Code No. D-2099/AICTE

FACULTY OF ENGINEERING

B.E. (CIVIL) V - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Hydraulic 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. What are major and minor losses in pipes?
2. Define equivalent size of pipe.
3. What do you understand by 'Flow in open channel?'
4. Define the term most economical section of a channel.
5. Define the term critical depth and write down the expression for the same.
6. Mention applications of hydraulic jump.
7. Define Reynolds's number.
8. What are distorted models?
9. Differentiate impulse and reaction turbine.
10. What do you mean by priming?

PART – B

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

11. Derive the expression for Darcy-Weisbach equation.

12. a) List out types of channels. Compare between open channel flow and pipe flow. What is the purpose of providing bed slope in open channels?
    b) Calculate the dimensions of the rectangular cross section of an open channel which. requires minimum area to convey 10 cumec. The slope being 1 in 1500. Take Manning's N = 0.01.

13. a) Describe specific energy diagram with a neat sketch.
    b) Water flows at a velocity of 1 m/s and a depth of 2 m in an open channel of rectangular cross section 3m wide. At certain section the width is reduced to 1.8 m and the bed is raised by 0.65m. Will the upstream depth be affected, if so to what extent?

14. State and explain in detail Buckingham theorem. Mention the advantages of dimensional analysis.

15. Illustrate and explain in detail on main parts and working principle of the Pelton Wheel Turbine with neat sketch.

16. Explain the term hydraulic jump. Derive an expression for the depth of hydraulic jump in terms of the upstream Froude Number.

..2

17. a) Define centrifugal pump and explain various components of a centrifugal pump with a neat sketch.

    b) A centrifugal pump having an outlet diameter equal to two times the inner diameter and running at 1200 rpm. works against a total head of 75m. The velocity of flow through the impeller is constant and equals to 3 m/s. The vanes are set back at an angle of 30 degrees at outlet. If the outer diameter of the impeller is 60 cm and width at outlet is 5 cm, determine vane angle at inlet, work done per second by impeller.

****

Code No: D-2105/AICTE

FACULTY OF ENGINEEERING

B.E. (EEE) V Semester (AICTE) (Main) Examination, March / April 2022

Subject: Power Systems - I

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 terms: Maximum demand, load factor
2. List the disadvantages of low power factor
3. What are the advantages of a doubly fed distributor over singly fed distributor?
4. What are the advantages of pulverizing the fuel used in thermal power stations
5. Define mass curve and load duration curve.
6. Why do we need to think of non conventional energy sources?
7. List the types of reactors.
8. What are bundled conductors.
9. Give the classification of cables?
10. Explain about three part tariff.

PART - B

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

11 a) A power station has the following daily load cycle :

Time in hours	0-6	6-10	10-12	12-16	16-20	20-24
Load in MW	40	50	60	50	70	40

Draw the load curve and find the maximum demand, units generated per day, average load and load factor.

b) Draw the diagram of pressurized water reactor and explain along with its advantages and disadvantages.

12 a) Draw the typical layout of a gas turbine power plant and explain the main components .

b) Explain the working of flat plate collectors.

13 a) A transmission line has a span of 200 meters between level supports. The conductor has a Cross sectional area 1.29cm^2, weight 1170kg/km and has a breaking stress of 4218kg/cm^2. Calculate the sag for a safety factor of 5, allowing a wind pressure of 122 kg per square meter of projected area. What is the vertical sag?

b) Discuss the methods for improving the string efficiency of overhead line insulators.

..2

14 a) Explain about the grading of cables with neat figures.
   b) Write short notes on the capacitance of three core cables.

15 a) Derive the expression for capacitance of an unsymmetrical transposed 3-phase transmission line.
   b) Explain the effect of earth on capacitance.

16 a) Derive an expression for most economical power factor.
   b) Explain the concept of GMR and GMD of a transmission line.

17 a) Explain neatly with figures what are the methods of improvement of power factor.
   b) A two wire dc distributor AB, 600 meters long is loaded as under :

Distance form A (meters) :	150	300	350	450
Load in Amperes :	100	200	250	300

The feeding point A is maintained at 400V and that of B at 430 V. If each conductor has a resistance of 0.01Ω per 100 meters, calculate i) the currents supplied from A to B ii) power dissipated in the distributor.

****

Code No. D-2436/AICTE

FACULTY OF ENGINEERING

B.E. (EEE) V - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Renewable Energy Sources

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 solar constant?
2 Differentiate terrestrial and extra terrestrial solar radiation?
3 What are the advantages of concentrating collectors?
4 What do understand by photo voltaic conversion?
5 What is Betz limit?
6 List out three differences between horizontal and vertical axis wind turbine?
7 What is the difference between fissures and fumaroles in geothermal energy?
8 Compare and contrast different types of tides?
9 What is the principle of OTEC?
10 Write two advantages of biogas generation?

PART - B

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

11. a) Write short notes on types of non conventional energy sources?
b) Draw the block diagram of fuel cell system and explain?

12 a) Explain about solar energy collectors?
b) What is solar pond, mention it's applications?

13 Mention different types of horizontal-axis turbines. Derive the expression for maximum wind power extracted by a wind turbine.

11. Explain the principles of tidal power generation? Also mention the advantages and limitations of tidal power?

15 Explain the closed cycle OTEC plant and list out the major problems associated OTEC?

16 a) Write the applications of Geothermal energy?
b) Explain briefly about Biomass conversion technologies?

17 Differentiate between the following methods of biogas generation
i) Pyrolysis ii) Combustion iii) Gasification iv) Anaerobic Digestion

****

Code No. D-2110/AICTE

FACULTY OF ENGINEERING

B.E. (EIE) V - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Power Plant Instrumentation

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 necessity of Condenser in TPP?
2 Explain about Steam Circuit.
3 Write advantages of piezo-electric accelerometer.
4 Explain about Pedestal Vibration.
5 What is the significance of Air-Fuel Ratio?
6 What is De-super heater?
7 What is the function of Lubricating oil?
8 Write a short note on Bypass Damper Super heater.
9 Write Applications of Steam Pipe fittings.
10 Sketch the diagram of Hydroelectric Power Plant.

PART – B

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

11 (a) Explain about water tube boilers.
(b) With a neat diagram explain the Bin system in coal handling.

12 (a) With a neat diagram explain about Smoke & Dust Monitoring Instrument.
(b) Explain in detail about Piping System used for Pressure Measuring System.

13 What is meant by Combustion of Fuel? Explain briefly with a neat diagram about how Air-Fuel ratio control is achieve in Power Plant.

14 What is the main purpose of Heat Exchanger? Draw the Schematic Diagram and Explain about the construction and working of Hydrogen Generator Cooling System.

