.O.P. (2) Rate of circulation of air in kg/min. (3) Piston displacement per minute in the compressor and expander and (4) Theoretical power per tonne of refrigeration.
- 12 A vapour compression refrigerator uses R-12 as refrigerant and liquid evaporates in the evaporator at -15°C. The temperature of this refrigerant at the delivery from the compressor is 15°C, when the vapour is condensed at 10°C. Determine the C.O.P., if (1) There is no under cooling and (2) the liquid is cooled by 5°C before expansion by throttling. Take specific heat at constant pressure for the superheated vapour as 0.64 kJ/kg K and that for liquid as 0.94 kJ/kg K.
- 13 Explain the working principle of Electrolux refrigeration system with help of neat sketch.

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- 14 The following data refer to a space to be air conditioned: Inside conditions = 25°C DBT and 50% RH Out-door conditions = 22°C DBT and 65% RH Room sensible heat gain = 46.5 kW Room latent heat gain = 17.5 kW Bypass factor for all the cooling coil = 0.1. The return air from the space is mixed with the outside air before entering the cooling coil in the ratio of 4:1 by mass. Determine (a) apparatus dew point temperature (b) condition of air entering leaving the coil (c) dehumidified air quantity (d) fresh air mass flow and volume flow rate and (e) total refrigeration load on the air conditioning plant.
- 15 The following data is available for the design of air conditioning of a small theatre. Outdoor design conditions = 30°C DBT and 70% RH, Comfort conditions required = 22°C DBT and 50% RH, Total seating capacity = 350 persons, Sensible heat gain per person = 90W, Latent heat gain per person = 30W, Sensible heat due to solar gain and infiltrated air = 46.6 kW, Latent heat gain due to infiltrated air = 23.3 kW, Fresh air supplied = 0.4 m<sup>3</sup> / min / person. Desirable temperature rise in the theatre = 8°C. Assume that the recirculated air is mixed with the fresh air after the conditioner.  
Find: (a) Room sensible heat factor  
(b) The percentage of total air circulated  
(c) The refrigeration capacity of the conditioner coil. Assume that the air leaves the conditioner coil with 100% RH.
- 16 Draw a neat diagram of three fluid system of refrigeration (Electrolux refrigeration system) and explain its working.
- 17 (a) Show that the adiabatic mixing of two fluids is irreversible.  
(b) Draw ASHRAE comfort chart.

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**FACULTY OF ENGINEERING**

**B.E. (CSE) VI - Semester (CBCS) (Backlog) Examination, March / April 2022**

**Subject: Software Engineering**

**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 Define Software Engineering. What is its importance?
- 2 What is an Agile Process? How it is different from traditional sequential process.
- 3 List the various tasks of Requirement Engineering.
- 4 What is software engineering practice? Why it is important?
- 5 Differentiate between cardinality and modality.
- 6 Are stepwise refinement and refactoring the same thing? If not, how to they differ?
- 7 What is Software Architecture?
- 8 Define coupling. List various types of coupling.
- 9 What is Stress Testing?
- 10 How are verification and validation important individually?

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

- 11 (a) What is the importance of Process Framework? What are the SEA's that are populated in each Framework Activity?  
(b) Explain in detail about spiral model with a neat diagram.
- 12 (a) Explain the system engineering process and its activities.  
(b) What is requirements engineering? Explain about elicitation in detail.
- 13 (a) Explain Scenario-Based modeling concepts with an example.  
(b) What are Design Classes? Explain the four characteristics of a well formed Design class.
- 14 (a) Explain the process of converting or mapping Data Flow Diagrams into Software Architecture.  
(b) Explain the Golden rules performed in user interface design.
- 15 Explain a suitable overall strategy for S/W testing for conventional S/W architecture.
- 16 Explain about:  
(a) RAD Model            (b) W5HH principle  
(c) Call and return architectural style.
- 17 Write notes on:  
(a) Design process and Design Quality  
(b) Glass-Box testing (White-Box Testing).



