Code No. 100 / S

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I-Semester (Supplementary) Examination, May / June 2018

Subject : Fluid Mechanics – II

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

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Define critical depth in four different ways.	2
2	Differentiate between a positive surge and negative surge.	2
3	What is boundary layer separation?	2
4	What is Reynold's model law.	2
5	Explain the terms : Manometric efficiency and mechanical efficiency as applicable to a centrifugal pump.	2
6	Classify the various types of uniform and non-uniform flows.	3
7	List the various water surface profiles based on slope of the channel.	3
8	Water flows through a rigid pipe with a velocity of 0.85 m/s. The length of the pipe is 3250m and the 'k' value of water is 2.2×10^3 MPa. Compute the critical time of closure of valve.	3
9	What are the merits of undistorted models?	3
10	Why are hydraulic losses less in a Kaplan turbine than in a Francis Turbine?	3

PART – B (50 Marks)

11	a)	Derive the condition for the most economical section of a trapezoidal channel as half of the top width is equal to one of the sloping side.	5
	b)	A trapezoidal channel having bottom width 6m and side slopes 2H : 1V is laid on a bottom slope of 0.0016. If it carries a uniform flow of water at the rate of 10000 lit/sec, compute the normal depth and the mean velocity of flow. Take manning's n = 0.025.	5
12	a)	Define a surge and give it classification. Also derive the equation for positive surge moving upstream.	5
	b)	The discharge of water through a rectangular channel of width 8m, is $15 m^3/s$ when depth of flow of water is 1.2m calculate i) specific energy of the flowing water ii) critical depth and critical velocity iii) value of minimum specific energy.	5
13	a)	Derive an expression for pressurise due to water hammer for sudden closure of valve and pipe elastic.	5
	b)	A jet plane which weighs 29.43KN has a wing area of $20 m^2$ flies at a velocity of 250Km/hr. When the engine delivers 7357 KW, 65% of the power is used to over come the drag resistance of the wing. Calculate coefficient of lift for the wing. Take density of air as $1.21 Kg/m^3$.	5

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14 a) State Buckingham's π theorem. Why this theorem is considered superior over the Rayleigh's method for dimensional analysis. 5

b) The resistance 'R' to the motion of a completely submerged body depends upon the length of the body 'L', velocity of flow 'V' mass density of fluid 'ρ' and kinematic viscosity of fluid 'ν'. By dimensional analysis prove that $R = \rho V^2 L^2 \phi\left(\frac{VL}{\nu}\right)$. 5

15 a) Define a centrifugal pump. Describe the principle and working of a centrifugal pump with a neat sketch. 5

b) A jet of water having a diameter of 65mm and the head of water at the centre of the nozzle is 100 meter strikes a flat plate, the normal of which is inclined at 55^0 to the axis of the jet. Find the normal force on the plate, when the plate is
i) Stationery
ii) Moving with a velocity of 16m/sec in the direction of the jet 5

16 a) Describe the various similarity laws. 5

b) A jet of water of diameter 75mm moving with a velocity of 25 m/s strikes a fixed plate in such a way that the angle between the jet and plate is 60^0. Find the force exerted by jet in the direction normal to the plate. 5

17 Write short notes **Two** of the following : 10

a) Characteristic curve of pumps
b) Froude model law
c) Stream lining

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Code No. 106 / S

FACULTY OF ENGINEERING

B.E. 3/4 (EEE) I-Semester (Supplementary) Examination, May / June 2018

Subject : Electrical Machinery – II

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

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Explain any one of the connections of three phase transformer.	3
2	Write about tap changer.	2
3	Write about maintenance of transformer.	3
4	When special tests are performed on transformers?	2
5	How rotating magnetic field is produced in 3 phase induction motors?	3
6	What is slip speed in 3 phase induction motors?	2
7	What is induction generator?	3
8	What is crawling in induction motors?	2
9	What is meant by unbalanced operation of 3-phase transformer?	3
10	Explain per phase equivalent circuits.	2

PART – B (50 Marks)