15 What is the function of Nuclear Reactor in NPP? Explain the working Principle of Nuclear Power Plant with relevant diagram.

16 Write a short note on:
(a) Boiler following Mode operation
(b) Wind Energy Power Plant.

17 (a) Explain Speed Governor.
(b) Explain about Turbine Supervisory Instrumentation.

****

Code No. D-2118/AICTE

FACULTY OF ENGINEERING

B.E. (ECE) V - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Digital Signal Processing

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 Compute circular convolution of the following two sequences
$x_1(n) = \{0, 1, 0,1\}$ and $x_2(n) = \{1, 2, 1, 2\}$
2 State any two properties of DFT.
3 State any two properties of Chebyshev filters.
4 Illustrate warping effect.
5 List the advantages of FIR filter.
6 Construct signal flow graph for $y(n) = 0.9\ x(n) + 1.4(n - 1)$.
7 List the application of multirate signal processing.
8 Discuss Multistage implementation of Decimation by a factor D.
9 Explain direct addressing mode in DSP processor.
10 Explain the use of Guard bits.

PART – B

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

11 Compute 8-point DFT of x(n) by Radix-2 DIF-FFT method for an 8-point sequence given by x(n)={2, 1, 0, -1, 3, 1, 2, 0}. Also sketch the magnitude and phase spectrum.

12 Design a Butterworth digital IIR LPF using Bilinear Transformation by taking T = 0.1s, to satisfy the following specifications.

$$0.5 \le |H(e^{j\omega})| \le 1.0 \quad ; \quad for\ 0 \le \omega \le 0.3\pi$$

$$|H(e^{j\omega})| \le 0.1 \quad ; \quad for\ 0.65\pi \le \omega \le 5\pi$$

Draw direct form – I structure of the filter.

13 Design a FIR High Pass Filter with cutoff frequency of 1.5kHz and sampling frequency of 5kHz with10 samples using Fourier Series method. Determine the frequency response and verify the design by sketching the magnitude response.

14 (a) Explain Interpolation with neat diagram.
(b) Consider the discrete time signal x(n) = {1, 4, 7, 10}. Determine the upsampled version of the signals for the sampling rate multiplication factor I = 3.

15 (a) Discuss special features of DSP Processors.
(b) Discuss about on-chip peripherals of DSP processors.

16 (a) Compute 4-point DFT of x(n) by Radix-2 DIT-FFT method for an 4-point sequence given by x(n)={3, 1, 2, 0}

(b) Determine H(z) from H(s) for T=0.1s using impulse invariant transformation technique.

17 Write short notes:

(a) Finite word length effects

(b) Sampling rate conversion by factor I/D

(c) Accumulator addressing

*****

Code No: D-2123/AICTE

FACULTY OF ENGINEERING

BE (MECH/PROD) V Semester (AICTE) (Main) Examination, March / April 2022

Subject: Design of Machine Elements

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 various theories of failures?
2. Explain the following terms subjected to variable loads.
   i) Stress concentration factor ii) Selection of Factor of safety
3. Design the shaft for transmitting a power of 20,000W at 1000rpm. The allowable shear stress for the shaft material is 40MPa.
4. Explain briefly axially loaded unsymmetrical welded section with neat diagram
5. What do you know about Compound screws?
6. Define the following terms
   i) Dead load ii) impact load
7. Explain about Miner's rule
8. What are the types of Keys?
9. Define the following terms in terms of riveted joints
   i) Margin ii) Pitch
10. Write briefly about differential screws.

PART - B

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

11. a) What is mean by "Principal Stress" and "Principal Planes"?
    b) A cylindrical shaft made of steel of yield strength 700MPa is subjected to static loads consisting of bending moment 10kN-m and a torsional moment 30kN-m. Determine the diameter of the shaft using two different theories of failure, and assuming a factor of safety of 2. Take E=210GPa and poisson's ratio = 0.25

12. a) What information do you obtain from Soderberg diagram?
    b) A circular rod of 500mm length is supported freely at its two ends. It is added upon by a central concentrated cyclic load having a minimum value of 20kN and a maximum value of 50kN. Find the diameter of rod by taking a factor of safety of 1.5, size effect of 0.85, surface finish factor of 0.9, stress concentration factor of 1. The material properties of rod are given by: ultimate strength of 650MPa, yield strength of 500MPa and endurance strength of 350MPa.

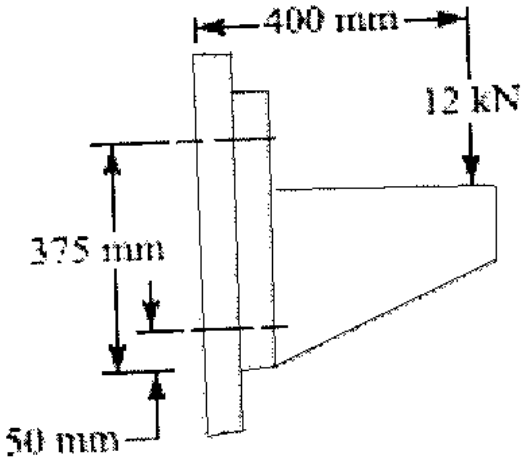
13. a) A line shaft rotating at 200 r.p.m is to transmit 20 kW. The shaft may be assumed to be made of mild steel with an allowable shear stress of 42 MPa. Determine the diameter of the shaft, neglecting the bending moment on the shaft.
    b) Compare the weight, strength and stiffness of a hollow shaft of the same external diameter as that of solid shaft. The inside diameter of the hollow shaft being half the external diameter. Both the shafts have the same material and length.

..2

14. a) Distinguish between cotter joint and Knuckle joint
    b) Design a knuckle joint to transmit 140kN. The design stresses may be taken as 80MPa in tension, 60MPa in shear and 140MPa in compression.

15. a) What is an eccentric loaded welded joint?
    b) A steam boiler is to be designed for a working pressure of 2.5N/mm^2 with its inside diameter 1.6m. Give the design calculations for the longitudinal and circumferential joints for the following working stresses for steel plates and rivets: In tension = 75MPa, In shear = 60 MPa; In crushing = 125MPa

16. The brackets are fixed on steel columns as shown in Figure. The maximum load that comes on the bracket is 12kN acting vertically at a distance of 400 mm from the face of the column. The vertical face of the bracket is secured to a column by four bolts, in two rows (two in each row) at a distance of 50 mm from the lower edge of the bracket. Determine the size of the bolts if the permissible value of the tensile stress for the bolt material is 84MPa. Also find the cross – section of the arm of the bracket which is rectangular.



