Code No. 14083

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I-Semester (Backlog) Examination, July 2021

Subject : Fluid Mechanics – II

Time: 2 hours **Max. Marks: 75**

Note: Missing Data, if any, may be suitably assumed.

PART – A

Answer any seven questions. (7x3 = 21 Marks)

1 Define laminar flow and turbulent flow in open channels with reference to Reynold's number.

2 Define critical depth and write the relation between specific Energy and critical depth for triangular channel section.

3 Differentiate between GVF and RVF with examples.

4 State the characteristics of surface profiles.

5 Differentiate between gradual closure and sudden closure of valve.

6 Differentiate between stream lined body and bluff body.

7 Differentiate between distorted model and undistorted model.

8 How do you select repeating variables in Buckingham JT method?

9 Write the significance of inlet and outlet velocity diagrams.

10 What is meant by multistage centrifugal pump?

PART – B

Answer any three questions. (3x18 = 54 Marks)

11 (a) Explain in detail with sketches the pressure and velocity distribution in an open channel.

(b) A trapezoidal channel has a side slope of 1 horizontal to 1.5 vertical and the bed slope is 1 in 2000. The area of the cross section is 55 m^2. If Chezy's C = 60. Determine the dimensions of the most economical section.

12 (a) Derive the momentum equation for a hydraulic jump in horizontal rectangular channel.

(b) A 3.5 m wide rectangular channel has a longitudinal slope of 175 mm/Km and manning's n = 0.015. When the discharge in the channel is 1.20 cumecs, estimate the slope of the water surface in the channel relative to horizontal, at a section where the depth of the flow is 0.90 m.

13 (a) A plate 45 cm x 15 cm has been placed longitudinally in a stream of crude oil of specific gravity 0.92 and kinematic viscosity of 0.9 stoke, which flows with velocity of 6 m/s. Calculate i) the friction drag on the plate, ii) thickness of the boundary layer at the trailing edge, and iii) Shear stress at the trailing edge.

(b) Discuss the phenomenon of separation of boundary layer in diverging flow.

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14 (a) State and explain Buckingham's JT- theorem, when do you adapt JT theorem and how to select the repeating variables.

(b) A shallow river 1,500m wide and the maximum depth of the flow is 5m.It carries a discharge of 3000 cumecs, the velocity of flow being 1.5m/s . The model of river of is constructed with horizontal scale of 1:800 and the vertical scale 1:40 . If Mannings n=0.025, find the value of n for the bed material of the model, check whether the flow in the model is turbulent. The hydraulic mean depth may be assumed to be equal to mean depth of flow.

15 (a) Explain 1) Unit Speed, Unit Discharge and Unit Power of a hydraulic turbine.
2) Draw the characteristic curves of turbine.

(b) Draw a neat sketch of centrifugal pump and explain its main components

16 (a) Derive Chezy's equation.

(b) What is meant by water hammer and derive the expression for sudden closure of the wall.

17 (a) What are the uses and limitations of Buckingham's JT method.

(b) Define specific speed of a centrifugal pump and derive the expression for specific speed.

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Code No. 14089

FACULTY OF ENGINEERING

B. E. 3/4 I - Semester (EEE) (Backlog) Examination, July 2021

Subject: Electrical Machinery - II

Time: 2 hours **Max. Marks: 75**

Note: Missing Data, if any, may be suitably assumed.

PART – A

Answer any seven questions. **(7x3 = 21 Marks)**

1. What do you mean by open delta and when is it used?
2. Justify why is, it preferable to keep HV open in open circuit test and LV short circuited in short circuit test.
3. List the various applications of SCIM and SRIM.
4. Discuss how polarity of transformer is determined from polarity test.
5. What are the advantages of parallel operation of transformer?
6. Differentiate between ideal & practical transformer.
7. The power input of a 3 phase induction motor is 50KW. Stator loss is 1KW. Find the gross mechanical power developed in rotor and rotor copper loss if slip is 4%.
8. How an induction generator is different from Induction motor and list its applications?
9. What will be the effect of torque developed by a 3-phase induction motort when the applied voltage is reduced to half supply frequency remaining unchanged?
10. Is it possible to connect two 1-phase transformers to give a 3-phase output from a 3-phase input? Explain.