11 Explain Parallel operation of transformer with equal and unequal voltage ratios. 10

12 A 600 kVA, single-phase transformer with 0.012 pu resistance and 0.06pu reactance is connected in parallel with a 300 kVA transformer with 0.014 pu resistance and 0.045 pu reactance to share a load of 800 kVA at 0.8 pf lagging. Find how they share the load a) when both the secondary voltages are 440V and b) when the open circuit secondary voltages are respectively 445V and 455V. 10

13 Explain routine test, special test and measurement of voltage ratio of a transformer. 10

14 Derive expression for torque and explain slip-torque characteristics of induction motor. 10

15 With neat diagrams, explain voltage control and variable frequency control methods for speed control of induction motors. 10

16 Explain per phase equivalent circuits of star/delta transformers. 10

17 Write short notes on a) tap changer on transformer b) double cage induction motors. 10

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Code No: 566/O

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I Semester (Old) Examination, June 2018

Subject: Digital Integrated Circuits and Applications

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

Note: Answer all questions from Part A and answer any five from Part B.

PART – A (25 Marks)

1. What are the current sinking and sourcing capabilities of TTL-74 series ICs? [3M]
2. What are the power supply voltage ranges of TTL and CMOS ICs? [2M]
3. Draw and explain the circuit of 2-input CMOS NAND gate. [3M]
4. State the advantages of ECL logic family. [2M]
5. Design a single digit magnitude comparator with suitable gates? [3M]
6. List out the applications of a decoder circuit. [2M]
7. What is the race around condition? How do you eliminate this? [3M]
8. Distinguish between synchronous and asynchronous counters? [2M]
9. Compare and contrast between PALs and PLAs. [2M]
10. What are CCDs? Give a few applications. [3M]

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PART – B (5x10=50 Marks)

11. (a) Explain the working operation of a TTL Tri-state inverter with a neat circuit diagram.
    (b) Explain various specifications of digital ICs. Give some typical values of them.
12. (a) Compare TTL and CMOS ICs with regard to their electrical parameters, speed of operation, noise immunity and noise margin.
    (b) Explain TTL to CMOS interfacing with a neat circuit diagram.
13. (a) Design a single digit BCD adder using two 7483 ICs with suitable gates.
    (b) Design a full subtractor using two 3x8 decoder ICs with suitable gates.
14. (a) Explain working of digital clock using cascaded BCD counters.
    (b) Design mod-6 asynchronous counter using JK-MS-FF. Draw timing diagram for a continuous clock.
15 (a) Draw the block diagram of a PLA and explain its working operation.
    (b) Differentiate between State and Dynamic RAM. Draw circuits of one cell of each and explain its operation.
16. (a) Compare characteristics of different logic families.
    (b) Explain N-MOS inverter with a neat sketch. What are the merits and de-merits of N-MOS logic family?
17. (a) Implement the following Boolean function using 8x1 line multiplexer IC.
    F(w,x,y,z) = $\sum m(0,1,3,5,7,8,9,12,14,15)$
    (b) Design a 3-bit odd parity generator with appropriate gates.

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Code No. 120 / S

FACULTY OF ENGINEERING

B.E. 3/4 (M/P/AE) I-Semester (Supplementary) Examination, May / June 2018

Subject : Dynamics of Machines

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

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 What is meant of Piston effort and Crank effort?
2 Explained the gyroscopic effect on four-wheeled vehicles.
3 What are spring – controlled governors? Describe the function of any one of them.
4 Explain the turning moment diagram of a Single-Cylinder double-acting steam engine.
5 What are in-line engines? How are they balanced? It is possible to balance them completely?
6 Why is balancing of rotating parts necessary for high speed engines?
7 What is meant by damping? Discuss the various types of dampings used.
8 Why vibration isolation is necessary for all unbalanced machines?
9 Find the ratio of amplitudes of rotors of torsional vibrations of a two-rotor system.
10 Establish an expression for the natural frequency of free vibration for a simply supported beam carrying a number of point loads by energy method.