17. Describe the design procedure for the unprotected type of the flange coupling with neat sketches.

****

Code No. D-2130/AICTE

FACULTY OF ENGINEERING

B.E. (AE) V - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Automotive Transmission

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 clutch judder.
2 What is the function of a clutch in a Transmission system?
3 What is the function of a gear box?
4 Why is double declutching technique used?
5 Why gear lubrication is required?
6 What is the main difference between fluid coupling and torque converter?
7 List out some of the merits and demerits of automatic transmission.
8 Define coupling point and where it is used.
9 What are the requirement of Automotive Transmission system?
10 List out some of the advantages of overdrive.

PART – B

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

11 (a) Explain the working principle of single plate clutch.
(b) Explain the working principle of cone clutch.

12 (a) Illustrate the working of constant mesh gear box.
(b) Draw synchronizer and explain its working.

13 Explain the working Chevrolet drive with a neat sketch.

14 (a) Explain continuous variable transmission system with a neat sketch.
(b) Draw performance characteristics of single phase, multi-stage and poly phase torque converters.

15 (a) Explain in detail working of hydrostatic drives.
(b) Illustrate the construction and working of an overdrive.

16 (a) Explain ward Leonard system with a neat sketch.
(b) What are the advantages of CVT over Manual Transmission?

17 (a) Explain the working of electric transmission system with a neat sketch.
(b) List out some of the advantages of electric transmission.

****

Code No. D-2133/AICTE

FACULTY OF ENGINEEERING

B.E. (CSE) V – Semester (AICTE) (Main) Examination, March / April 2022

Subject: Operating Systems

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 operating system?

2 What is PCB? draw its slimetine

3 Draw the process state transition diagram?

4 Distinguish between binary semaphore and counting semaphore?

5 State the necessary conditions for the deadlock to occur?

6 What is Compaction? Under what circumstances it is not possible?

7 Differentiate between Internal and External fragmentation?

8 What is a device driver?

9 What is File? What are the attributes of a file?

10 Define Seek time and Rotational latency?

PART - B

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

11) (a) What is an Operating System? List the services that an operating system provides to its users?

(b) Explain the different Multithreading Models?

12) (a) Explain process state transition diagram?

(b) Draw the Gantt chart and Compute average Turnaround time and average Waiting time for each scheduling algorithm using FCFS,SJF(pre-emptive) ,Priority (non-preemptive),Round robin (Time slice=2ms) .process scheduling method.

Process	Burst Time	Priority	Arrival time
P1	10	3	0
P2	1	1(H)	2
P3	2	3	3
P4	1	4 (L)	1
P5	5	2	1

13 (a) What is critical-solution problem? Write the solution for Readers-Writers problem with semaphores.

..2

(b) Explain the Bankers Algorithm for Deadlock Avoidance for the following example and Find the Safe Sequence

Process	Max	Allocation	Available
	A B C	A B C	B C
P0	7 5 3	0 1 0	3 2
P1	3 2 2	2 0 0	
P2	9 0 2	3 0 2	
P3	2 2 2	2 1 1	
P4	4 3 3	0 0 2	

14 (a) Explain the Paging technique with a suitable Example?
(b) Discuss about various File Allocation Methods

15 Consider the following page -reference string
1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6
Calculate the number of page faults that would occur for the following algorithms Assuming frame size as 4
1.FIFO 2.OPTIMAL 3.LRU 4.MRU 5.LFU 6.MFU

16 (a) Consider disk queue with I/O requests for the blocks on cylinders:
95, 181, 39, 123, 12, 124, 65, 68 and the disk head is initially at 57.compute the total number of head movement according to SSTF, SCAN, LOOK disk scheduling algorithm
(b) What is Virtual memory? Explain about Demand paging?

17 Write Short Notes on any Two of the following
(a) Semaphores
(b) DMA
(c) Free space allocation techniques

****

Code No: D-2147/AICTE

FACULTY OF ENGINEERING

B. E. (I.T) V - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Operating Systems

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. State the two goals of an operating system.
2. Write about concept of multithreading in detail.
3. What is critical section?
4. Define aging and how this problem can be solved?
5. Differentiate between a Page Fault and Page Replacement with an example.
6. List out the important difference between paging and segmentation.
7. What is the purpose of copy on write technique?
8. What is stream?
9. What is encryption and decryption?
10. What type of operating system is Windows NT?

PART - B

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

11. a) Describe the actions taken by a thread library to content switch between user level threads.
    b) Describe the differences among short-term, medium-term and long-term scheduling.

12. a) What resources are used when a thread is created and how do they differ from those used when a process is created.
    b) Explain different methods of recovery from deadlock.

13. a) What are the steps required to service page Replacement request?
    b) What is the criteria for comparing CPU scheduling algorithms.

14. a) What are the strategies for managing memory free space?
    b) Explain various allocation methods.

15. a) What do you mean by access rights in protection? Explain.
    b) Explain how cryptography is used as a security tool.

16. a) Define System call. Explain any five process related system calls.
    b) Explain the different Multithreading Models.

17. a) What is file mounting? What are cascade mounts explain? Explain.
    b) Explain about the physical memory and virtual memory management.

****

Code No. D-2398/AICTE

FACULTY OF ENGINEERING

B.E. (CME) V - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Design Analysis and Algorithms

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. Show the following: (a) $10n^2 + 9 \neq O(n)$ (b) $n^3 + 10n^2 = O(n^3)$.
2. Write control abstraction of Greedy method.
3. Explain optimal merge pattern with an example.
4. Define principle of optimality.
5. Explain knapsack problem.
6. Define class P, NP problems.
7. What are B+ trees? Where we use them.
8. Explain compressed Tries.
9. Explain Clique of a graph.
10. Explain Assignment Problem.

PART – B

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

11. (a) Explain recursive functions algorithm analysis with an example.
    (b) Give the algorithm for matrix multiplication and find the time complexity of the algorithm using step – count method.

12. (a) State the Greedy Knapsack? Find a solution to the Knapsack instance n=3, m=20, (P1, P2, P3) = (25, 24, 15) and (W1, W2, W3) = (18, 15, 10).
    (b) What is a Spanning tree? Explain Prim's Minimum cost spanning tree algorithm with suitable example.

13. (a) What is a Hamiltonian Cycle? Explain how to find Hamiltonian path and cycle using backtracking algorithm.
    (b) Explain Knuth Mories algorithm with an example.

14. Draw an Optimal Binary Search Tree for n=4 identifiers (a1,a2,a3,a4) = (do, if, read, while) P(1:4)=(3,3,1,1) and Q(0:4)=(2,3,1,1,1).

15. (a) Write short notes on Tries?
    (b) Construct B+ Tree with m=3, for the nodes given 1, 3, 5, 7, 9, 2, 4, 6, 8, 10.

16. (a) Write short notes on Parallel Programming.
    (b) Write short notes on P,NP,NP complete, NP Hard problems.