PART – B

Answer any three questions. **(3x18 = 54 Marks)**

11. A 20KVA, 2200/200V 50 Hz transformer is tested for efficiency and regulation as follows

    O.C test: 220V, 4.2A, 148W (LV side)

    S.C test: 86V, 10.5A, 360W (HV side)

    Estimate (a) Core losses

    (b) Equivalent resistance as referred to primary.

    (c) Equivalent resistance as referred to secondary.

    (d) Regulation of transformer at 0.8p.f lag.

    (e) Efficiency at full load at 0.8 pf lead.

    (f) Equivalent circuit referred to LV side.

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12. (a) Explain briefly the working of tap changing transformers.
    (b) A Transformer has a primary voltage rating of 11,000V & secondary voltage rating of 2200V. Two windings are connected in series & the primary is connected to a supply of 11,000V to act as a step up auto transformer. Determine the voltage output of the transformer.

13. Draw circle diagram for a 440V 4 pole 3 phase SRIM for the following data
    NO LOAD TEST: 440V 9A 0.2p.f lag
    BLOCKED ROTOR TEST: 110V 22A 0.3p.f lag
    N1/N2=3.51 given stator copper losses=rotor copper losses and full load current=20. Calculate the (a) full load output & efficiency for full load (b) F.L slip (c) external resistance value if TSt=20% T.F.L. Also find current and p.f under these conditions.

14. (a) Explain Seherbius drive with the help of neat schematic diagram.
    (b) For a 3 phase I.M maximum torque is twice the full load torque and the starting torque is 1.6 times the full load torque. In order to get a full load slip of 5% calculate the percentage reduction in rotor resistance. Neglect stator.

15. (a) Discuss any two methods of speed control of squirrel cage Induction motor.
    (b) A 30 HP induction motor has full load efficiency of 84%. The stator and rotor copper losses are each equal to stator iron loss at full load. The total mechanical losses are one fifth of no load losses. Determine the full load slip of the motor.

16. (a) A 500KVA, 1100/400V delta/star distribution transformer has a resistance drop of 1% and reactance drop of 5%. Find the (a) transformer impedance drop as referred to high voltage side and (b) voltage regulation at full load at 0.8 p.f lag.
    (b) Write short notes on maintenance of transformers.

17. (a) Explain single phasing ion delta/star 3-phase transformer.
    (b) Write short notes on routine tests and special tests on transformers.

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Code No. 14095

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) I-Semester (Backlog) Examination, July 2021

Subject : Signals and Systems

Time: 2 hours **Max. Marks: 75**

Note: Missing Data, if any, may be suitably be assumed.

PART – A

Answer any seven questions. **(7x3 = 21 Marks)**

1. Define a "Signal" and classify them.
2. What are the key operations which can be performed on signals?
3. Define Periodic, Even and ODD signals.
4. What are the properties of a Linear Time Invariant System?
5. What is the difference between Fourier series and Fourier transform? Express Mathematically.
6. Give the Fourier Transform of a STEP Function.
7. What is a Laplace Transform? State the Initial and Final value theorems.
8. Discuss wave form synthesis.
9. What is "Sampling Theorem".
10. What are the Properties of a Z Transform?

PART – B

Answer any three questions. **(3x18 = 54 Marks)**

11. a) What is a SYSTEM? Define the types of signals and distinguish whether the following signals are Continuous, Discrete, even or odd signals:
    (i) $x(t)=e^{-3t}\,u(t)$ (ii) $x(t) = 0.1t^3$ Sketch them.
    b) Explain what do you understand by (i) Time Scaling (ii) Decimation and Expansion of a signal.

12 a) Define Fourier series representation of a continuous time periodic signal and indicate the Fourier coefficients. To which domain the Fourier coefficients are related to?
    b) Define the Fourier series representation of the signal x (t) = 3 cos (nt/2 + n/4) and sketch the spectra.