PART – B (50 Marks)

11 A horizontal gas engine running at 220 rpm has a bore of 230 mm and a stroke of 460mm. The connecting rod is 950 mm long and the reciprocating parts weigh 25 kg. When the crank has turned through an angle of 30^0 from the inner dead centre, the gas pressure on the cover side and crank sides are 500 KN/m^2 and 60 KN/m^2 respectively. Diameter of piston rod is 40 mm. Determine i) turning moment on the crank shaft ii) thrust on the bearings and iii) acceleration of the flywheel which has a mass of 10 kg and radius of gyration of 650 mm while the power of the engine is 25KW.

12 The arms of a Hartnell governor are of equal length. When the sleeves is in the mid-position, the masses rotate in a circle with a diameter of 150mm (the arms are in the mid-position). Neglecting friction, the equilibrium speed for this position is 360 rpm. Maximum variation of speed, taking friction into account, is to be 6% of the mid-position speed for a maximum sleeve movement of 30mm. The sleeve mass is 5 kg and the friction at the sleeve is 35N. Assuming that the power of the governor is sufficient to overcome the friction by 1% change of speed on each side of mid-position, find (neglecting obliquity effect of arms), the i) mass of each rotating ball ii) spring stiffness and iii) initial compression of the spring.

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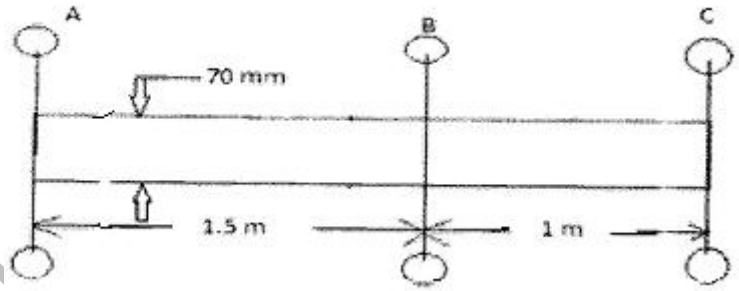
13 A rotating shaft carries four masses A, B, C and D which are radially attached to it. The mass centres are 30mm, 38mm, 40mm and 35mm respectively from the axis of rotation. The masses A, C and D are 7.5 kg, 5 kg and 4 kg respectively. The axial distance between the planes of rotation of A and B is 400 mm and between B and C is 500 mm. The masses A and C are at right angles to each other. Find for a complete balance : a) the angle between the masses B and D from mass A b) the axial distance between the planes of rotation of C and D and c) the magnitude of mass B.

14 Calculate the whirling speed of a shaft 20mm diameter and 0.6m long carrying a mass of 1 kg at its mid-point. The density of the shaft material is 40 x 103 kg/m^3, and Young's modulus is 200 GN/m^2. Assume the shaft to be freely supported.

15 The measurements on a mechanical vibrating system show that it has a mass of 8kg and that the springs can be combined to give an equivalent spring of stiffness 5.4 N/mm. If the vibrating system have a dashpot attached which exerts a force of 40 N when the mass has a velocity of 1 m/s, find : i) critical damping coefficient ii) damping factor iii) logarithmic decrement and iv) ratio of two consecutive amplitudes.

16 A single cylinder oil engine drives directly a centrifugal pump. The rotating mass of the engine, flywheel and pump with the shaft equivalent to a three rotor system as shown in figure below.



The mass moment of inertia of the rotors A, B and C are 0.15, 0.3 and 0.09 kg-m^2, find the natural frequency of the torsional vibration. The modulus of rigidity for the shaft material is 84 KN/mm^2.

17 a) Explain the turning moment diagram of a single-cylinder four stroke internal combustion engine.
b) Explain the terms i) Variation is tractive force ii) Swaying couple
c) What do you understand by gyroscopic couple? Derive a formula for its magnitude.