17. Explain Travelling sales person problem using LCBB procedure with the following instance and draw the portion of the state space tree and find an optimal tour.

$$\begin{pmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{pmatrix}$$

**

Code No: D-3598/CBCS

FACULTY OF ENGINEERING

B.E (Civil) V - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Theory of Structures - I

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 Using dummy load method find the deflection of free end of a cantilever beam of span 4m subjected to UDL of intensity 20 kN/m over entire span.
2 What are knee braces in trusses?
3 Explain Displacement factor in Kani's Method.
4 Write the basic slope-deflection equations for any intermediate span of a continuous beam subjected to an external general load system.
5 Write the effect of change in temperature on a three hinges arch.
6 State Eddy's theorem?
7 What is rotational factor and displacement factor?
8 When an end of continuous beam is fixed, the rotation contribution in Kani's method is (a) 2EI/L (b) 3EI/L (c) EI/L (d) 4 EI/L
9 What are the limitations of Kani's method?
10 State and explain Castingliano's theorem.

PART – B

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

11. Draw the BMD and show all important features of the diagram shown in Figure 1 using slope deflection method for the given portal frame.

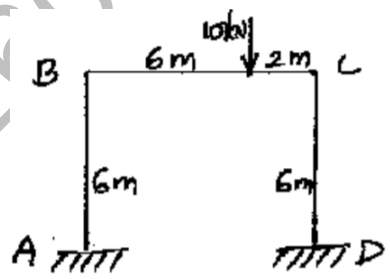


Figure 1

12. Analyse the continuous beam shown in Figure 2, using moment distribution method and draw the bending moment diagram. All the members have the same flexural rigidity.

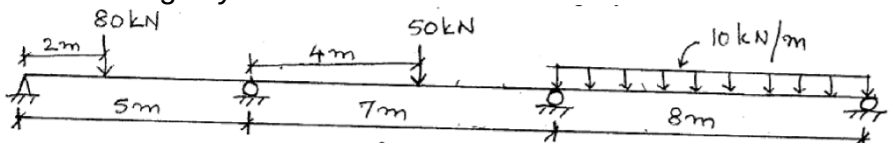


Figure 2

..2

13. Draw SFD and BMD of the given continuous beam shown in Figure 3 using Kani's method of analysis.

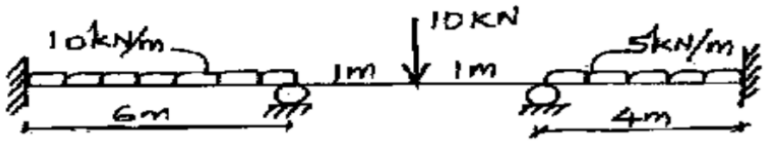


Figure 3

14. Determine the forces in all members of the redundant truss shown in Figure 4. Take
A = 100mm^2, E = 200 GPa for all members.

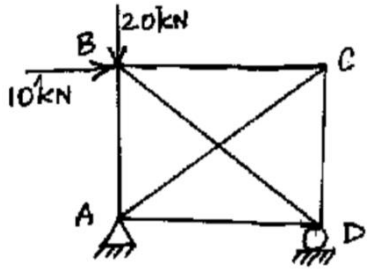


Figure 4

15. Analyse the frame shown in Figure 5 by Kani's method and draw its BMD.

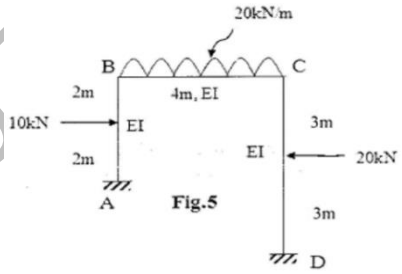


Figure 5

16. A portal frame hinged at its base is loaded as shown in Figure 6 using the method of
minimum strain energy, analyse the frame and plot the BMD.

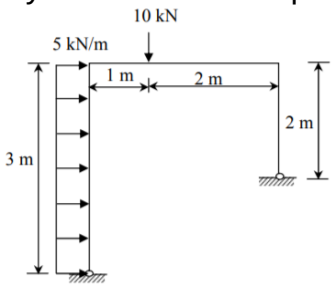


Figure 6

17. A symmetrical three hinged circular arch has a span of 16m and a rise to the central hinge of 4m. it carries a vertical load of 16 kN at 4m from the left-hand end. Find
(a) the magnitude of the thrust at the springing
(b) the reactions at the supports
(c) BM at 6m from the left-hand hinge.

****

Code No:D-3609/CBCS

FACULTY OF ENGINEERING

BE (EEE/EIE) V–Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Digital Signal Processing and Applications

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 a) causality b) Stability.
2. Determine the fundamental period of x(n) = cos (0.5 n)
3. Compute the DFT of a Sequence (-1)n for N = 4.
4. Distinguish between Analog and Digital Filter.
5. What is the speed improvement factor in calculating 64 pt DFT of a sequence Using direct computation and FFT algorithm.
6. What are the properties of bilinear transformation.
7. Determine Butterworth poles of order n = 2.
8. What is the need of anti aliasing filter prior to down sampling?
9. What is Multirate Signal Processing?
10. List the application of DSP processor.

PART – B

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

11. Determine whether the following signals are a) linear or non linear
    b) Time variant or time invariant c) stable or unstable d) casual or no- casual.
    a) y(n) = $\sum_{n-no}^{n+no} X(k)$
    b) y(n) = n. X^2 (2n)
    c) y(n) = cosh(nx(n) + x(n-1))

12. a) State and prove time scaling and time reversal properties of DFT.
    b) Find the DFT of a sequence x(n) = {1, 1, 1, 1, 1, 1, 0, 0} using DIF FFT algorithm.

13. a) Write the procedure to design Checyshev filter.
    b) Find the digital filter H(z) from given analog filter below using step invariant Method. H(s) = $\frac{1}{(S+1)(s+2)}$

14. Write the equation of any four window used in design of FIR filter.

15. a) Write short notes on Architecture of TMS320C5X. Write about the Bus structure, CALU, AR and INDEX registers in detail.
    b) Write short notes on Programmable DSP.

..2

16. a) Find the Inverse Z-Transform of
X(Z) = $\frac{(Z+0,2)}{(Z+0.5)(Z-1)}$.

b) Design a Chebyshev Filter with a maximum pass band attenuation of 2.5 dB at Ω p = 20 rad / sec. and the stop-band attenuation of 30 dB at Ω s = 50 rad / sec.

17. a) Write a short note on Speech recognition and speed synthesis.

b) State and prove Time shifting properties of DFT

****

Code No. D-3623/CBCS

FACULTY OF ENGINEERING

B.E. (ECE) V- Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Analog Communications

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. List the properties of Hilbert Transform
2. Compare SSB and VSB.
3. Define modulation index and bandwidth of FM
4. Compare NBFM and WBFM.
5. Illustrate Single and double polarity PAM wave.
6. State sampling theorem for Band pass signals.
7. Explain the image frequency rejection of a radio receiver.
8. Define the term fidelity
9. What is meant by Noise? State the different types of Noise.
10. Explain briefly about pre-emphasis and De-emphasis.