13 a) State & Proof Parseval Theorem.
    b) State the properties of Fourier Transform.

14 a) Define and state the properties of LAPLACE Transforms.
    b) How do you solve for the time response, for an series R L C Circuit using Laplace Transform technique? Consider source being y(t) = Sin (wt). Assume R = 1.0 Ohm, L = 0.08 H, C = 0.25 μ F.

15 a) What do you understand by Sampling of Continuous Time Signals? What is sampling theorem? How do you reconstruct a signal from its samples?
    b) What do you understand by wave form synthesis?

16 a) What is a Z Transform? What are its properties?
    b) What is Difference Equation?

17 Write short notes on (i) Convolution Integral (ii) Ortho normality and completeness, (iii) Continuous exponential signal representation.

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Code. No.14102/O

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I-Semester (Old) Examination, July 2021

Subject: Digital Integrated Circuits and Applications

Time : 2 Hours **Max. Marks: 75**

Missing data, if any, may be suitably assumed

PART – A

Note: Answer any Seven Questions **(7x3= 21 Marks)**

1. What are the advantages of digital ICs over Analog ICs?
2. Compare DTL and TTL logic families?
3. Briefly write about Totem Pole TTL logic family?
4. Draw circuit of CMOS inverter?
5. Compare Serial binary adder and carry look – ahead adder?
6. Draw circuit of 1-bit digital comparator?
7. List the applications of shift register?
8. Explain working principle of Master-Slave JK-flip flop?
9. Write about Flash Memory?
10. What is a ROM. What are the different types of ROMS?

PART – B

Note: Answer any Three Questions **(3x18= 54Marks)**

11 a) Explain the working of TTL NOR gate?
b) Write about Tri-State logic?

12 Explain working of CMOS Transmission gate with circuit diagram, what are its applications?

13 a) Design a binary Full Subtractor using 4*1 multiplexers?
b) Write about parity Bit generator system?

14 Design a divide by 10 up-down ripple counter using JK flip flops. Draw the waveforms?

15. a) What are PLDs – explain briefly?
b) Explain PLA with its architecture?

16. Explain the working of 40bit Carry look ahead adder with circuit diagram?

17 Write short notes on
a) Expanding word size and capacity in memory
b) IC characteristics
c) Dynamic MOS inverter

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Code No.14097

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I – Semester (Backlog) Examination, July 2021

Subject: Computer Organization and Architecture

Time: 2 hours **Max. Marks: 75**

Note: Missing Data, if any, may be suitably assumed.

PART – A

Answer any seven questions. **(7x3 = 21 Marks)**

1 What is micro operation and micro instruction?
2 Design 2's complement adder / substractor.
3 Differentiate between restoring and non-restoring algorithms.
4 Write about one and two address instruction.
5 What is pipeling?
6 Differentiate between I/O mapped IO and memory mapped IO.
7 Explain in brief Flyn's classification.
8 Write feature of RISC.
9 Explain the need for IO interface.
10 Write about Cache memory.

PART – B

Answer any three questions. **(3x18 = 54 Marks)**

11 Explain Booth's multiplication algorithm for signed 2's complement number in detail with the example.

12 a) Explain the input and output configuration of a computer. List any five I/O instruction with controller.
b) Explain the addressing modes of a basic computer.

13 a) Explain hardwired control unit design approach.
b) Write about Micro programmed control unit.

14 a) What is virtual memory. Explain its address translation.
b) Write about CPU-IOP communication.

15 a) Explain pipelining conflict and their remedies.
b) Write short notes on Vector processing.

16 a) Differentiate between Hardwired and Micro programmed control unit.
b) Explain VLIW architecture.

17 Write any two:
a) Common Bus System
b) Barrel shifter
c) DMA.

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Code No. 14105

FACULTY OF ENGINEERING

B.E. 3/4 (M/P/AE) I-Semester (Backlog) Examination, July 2021

Subject : Dynamics of Machines

Time: 2 hours **Max. Marks: 75**

Note: Missing Data, if any, may be suitably assumed.