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Code No. 133 / S

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I - Semester (Supplementary) Examination, May / June 2018

Subject : Operating Systems

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

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1 Differentiate Preemptive and Non-Preemptive Scheduling algorithms. (3)
2 Define context switching with a neat diagram. (3)
3 Differentiate random and sequential access of a file. (2)
4 List the methods used for Free space management. (3)
5 Cite the necessary conditions required for deadlock to occur. (3)
6 Define race condition with an example. (3)
7 What do you understand by Rotational latency? (2)
8 Differentiate between maskable and non-maskable interrupts and give an example for each. (2)
9 What is the use of plug-and-play manager in WINDOWS – XP? (2)
10 How security issues are addressed in Linux? (2)

PART – B (50 Marks)

11 (a) Explain the role of schedulers with the help of process transition diagram. (4)
(b) Discuss about Multi-level feedback queue scheduling algorithms with an example. (6)

12 (a) Find the number of page faults in FIFO, LRU, OPTIMAL and LFU Page Replacement algorithms for the following reference string.
7, 0, 2, 1, 3, 4, 2, 1, 0, 2, 1, 4, 3, 2, 1, 0, 0, 1, 2, 1 (no. of frames =4) (7)
(b) Describe various file allocation methods. (3)

13 (a) Describe classical problems of synchronization. (7)
(b) List and explain the methods used for deadlock recovery. (3)

14 (a) Explain the levels of RAID with a neat diagram. (6)
(b) Describe the steps with a neat flow chart for transforming I/O request to hardware operations. (4)

15 (a) Compare how process management is done in Linux and Windows. (5)
(b) Explain the system components in Windows XP. (5)

16 Explain Disk scheduling algorithms for the following example. Initially the read/ write head is at 125 cylinder and total number of cylinders are 5000 i.e. 0 to 4999
86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 (10)

17 Write short notes on any **two** of the following: (2x5)
(a) Process synchronization with Hardware instructions
(b) Approach used for deadlock avoidance
(c) Implementation of segmentation

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Code No. 139 / S

FACULTY OF INFORMATICS

B.E. 3/4 (IT) I-Semester (Supplementary) Examination, May / June 2018

Subject : Operating Systems

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

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Why operating system is known as a resource allocator?	3
2	What is a system call?	2
3	Explain wait () and signal() system calls.	3
4	Define Starvation and aging.	3
5	Differentiate between External and Internal Fragmentation.	3
6	Explain Copy-on-write principle.	2
7	What are the properties of immutable files?	2
8	What is the purpose of command mode interpreter?	2
9	What are the various kinds of performance overheads associated while servicing an interrupt?	3
10	How does the principle of least privilege aid in the creation of protection system.	2

PART – B (5 x 10 = 50 Marks)

11	a)	What is the main advantage for an operating system designer for using a virtual machine architecture?	5
	b)	Describe the actions taken by a thread library to content switch between user level threads.	5
12	a)	Explain the reader-writer problem of synchronization and explain the semaphore solution for it.	6
	b)	Write the differences between deadlock prevention and avoidance.	4
13	a)	With a suitable example, explain the deadlock avoidance algorithms for a system with multiple instances of an each resource type.	5
	b)	Differentiate between segmented paging and page segmentation.	5
14	a)	Explain belady's anomaly and justify why LRU page replacement does not suffer from the same.	5
	b)	Explain the advantages and disadvantages of contiguous vs. linked file allocation policies.	5
15	a)	What problems could occur if a system allowed a file system to be mounted simultaneously at more than one location?	6
	b)	How does DMA increase system concurrency? How does it complicate hardware design?	4

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16 a) Discuss the strengths and weakness of implementing an access matrix using capabilities that are associated with domains. 6

b) A password may become known to other users in a variety of ways. Is there a simple method for detecting that such an event has occurred? Explain your answer. 4

17 Write short notes on the following :

a) Directory structure 3

b) Firewall 4

c) Demand paging 3

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Code No: 112/S

FACULTY OF ENGINEERING

B.E 3/4 (EIE) I-Semester (Supple.) Examination, May/June 2018

Subject: Signals & Systems

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

Note: Answer all questions from Part-A and any five questions from Part-B

PART-A(25 Marks)