PART – B

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

11. a) With necessary circuit diagram and waveforms, explain how DSB-SC wave is generated using 1) Balanced Modulator 2) Ring Modulator
    b) When a broadcast AM transmitter is 50 percent modulated, its antenna current is 12 A. What will be current when the modulation depth is increased to 0.9

12. Explain the detection of FM wave using balanced frequency discrimination.

13. a) Explain, how a PPM signal can be generated from PWM signal?
    b) Compare PAM, PWM and PPM pulse modulation techniques.

14. Draw the block diagram of super heterodyne receiver and explain the function of each block.

15. Derive the expression for the figure of merit of an SSB-SC System.

16. a) What is vestigial side band (VSB) modulation and explain its characteristics.
    b) Explain various types of AGC, their advantages and disadvantages

17. Explain in Detail 1) Time Division Multiplexing 2) COSTAS Loop

****

Code No. D-3629/CBCS

FACULTY OF ENGINEERING

B.E. (MECH) V Semester (CBCS) (Backlog) Examination, March / April - 2022

Subject: Manufacturing Processes

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 terms: Sprue, Parting line and gate.
2 State the functions of chill used in sand casting.
3 What is weldability? State the factors affecting weldability.
4 State the differences between carburizing and oxidizing flames.
5 "Joint gap is highly critical in soldering and brazing processes". Justify the statement.
6 What are the reasons for hot cracks occurring in welding?
7 How do you decide minimum and maximum temperatures in a hot working process?
8 What is the binder used in CO_2 moulding process? State the process of hardening of the mould.
9 Explain briefly about spinning in sheet metal.
10 What is bend allowance and how it is calculated?

PART – B

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

11 a) What are the advantages of solid state welding processes over fusion welding processes?
b) State and explain various welding defects and their causes.

12 a) Explain the principle of investment casting with a neat sketch.
b) Explain the concept of blow moulding process. Mention the advantages of the process.

13 a) Describe the GTAW process. How GTAW is different from PAW process?
b) Discuss with sketches, the types of pattern allowances.

14 a) Explain the principle of Friction Welding with a neat sketch. Mention its applications.
b) Sketch and explain electro-magnetic forming with neat sketch.

15 a) Explain various stages involved in powder metallurgy process.
b) Briefly explain the types of flames in gas welding and their applications.

16 a) Explain the Plastic Injection Moulding with a neat diagram.
b) Explain the principle of centrifugal casting process with a neat diagram.

17 Write short notes on:
a) Rubber Pad Forming.
b) Ultrasonic Welding.

*****

Code No. D-3634/CBCS

FACULTY OF ENGINEERING

B.E. (PROD) V Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Metal Forming Technology

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 understand by work hardening of metals? Explain
2 What is spring back in sheet metal bending?
3 What is flow stress and how it can be expressed?
4 Sketch and explain important features of a progressive die.
5 Write the parameters affecting extrusion pressure.
6 Describe the principle of closed die forging.
7 What are the lubricants used in wire drawing?
8 Why strength of rolled part is usually greater than a cast part? Explain.
9 Distinguish between fullering and edging with neat sketches.
10 Sketch the four-high rolling mills and label the parts.

PART – B

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

11 a) What is recrystallization temperature? Discuss its significance in metal forming operations.
b) Explain the phenomenon of yielding of a ductile material under bi-axial state of stress.

12 Give a detailed classification of presses and mention their applications.

13 a) Explain cold working and hot working with their advantages and disadvantages.
b) Differentiate between deep drawing and spinning operation.

14 a) Sketch compound die set labeling all the parts and give its applications.
b) Explain the effect of friction and die angle in extrusion process.

15 a) Discuss the detail the process of Isothermal forming.
b) Describe working of drop forging hammer with a neat sketch.

16 Discuss the significance of roll speeds and roll gaps on rolling operations.

17 Write short notes on:
a) Flow forming process
b) Power rolling process

*****

Code No. D-3636/CBCS

FACULTY OF ENGINEERING

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

Subject: Automotive Diesel Engines

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 two basic types of diesel engines?
2. Define the following terms: compression ratio, bore, stroke and combustion chamber.
3. What do you understand by crank case scavenging?
4. Name the different types of injection nozzles used in diesel engines.
5. What are the different methods of super charging?
6. What are the different types of governors used in fuel injection systems of CI engines?
7. What is Pressure- Crank angle diagram?
8. What is intake swirl?
9. How can a CI engine be modified for super charging?
10. What are the parameters which define the performance of a CI engine?

PART – B

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

11. Explain how the ignition process occurs in a diesel engine.
12. What is an air-standard cycle and a fuel air cycle? Explain each in detail.
13. Explain the working of the direct and indirect injection combustion chambers.
14. Discuss about the engine performance and emission characteristics of diesel engines and the various factors affecting these.
15. Explain the fundamental turbo charger equations and turbo charger efficiency related to CI engines.
16. Explain the use of the study of heat balance of CI engines.
17. Write short notes on (a) abnormal combustion, (b) Exhaust gas recirculation and (c) engine testing and emission standards.

**

Code No. D-3640/CBCS

FACULTY OF ENGINEERING

B.E. (CSE) V Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Data Communication

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. Why is layered concept needed in Protocol Architecture?
2. List and give examples of types of transmission impairment.
3. What are the reasons for breaking a long data transmission up into a number of frames?
4. What is the major disadvantage of asynchronous transmission?
5. Differentiate between circuit switching and packet switching.
6. What is the need for AAL?
7. What is MAC Protocol? Where is it needed?
8. Differentiate between bridges and switches.
9. List out applications of Bluetooth.
10. What is meant by frequency reuse technique?

PART – B

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

11. (a) Explain about the functionalities and duties of each TCP/IP layer.
    (b) Explain the guided transmission media and characteristics.

12 (a) For the bit stream 111010010 sketch the wave form of any three Digital Encoding formats.
    (b) Discuss CRC technique with an example.

13 (a) Describe the concept of sliding window protocol.
    (b) Explain relation between TPs, VPs, VCs.

14 (a) Draw frame format of IEEE 802.3 Ethernet LAN and explain each field.
    (b) Explain CSMA/CD Technique.

15 (a) Explain IEEE 802.11 protocol architecture.
    (b) Write notes on Wireless transmission.

16 (a) Explain Bluetooth architecture.
    (b) Give Overview of operation of cellular systems.

17 (a) Explain in detail the important characteristics of EIA – 232 interface.
    (b) Explain in detail NULL modem.