PART – A

Answer any seven questions. **(7x3 = 21 Marks)**

1 Explain the effect of the gyroscopic couple on an aero plane.

2 Draw the turning moment diagram of a four stroke cycle for internal combustion engine.

3 Write a short note on primary and secondary balancing.

4 Discuss briefly with a neat sketch of the torsional free vibrations.

5 Explain the terms : (i) resonance, (ii) transverse

6 State and explain D' Alembert's principle.

7 What is gyroscopic couple?

8 Derive the following expressions of a Hammer Blow, for an uncoupled two cylinder locomotive engine.

9 Explain the term 'dynamic magnifier'.

10 Express the frequency of torsional vibrations of a geared system.

PART – B

Answer any three questions. **(3x18 = 54 Marks)**

11 The crank and connecting rod of an engine are 60 mm and 275 mm respectively. The vertical engine is running at 1600rpm. The diameter of the piston is 110 mm and the mass of the reciprocating parts is 1.3 kg. During the expansion stroke when the crank has turned 20^0 from the top dead centre, the gas pressure is 650kN/m^2. Determine the
(i) net force of the piston
(ii) net load on the gudgeon pin
(iii) thrust on the cylinder walls
(iv) speed at which gudgeon pin load is reversed in direction

12 A machine punching 38mm holes in 32mm thick plate requires 7N-m of energy per sq. mm of sheared area, and punches one hole in every 10 seconds. Calculate the power of the motor required. The mean speed of the flywheel is 25 metres per second. The punch has a stroke of 100mm. Find the mass of the flywheel required, if the total fluctuation of speed is not to exceed 3% of the mean speed. Assume that the motor supplies energy to the machine at uniform rate.

13 Four masses m_1, m_2, m_3 and m_4 are 200kg, 300kg, 240kg and 260kg respectively. The corresponding radii of rotation are 0.2m, 0.15m, 0.25m and 0.3m respectively and the angles between successive masses are 45°, 75° and 135°. Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2m.

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14 A shaft 50 mm diameter and 3.5 metres long is simply supported at the ends and carries three loads of 1100 N, 1600 N and 700 N at 1 m, 2 m and 3 m from the left support. The Young's modulus for shaft material is 210 GN/m^2. Find the frequency of transverse vibration.

15 A pump drives with help of a motor through gearing. The speed of the pump is one-third that of the motor. The diameter and length of the pinion shaft is 60mm and 300mm. The moment of inertia of a motor is 400 kg-m^2. The diameter and length of the impeller shaft is 100mm and 600mm. The moment of inertia of a impeller is 1500 kg-m^2.Find the frequency of torsional vibration of the system. Neglect the inertia of the gears and the shafts. Take G = 80GN/m^2.

16 A loaded Porter governor has four links each 250mm long, two revolving masses each of 3kg and a central dead weight of mass 20kg. All the links are attached to respective sleeves at radial distances of 40mm from the axis of rotation. The masses revolve at a radius of 150mm at minimum speed and at a radius of 200mm at maximum speed. Determine the range of speed.

17 A ship propelled by a turbine rotor which has a mass of 5tonnes and a speed of 2100r.p.m. The rotor has a radius of gyration of 0.5 m and rotates in a clockwise direction when viewed from the stern. Find the gyroscopic effects in the following conditions:

1. The ship sails at a speed of 30 km/h and steers to the left in a curve having 60 m radius.
2. The ship pitches 6 degree above and 6 degree below the horizontal position. The bow is descending with its maximum velocity. The motion due to pitching is simple harmonic and the periodic time is 20 seconds.
3. The ship rolls and at a certain instant it has an angular velocity of 0.03rad/s clockwise when viewed from stern. Determine also the maximum angular acceleration during pitching. Explain how the direction of motion due to gyroscopic effect is determined in each case.