**FACULTY OF ENGINEERING**  
**B.E. (IT) VI - Semester (CBCS) (Backlog) Examination, March / April 2022**  
**Subject: Web Application Development**

**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. Write about URL.
2. What do you understand by HTML?
3. Differentiate HTML and XML.
4. What is a Well Formed XML Document?
5. Illustrate basic selectors in JQuery.
6. Define JSON and its Syntax rules.
7. Define angular JS.
8. What are the two types of bootstrapping in Angular JS?
9. What is Full Stack Java Script Development?
10. Write the Syntax to create a collection and to drop a collection in Mongo DB.

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

11. (a) Explain about the ordered list and unordered list properties in CSS with example.  
(b) Create an HTML document to explain the working of CSS Overriding.
12. (a) Explain general structure of XML program.  
(b) Explain how to publish XML document using XSLT.
13. (a) Explain about JSON datatypes in brief with an example programs.  
(b) Write short notes on Event Handling in JavaScript.
14. (a) Give brief about each data binding in angular JS with example program.  
(b) Explain about Angular JS services with example program.
15. (a) Write short notes on SMACK stack.  
(b) Explain Angular.JS expressions with example program.
16. (a) Explain XML Schema with an example.  
(b) Differentiate between CDATA and PCDATA in XML.
17. (a) Create a web server using node .JS which responds to client requests.  
(b) What is data sharding in mongo DB? Explain.

**FACULTY OF ENGINEERING**

**B.E. (AE) VI - Semester (CBCS) (Backlog) Examination, March / April 2022**

**Subject: Performance & Testing of Automotive Vehicles**

**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. Name the forces and moments acting on a car body.
2. Explain Aerodynamic drag.
3. List out types of automotive gear box.
4. Draw a neat sketch of cone clutch.
5. How does the traffic condition, vehicle condition effects fuel economy?
6. Explain RAC rating.
7. Explain vehicle performance testing?
8. Explain anti rolling bar and torsion bar.
9. Explain breaking testing on road.
10. List any engine testing noises.

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

11. Explain briefly the following
  - (a) Air resistance
  - (b) Rolling resistance
  - (c) Grade resistance
12. (a) Describe the construction and working of single plate clutch.  
(b) How will you find the total gear ratio from engine to the rear wheels?
13. (a) What are the factors that effect thermal efficiencies of the IC engines?  
(b) How does the traffic conditions and driving habits effects the fuel economy?
14. Describe a rigid axle front suspension using longitudinal leaf spring.
15. Explain the following:
  - (a) Cylinder leakage test
  - (b) Types of engine noises
16. Explain the effects of atmospheric pressure, temperature and humidity on vehicle performance.
17. (a) Explain the Gearbox testing procedure.  
(b) What is the difference between the traction and tractive effort?



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12. Calculate the quantities R.C.C slab 1:2:4 of thickness 150 mm and inside dimensions 4mX5m take 12mm diameter of main reinforcement 120mm c/c spacing, 10mm diameter of distribution reinforcement 150mm c/c spacing.
13. a) Distinguish between general specification and detailed specification.  
b) What is a supplementary estimate?
14. Calculate the quantities of R.C.C column footing for 4 columns using the following data:  
size of footing 1000mmX1000mm;  
footing height T is 450mm, t=200mm  
size of column is 230mmX460mm.
15. a) Explain the factors affecting analysis of rates.  
b) Explain the essentials of a contract.
16. An irrigation canal has the following details. Bed width=6m, top width of left bank=3.3m, top width of right bank=3.5m, side slopes in cutting 1:1 and side slopes of both banks 1:5:1. Height of banks from bed 2.55m, longitudinal slope of the bed 1 in 4000. There was no transverse slope of the bed and ground. Ground levels at 6 consecutive stations which are at 50m intervals are as follows:

Station	1	2	3	4	5	6
R.L. of ground	100	100.3	100.5	100.6	99.7	99.2

Bed of level at station 1 is 98.5m. Compute the earthwork in cutting and filling.