*****

Code No. D-3649/CBCS

FACULTY OF ENGINEERING

B.E. (IT) V - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Database Systems

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 Illustrate the difference between 3-levels of abstraction.
2 What is a view? What are the conditions needed for a view to become updatable view?
3 Specify ACID properties.
4 State the purpose of indexing.
5 Draw the state diagram of a transaction.
6 What is an assertion? Write its syntax in SQL.
7 What is meant by functional dependency?
8 Define Transaction Log backup.
9 What is a data model? List different categories of data models.
10 How do you test for empty relations?

PART – B

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

11 Write about different advanced recovery techniques in detail.

12 (a) Write about attribute types used in the E-R model.
(b) Explain E-R diagram with their extended E-R features.

13 (a) Define Hashing. Write differences between static and dyn0amic Hashing.
(b) Compare ordered indexing and hashing.

14 (a) Discuss fundamental relational algebra operations with examples.
(b) What is a view? Give an example.

15 Compute the closure of the following set F of functional dependencies for relation schema
R= (A,B,C,D,E) A→BC; CD→E; B→ D; E →A; List the candidate keys of R?

16 (a) Explain why cascadelessness of schedule is desirable with an example.
(b) Demonstrate recursive queries.

17 Write short notes on:
(a) Deadlock Prevention
(b) Deadlock Detection
(c) Deadlock recovery.

****

FACULTY OF ENGINEERING

B.E. III/IV (Civil) I - Semester (NON-CBCS) (Backlog) Examination,

March / April 2022

Subject: Fluid Mechanics - II

Time: 3 Hours **Max. Marks: 75**

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

PART – A

Note: Answer all questions. **(25 Marks)**

1 State in detail various types of flows channels.
2 What is meant by critical velocity of flow in an open channel?
3 State briefly the classification of channel bottom slopes. Give the detailed classification of gradually varied flow profiles.
4 A rectangular channel 5.0 m wide conveys water at 12.00 cumec at a depth of 0.35 m. if a hydraulic jump occurs, find the depth of flow after the jump.
5 Explain the water hammer phenomenon.
6 State the principle of stream lined body.
7 State the merits and demerits of distorted model.
8 Define Mach cone.
9 What do you mean by specific speed of a turbine? Why is it called a type characteristic?
10 Sketch a centrifugal pump and label the components.

PART – B

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

11 a) Water flows at 12.5 m^3/s in a channel 2 m wide, at a velocity of 1.25m/s. Calculate the specific energy head. Find also the critical depth, critical velocity and minimum value of specific energy head corresponding to this discharge in the channel.
b) What do you understand by most economical channel section? Derive the condition for the rectangular channel of best section. Show that hydraulic mean depth is one-half the depth of flow.

12 a) Derive the dynamic equation of gradually varied flow.
b) The loss of energy head in a hydraulic jump is 4.75 m. The Froude's number just before the jump is 8.0. find (i) percentage loss of energy head due to jump, ii) Discharge per meter width of channel, (iii) Froude's number after the jump, iv) The depths before and after the hydraulic jump, (v) Length of the jump.

13 a) Define boundary layer and explain the fundamental causes of its existence. Also discuss the various methods of controlling the boundary layer.
b) What is the significance of critical period of the pipeline in unsteady flow? Water flowing in a long pipe is suddenly stopped by closing a valve at the discharge end. The dia of the pipe is 160 mm and its thickness is 7 mm. The quantity of water flowing in the pipe is 20 lit/sec. Find the rise of pressure due to instantaneous closure of valve at the discharge end. Take modulus of elasticity of the pipe material as 1.962 x 10^5 N/mm^2 and bulk modulus of water as 1.962 x 10^3 N/mm^2.

b) What is the significance of critical period of the pipeline in unsteady flow? Water flowing in a long pipe is suddenly stopped by closing a valve at the discharge end. The dia of the pipe is 160 mm and its thickness is 7 mm. The quantity of water flowing in the pipe is 20 lit/sec. Find the rise of pressure due to instantaneous closure of valve at the discharge end. Take modulus of elasticity of the pipe material as 1.962×10^5 N/mm^2 and bulk modulus of water as 1.962×10^3 N/mm^2.

14 a) What are the various types of similarities that should exist between a model and a prototype? Also state the factors influencing the selection of a scale for a model.

b) The velocity and discharge for a 1/50 scale model of a spillway are 0.60 m/s and 0.180 m^3/s, calculate the corresponding velocity and discharge in the prototype.

15 a) A reaction turbine (outward flow) utilizes 520 cumec of water. The internal and external diameters of the runner are 1.50 m and 2.50 m respectively. The width of the runner is 300 mm at inlet as well as at outlet. If the head on the turbine is 50 m and the speed of the runner is 190 rpm, find the runner vane angles at inlet and outlet and the guide blade angle. Neglect the thickness of the vanes and assume that the turbine is discharging radially at outlet.

b) Explain in detail the various application of impact of jets. Find the force of impact of jet when it strikes a flat plate at right angles.

16 a) Stating the significance of Froude's number for hydraulic jump, provide the detailed classification of jumps according to Froude's number also.

b) Explain differ types of surges in open channel, what are the significance of them?

17 a) What do you mean by fundamental units and derived units? Give examples.

b) What is cavitation and what are its caused? How will you prevent the cavitation in hydraulic machines.

*****

FACULTY OF ENGINEERING

B.E. III / IV (EIE) I – Semester (NON-CBCS) (Backlog) Examination, March / April 2022

Subject: Signals and Systems

Time: 3 hours **Max. Marks: 75**

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

PART – A

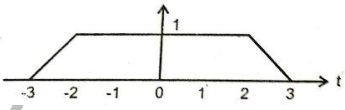
Note: Answer all questions. **(25 Marks)**

1. Define step and delta function.
2. State Sampling theorem.
3. Define natural response and forced response?
4. Define Convolution Sum.
5. Define System function.
6. What is the condition of convergence of Laplace Transform?
7. Define Fourier transform.
8. Explain the multiplication property of continuous time Fourier series.
9. What is the sufficient condition for existence of DTFT?
10. Define inverse Z transform.

PART – B

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

11. (a) Express the signal shown in terms of step and ramp.

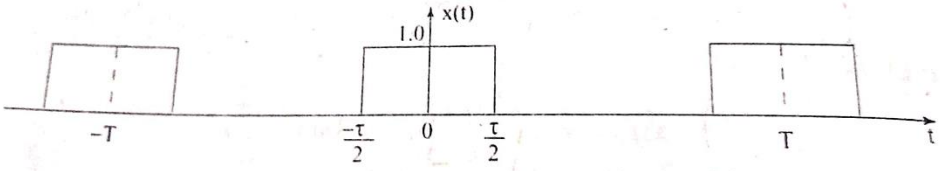


(b) Find which of the following signals are casual or non-casual.