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Code No. 14118

FACULTY OF ENGINEERING

B. E. 3/4 (CSE) I – Semester (Backlog) Examination, July 2021

Subject: Operating Systems

Time: 2 hours **Max. Marks: 75**

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any seven questions. **(7x3 = 21 Marks)**

1. What is a system call?
2. Draw and explain the process state transition diagram.
3. What is race condition? Explain with example.
4. State the necessary conditions for the deadlock to occur.
5. What are the causes of Thrashing?
6. What is compaction technique? Give an example.
7. Why file name extensions are used?
8. Define seektime and rotational time.
9. Explain different multithreading models.
10. List the design goals of LINUX.

PART – B

Answer any three questions. **(3x18 = 54 Marks)**

11. (a) What is critical section problem?

    (b) What is semaphore? Explain how it is used to solve the critical section problem with example.

12. Consider the following set of processes.

Process	Burst Time	Priority	Arrival Time
P1	10	3	0
P2	3	2	2
P3	1	1	1
P4	5	4	1
P5	7	2	1

    (i) Draw the Gantt charts that illustrates the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preamptive priority (a larger priority number implies a higher priority) and RR(TQ=2).

    (ii) Calculate the turn around time and waiting time of each of the process for each of the algorithm.

13. (a) Write the banker's algorithm for deadlock avoidance.

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(b) Consider the following snapshot of a system

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P0	2 0 0 1	4 2 1 2	3 3 2 1
P1	3 1 2 1	5 2 5 2	
P2	2 1 0 3	2 3 1 6	
P3	1 3 1 2	1 4 2 4	
P4	1 4 3 2	3 6 6 5	

Illustrate that the system is in safe state by demonstrating an order in which the processes may complete.

14. Consider the following page-reference string.
7 0 2 1 3 4 2 1 0 2 1 4 3 2 1 4 3 2 1 0 0 1 2 1
Calculate the number of page faults that would occur for the following algorithm assuming frame size as 3.

FIFO optimal LRU MRU LFU MFU

15. (a) Explain in detail the file allocation methods.
(b) Write about the implementation of the Access matrix.

16. (a) Explain the various Directory implementation methods.
(b) Discuss about swap-space-management.

17. Write short notes on any two:
(a) Free space management.
(b) File types.
(c) Inverted paging.

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Code No: 14123

FACULTY OF ENGINEERING

BE 3/4 (IT) I-Semester (Backlog) Examination, July 2021

Subject: Operating Systems

Time: 2 hours **Max. Marks: 75**

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any seven questions. **(7x3 = 21 Marks)**

1 Explain symmetric and asymmetric multiprocessing.

2 Define system Boot.

3 What are the different methods for deadlock prevention?

4 Explain resource allocation graph with an example.

5 Define process swapping.

6 What is segmentation?

7 What are the various file allocation methods?

8 Define seek time and rotational latency.

9 Explain symmetric and asymmetric encryption.

10 Define denial-of-service attack.

PART – B

Answer any three questions. **(3x18 = 54 Marks)**

11 (a) Explain various types of system calls.
(b) Explain various multithreading models.

12 Given the below set of processes, Calculate each process' Average Turnaround Time, and Average Waiting Time using FCFS, SJF(Non-Preemptive, Preemptive), Priority(Non-Preemptive, Preemptive), Round Robin (Time Slice/Quantum = 1) process scheduling methods. Depict using Gantt chart for each method.

Process-id	CPU Burst Time	Arrival-Time	Priority
P_1	10	5	3
P_2	1	0	1
P_3	2	0	3
P_4	1	2	4
P_5	5	3	2

13 What is readers-writers problem? Give its solution using semaphores.

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14 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
How many page faults would occur for the following replacement algorithms?
• LRU replacement
• FIFO replacement
• Optimal replacement
Number of frames:
i. four frames
ii. five frames

15 Suppose the disk drive has 5000 cylinders numbered 0-4999. The drive is currently serving request at cyllinder143. The queue of pending requests in FIFO order is:
86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.
Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms?

i. FCFS.
ii. SSTF
iii. SCAN
iv. C-SCAN

16 What is RAID? Explain different RAID levels.

17 What is an Access matrix? What are the different mechanisms used for the implementation of Access matrix.

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