17. Write short notes on the following:  
a) BOT and BOOT with examples.  
b) PPP Projects.

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**FACULTY OF ENGINEERING****B.E. (EEE/EIE) VI - Semester (AICTE) (Backlog) Examination, March / April 2022****Subject: Digital Signal Processing and Application****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. Determine the fundamental period of  $x(n) = \cos(2\pi n)$ .
2. Mention the properties of ROC in Z-transform.
3. Compute the DFT of a Sequence  $(-1)^n$  for  $N=3$ .
4. Find the IDFT of  $Y(k) = \{0, 0, 1, 1\}$ .
5. Distinguish between Analog and Digital Filter.
6. Design Procedure using Bilinear transformation.
7. Mention application of DSP in speech Processing.
8. Compare Hamming and Kaiser Window.
9. Draw the architecture of ADSP.
10. Write about On-Chip Peripheral.

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

11. (a) Find the Forced response of the system described by difference equation  $y(n) + 2y(n-1) + y(n-2) = x(n) + x(n-1)$ .  
(b) Find the inverse Z-Transform of  $X(z) = z + 0.2 / (z + 0.5)(z - 1) \quad |z| > 1$ .
12. (a) State and Prove Symmetry properties of DFT.  
(b) Calculate the time sequence  $x(n)$  for given DFT components  $\{1, 1+j, 0, 1-j\}$
13. (a) What is FFT and why it is needed. What are the differences and similarities between DIF and DIT algorithms. Distinguish between DTFT, DFT and FFT.  
(b) Find the DFT of a sequence  $x(n) = \{1, 1, 1, 1, 0, 0, 0, 0\}$  using DIT algorithm.
14. Obtain the Direct Form-I and II and parallel form realization for the system  $y(n) = -0.1y(n-1) + 0.2y(n-2) + 3x(n) + 3.6x(n-1) + 0.6x(n-2)$
15. (a) Write short notes on Programmable DSPs.  
(b) Write short notes on Bus structure in DSP Processor.
16. (a) What are the popular windows functions used for computing the coefficients of FIR filters. Mention the advantages of FIR over IIR filter.  
(b) For the analog Transfer function  $H(s) = 3 / (s+1)(s+2)$ . Determine  $H(z)$  using Impulse invariance method. Assume  $T=2\text{sec}$ .
17. (a) Design a Chebyshev Filter with a maximum pass-band attenuation of 3.5 dB at  $\Omega_p = 40 \text{ rad/sec}$  and the stop-band attenuation of 20db at  $\Omega_s = 60 \text{ rad/sec}$ .  
(b) Write short notes (a) Convolution (b) Sampling.

**FACULTY OF ENGINEERING**  
**B.E. (AE) VI Semester (AICTE) (Backlog) Examination, March / April 2022**

**Subject: Computer Aided Design Analysis & Manufacturing**

**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 do you mean by Design Criteria?
- 2 Explain concatenation transformation?
- 3 State any four properties of Bezier curves
- 4 Define synthetic curves?
- 5 Indicate the G codes for tool length and cutter radius compensation.
- 6 Classify various types of APT statements.
- 7 Discuss the disadvantage in DNC machining system?
- 8 Describe, how do you specify a Industrial Robot?
- 9 Define CAPP.
- 10 Define Reverse Engineering.

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

11. a) Write any four properties of B-spline curve  
b) Four vertices of Bezier polygon are  $P_0(1,1)$ ,  $P_1(2,3)$ ,  $P_2(4,3)$  and  $P_3(3,1)$ .  
Determine seven points on the Bezier curve.
12. a) Explain B-REP and C-Rep approach of solid modeling with examples. Write CSG Tree for the following figure 1.