(i) $x_1(t)= e^{at}\, u(t)$ (ii) $x_2(t)= e^{-2t}\, u(-t)$ (iii) $x_3(t)= \text{sinc}\, t$

(iv) $x_1(n)= u(n+3)-u(n-2)$ (v) $x_2(n)= (\frac{1}{2})^n u(n+2)$

12. Find the Fourier series representation of the signal shown below.



13. Using classical method solve $\frac{d^2y(t)}{dt^2} + 4\frac{dy(t)}{dt} + 4\,y(t) = \frac{dx(t)}{dt} + x(t)$ if the initial conditions are $y(0^+)=\frac{9}{4}$; $\frac{dy(0^+)}{dt} = 5$ and input $x(t)$ is $e^{-3t}\, u(t)$.

14. Explain the solution of differential equations using Laplace Transform.

15. (a) Define Z transform

(b) List the properties of convergence

(c) Find the Z transform and ROC for the signal $x(n)= a^n u(n)$.

16. Find the DFT of a sequence x(n) = {1, 2, 3, 4, 4, 3, 2, 1}

17. a) Write properties of Fourier transform.

    b) Write properties of Z transform.

*****

Code No: D-3089/NON-CBCS

FACULTY OF ENGINEERING

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

Subject: Electrical Machinery - II

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 auto transformer
2. Draw the connection diagram & Phasor diagram for delta / star configuration of – 30^o connection.
3. Why excessive insulation is harmful to a coil
4. When a bank of two 1- ϕ transformer are connected in an open delta arrangement to supply a 3-ϕ load, do they supply their rated output.
5. The power output of an induction motor is 42KW when it is running at 4% slip. The stator resistance and core loss are observed negligible. Calculate torque developed in synchronous watts.
6. A 3-ϕ induction motor having full load torque of 60Nm when delta connected develops a starting torque of 120Nm. For the same supply voltage calculate the starting torque if the motor is changed to star connection.
7. A 3-ϕ induction motor is to be started first using and auto transformer with 80% tapping & direct on line starting what will be the ratio of starting torques.
8. What is the effect of injecting voltage in the motor circuit of an induction motor
9. Discuss the effects of unbalanced operation of 3-ϕ transformer
10. What is the effect of single phasing operation in Delta/Star operation of 3-ϕ Transformer.

PART – B

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

11. Two single phase transformers are Scott connected to supply a two-phase load at 110V consisting of
    a. 600KW at UPF
    b. b. 900KW AT 0.7 P.F lagging

    If the terms ratio of the two transformers is 60:1. Find the currents in the lines of the 3-ϕ supply.

12. Explain sumpner's test on 3-ϕ transformer

13. A 500V, 25HP, 50Hz 6-pole induction motor gives the following test results No load test : 500V, 15A, 1200 W
    S.C test : 120 V, 45A, 3500 W
    Draw the circle diagram and find
    i) Stator current & power factor at full load
    ii) Starting toque
    iii) Full load torque
    iv) Efficiency at full load
    v) Maximum torque

...2

14. A star connected cage induction motor has the following data of 400V, 50Hz, 4-pole, 1460rpm Rs=7Ω, Rr=2Ω, Xs=Xg=3Ω calculate the starting torque & starting current of the motor at 50Hz and 10Hz for V/f control

15. a) Explain the single phasing operation in a 3-ϕ star – Delta & Delta-star transformer

    b) Explain the unbalanced operation of a 3- ϕ induction motor.

16. Find the efficiency and the % slip if the stator & rotor copper loss is 3.2 & 2.9 KW respectively. Power input is 95KW and the stator iron loss is 1.1KW & mechanical loss is 1.3KW

17. Write short notes on

a) On load tap changing transformer
b) Star delta starter
c) Double cage induction motor

****

Code No. D-3095/N/NON-CBCS

FACULTY OF ENGINEERING

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

Subject: Computer Organization and Architecture

Time: 3 Hours **Max. Marks: 75**

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

PART – A

Note: Answer all questions. **(25 Marks)**

1 Draw the block diagram of a 4-bit combinational circuit shifter & write its truth table.
2 Explain arithmetic and logical right shift operations with an example.
3 Define micro operation and micro instruction.
4 What is IEEE 754 standard formats for binary floating point numbers?
5 What are the basic differences between a branch instruction, a call subroutine instruction and program interrupt?
6 What is micro instruction? Compare vertical & horizontal microinstruction formats.
7 What is the difference between I/O mapped I/O and memory-mapped I/O?
8 Draw the structure of memory hierarchy.
9 How CAM is different from read/write memory?
10 What are the differences among pipeline, super-pipeline and super-scalar structures?

PART – B

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

11 (a) Design a 4-bit common bus system using multiplexers and four registers.
(b) Explain various addressing modes in the general purpose computer with examples.

12 (a) Explain the common bus system of a basic computer with a neat sketch.
(b) Explain the operation of an address sequencer in a micro programmed control.

13 Explain control points and control signals for the accumulator based CPU with the help of its flow chart.

14 (a) Explain the operation of Daisy chaining method of priority interrupt.
(b) Write the sequence of steps to be followed for DMA transfer.

15 (a) Compare between RISC and CISC processors.
(b) Derive the expression for efficiency, throughput and speed-up for k-stage pipeline for n tasks.

16 (a) Explain pipeline conflicts and discuss the remedies for those conflicts.
(b) Explain any four data manipulation instructions.

17 Write short notes on:
(a) Barrel shifter
(b) Arithmetic micro-operations.

****

Code No. D-3096/O/NON-CBCS

FACULTY OF ENGINEERING

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

Subject: Digital Integrated Circuits and Applications

Time: 3 Hours **Max. Marks: 75**

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

PART – A

Note: Answer all questions. **(25 Marks)**

1 Give logic levels and noise margin of DTL families.
2 Write about integrated circuits classifications.
3 Write the characteristics of CMOS logic family.
4 Explain about interfacing of CMOS with TTL.
5 What are the applications of demultiplexers?
6 Explain digital comparator.
7 Write about applications of universal shift registers.
8 What is the difference between synchronous counter and asynchronous counter?
9 What is a FLASH memory explain briefly?
10 Compare PLDs and PLAs.

PART – B

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

11 (a) Explain Totem pole TTL logic family with necessary diagram.
(b) Draw and explain DTL NOR GATE. Compare CMOS and TTL families.

12 (a) What is interfacing? Explain interfacing between TTL and ECL logic.
(b) Draw CMOS bilateral switch and explain its working.