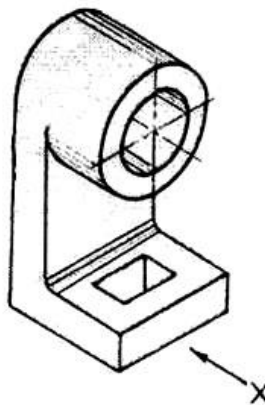


Fig. 1

- b) The triangle  $A(1,1)$ ,  $B(2,1)$  and  $C(1,3)$  is scaled by a factor of 2. Find the coordinates of the triangle.

13. Write an APT part program for the profile shown in fig.2 with cutting speed and feed rate as 500 rpm and 100 mm/min. The cutter is of 10 mm diameter and depth of the job is 15 mm. Use macro statements for drilling operation.

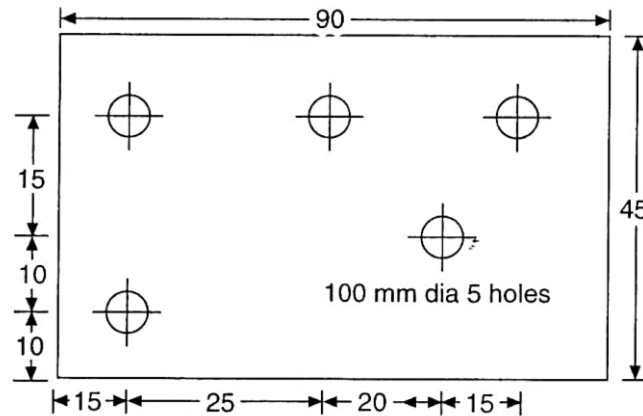


Fig. 2

14. a) Explain with sketch direct and indirect translator in CAD exchange system. Discuss about STEP file format.  
b) List various drives used in Robot. Describe programming methods in Robot.
15. a) Explain adaptive control? Explain ACC and ACO adaptive control system.  
b) Interpret computer aided quality control? Explain the working of scanning laser beam device.
16. a) Differentiate retrieval and generative types of CAPP.  
b) Discuss about rapid prototyping? Explain FDM method with sketch
17. a) What is FEA? What are the basic steps involved in it.  
b) State, what is FMS? Explain the role of AGV in FMS.

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**FACULTY OF ENGINEERING**  
**B.E. (CSE) VI Semester (AICTE) (Backlog) Examination, March / April 2022**  
**Subject: Computer Networks**

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 Define the five components of Data Communication.
- 2 State the difference between Synchronous and Asynchronous Transmission.
- 3 Compare the two types of errors with example.
- 4 State two difference between Pure ALOHA and Slotted ALOHA.
- 5 Identify the IPv4 class, netid and the hostid of the following IP addresses.
  - a) 132 . 56. 8 . 6
  - b) 208 . 34. 54. 12
- 6 Compare circuit switching and packet switching.
- 7 State the services offered by TCP to application layer.
- 8 Define choke packet and what does is it indicate.
- 9 State the two types of DNS messages and their purpose.
- 10 Define the purpose of firewall and list the types of firewall.

**PART – B**

**Note: Answer any five questions**

**(5 x 10 = 50 Marks)**

- 11 a) Summarize the differences between ISO-OSI and TCP/IP reference model.  
b) Explain about the different transmission media.
- 12 a) Illustrate the CRC error detection method for the given dataword **1010011110** and the divisor **10111** by computing the codeword.  
b) Demonstrate Go-Back-N ARQ protocol with an example.
- 13 a) Compare Virtual Circuit network and Datagram network.  
b) Describe IPv4 Classful Addressing.
- 14 a) Distinguish the different scenarios of connection establishment in TCP with proper diagrammatic illustrations.  
b) Discuss about the various open-loop congestion control
- 15 a) Distinguish between the two DNS name resolution mechanism with an example.  
b) Explain the functions of network management system.
- 16 a) Compare the different topologies for interconnecting devices.  
b) Explain the CSMA/CD multiple channel access protocol.
- 17 a) Discuss about ARP protocol.  
b) Write notes on Digital Signatures.

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