13 Draw logic diagram of 4 bit parallel adder and explain the process of addition.

14 Design an asynchronous Decade counter using T flip flops. Draw output waveforms.

15 (a) Draw architecture of PLD and explain operation.
(b) Compare EPROM and EEPROM.

16 (a) Explain conversion of SR flip flop to JK flip flop.
(b) Explain a digital multiplier with example.

17 Write short notes on:
(a) Drivers for LED and LCD displays
(b) Tri state logic.

****

Code No. D-3103/NON-CBCS

FACULTY OF ENGINEERING

B.E. III / IV (MECH/PROD/AE) I Semester (NON-CBCS) (Backlog) Examination, March / April 2022

Subject: Dynamics of Machines

Time: 3 Hours **Max. Marks: 75**

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

PART – A

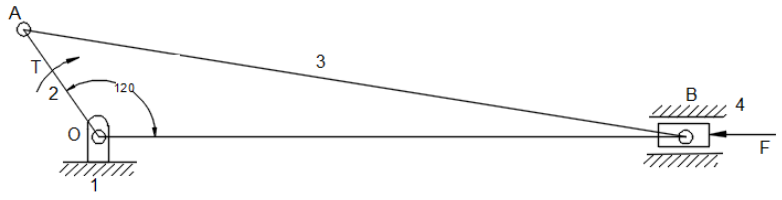
Note: Answer all questions. **(25 Marks)**

1 What is gyroscopic couple?
2 What is the function of a flywheel?
3 Why is balancing of rotating parts necessary for high speed engines?
4 What do you understand by transmissibility?
5 A shaft, which has one end, is fixed and the other end carries a disc of mass 500 kg at a radius of gyration of 450mm.Torsional stiffness of the shaft is 785N-m. Determine the frequency of torsional vibrations.
6 What is meant by piston effort and crank effort?
7 What is the function of a governor?
8 Derive the following expressions of a Swaying couple, for an uncoupled two cylinder locomotive engine.
9 Discuss briefly with neat sketches the transverse free vibrations.
10 What is the natural frequency of torsional vibrations for a two rotor system?

PART – B

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

11 A slider crank mechanism with the following specifications is acted upon by a force F=2.2kN at B as shown in figure. OA = 95 mm ‘ AB = 440 mm. Determine the input torque T on the link OA for the static equilibrium of the mechanism for the given configuration.



12 A multi-cylinder engine is to run at a speed of 600r.p.m. On drawing the turning moment diagram to a scale of 1mm = 250N-m and 1mm = 3°, the areas above and below the mean torque line in mm^2 are: + 160, – 172, + 168, – 191, + 197, – 162 the speed is to be kept within ± 1% of the mean speed of the engine. Calculate the necessary moment of inertia of the flywheel. Determine the suitable dimensions of a rectangular flywheel rim if the breadth is twice its thickness. The density of the cast iron is 7250kg/m^3 and its hoop stress is 6MPa. Assume that the rim contributes 92% of the flywheel effect.

13 A single cylinder reciprocating engine has speed 240r.p.m. stroke 300mm, mass of reciprocating parts 50kg, mass of revolving parts at 150mm radius 37kg. If two third of the reciprocating parts and all the revolving parts are to be balanced, find:
i) The balance mass required at a radius of 400mm
ii) The residual unbalanced force when the crank has rotated 60° from top dead centre.

14 A shaft 1.5 m long, supported in flexible bearings at the ends carries two wheels each of 50 kg mass. One wheel is situated at the centre of the shaft and the other at a distance of 375 mm from the centre towards left. The shaft is hollow of external diameter 75 mm and internal diameter 40 mm. The density of the shaft material is 7700 kg/$m^3$and its modulus of elasticity is 200 GN/m^2. Find the lowest whirling speed of the shaft, taking into account the mass of the shaft.

15 A mild steel shaft 1.5 m long is 95 mm in diameter for the first 0.65 m of its length, 65 mm in diameter for the next 0.55 m of the length and 55 mm in diameter for the remaining length. The shaft carries two flywheels at two ends, the first having a mass of 1000kg and 09 m radius of gyration located at the 95 mm diameter end and the second having a mass of 750 kg and 0.6 radius of gyration located at the other end. Find the location of the node and the natural frequency of the free torsional vibration of the system. The modulus of rigidity of the shaft material is 80GN/m^2.

16 A Porter governor has equal arms each 250mm long and pivoted on the axis of rotation. Each ball has a mass of 5kg and the mass of the central load on the sleeve is 25kg. The radius of rotation of the ball is 150mm when the governor begins to lift and 200mm when the governor is at maximum speed. Find the minimum and maximum speeds and range of speed of the governor.

17. The turbine rotor of a ship has a mass of 3500 kg. It has a radius of gyration of 0.45 m and a speed of 3000 r.p.m. clockwise when looking from stern. Determine the gyroscopic couple and its effect upon the ship:
    1. When the ship is steering to the left on a curve of 100 m radius at a speed of 36 km/h.
    2. When the ship is pitching in a simple harmonic motion, the bow falling with its maximum velocity. The period of pitching is 40 seconds and the total angular displacement between the two extreme positions of pitching is 12 degrees.

*****

Code No. D-3116/NON-CBCS

FACULTY OF ENGINEERING

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

Subject: Operating Systems

Time: 3 Hours **Max. Marks: 75**

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

PART – A

Note: Answer all questions. **(25 Marks)**

1 Define the following terms: (i) Throughput (ii) Waiting time.
2 Define necessary conditions for deadlock occur.
3 Distinguish between Thread and Process.
4 Define Semaphore and its operations.
5 What is hardware abstraction layer?
6 What is Critical Section?
7 Define Internal and External Fragmentation.
8 List any five common file types in Unix.
9 Write about Access methods.
10 Write short notes on Inter Process Communication.

PART – B

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

11 (a) What is PCB? Explain the purpose of PCB.
(b) Discuss threading models.
(c) Explain multi-level feedback queue scheduling algorithm.

12 Find average waiting time and average turn around time for the following example in
(i) FCFs, (ii) RR (Time slice = 3 M), (iii) SJF and (iv) SRTF.

Process	Burst Time	Arrival Time
P1	25	0
P2	28	2
P3	8	4
P4	4	6
P5	6	1

13 (a) Explain classical problems of synchronization.
(b) Explain Banker's Algorithm for deadlock avoidance.

14 Consider disk queue with I/O request for the blocks on cylinders: 95, 181, 39, 123, 12, 124, 65, 68 and the disk head is initially at 57. Compute the total number of head movement according to SSTF, SCAN, LOOK disk scheduling algorithm.

15 (a) Explain about RAID Structure.
(b) Explain segmentation with a neat diagram.

16 (a) How process management is performed in LINUX? Explain.
(b) Explain the architecture of WINDOWS-XP.

17 Explain briefly Windows7-Design principles.

****