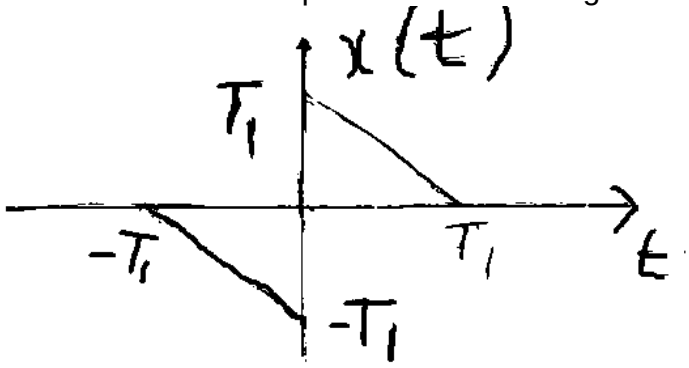
1. Define (a) Casuality (b) Stabilits 3
2. Determine the fundamental period of x(t) = cos(0.5TTt) 2
3. What is Dirichlets conditions? 2
4. Write the relationship between Trigonometric Fourier series and exponential Fourier series 3
5. Evaluate fourier transform of Constant signal 2
6. State the properties of Convolution 3
7. Define final Value & Initial Value theorem in Laplace Transform 3
8. Determine the laplace transform of u(t-1) 2
9. Determine Z-Transform of e^{-at} Cpsμt 3
10. State sampling theorem 2

PART-B (50 Marks)

11. a. Find the natural response of the system described by difference equation y(n) + 2y(n-1)+y(n-2)=x(n)+x(n-1) with initial condition y(-1)=y(-2)=1. 7

    b. Determine convolution sum of two sequences x(n) = {1, 2, 1, 2} ; h(n) = { 1, 1, 1, 1} 3

12. Calculate the Fourier transform of the aperiodic sawtooth signal shown in figure. 10



13. Fine the trigonometric Fourier series of full wave rectified sinusoidal signal 10

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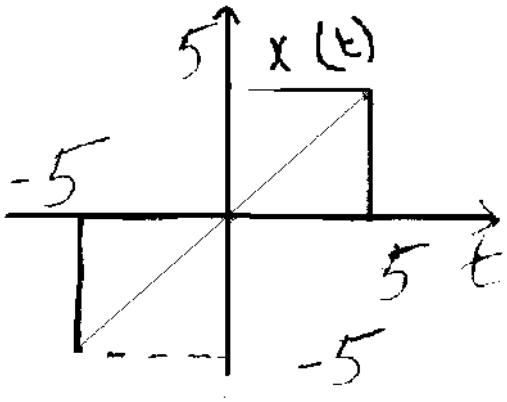
Code No: 112/S

14. a. List out the properties of Laplace Transform. Derive time shifting and time scaling
properties of Laplace transform 5

b. Find the Laplace Transform of Periodic Saw tooth signal as shown in fig 5



15. a. Consider a system described by differential equation.
Y(n)-0.5y(n-1)-0.25y(n-2)=x(n), determine y(n) if x(n)=(0.5) n u(n) using Z-Transform 5

b. Evaluate Inverse Z transform of $X(z) = 3z^2 + 2z + 1 / z^2 + 4z+3$ 5

16. a. Determine Z-Transform and ROC of the following a) $0.3^n u(n)$ b) t^2 5

b. Find the Inverse Laplace Transform of $G(s) = s/ (s+3) (s^2+4s+5)$ 5

17 Write short notes on the following: 10
a. Discrete spectrum
b. Orthonormality & Completeness
c. Convergence

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Code No. 117/S

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I-Semester (Suppl) Examination, May/June 2018

Subject: Computer Organization and Architecture

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

Note: Answer all questions from Part A & any five questions from Part B.

PART – A (25 Marks)

1. Explain the memory operation for each RTL statement (2)
   a) R2 ← M [AR]
   b) M[AR] ←R3
2. Explain direct and indirect address modes with an example (3)
3. Show the hardware implementation for signed 2's complement addition and subtraction (2)
4. Show the hardware for a 2-bit by 2-bit array multiplier and explain with an example (3)
5. Distinguish between hardwired and micro-programmed control unit (2)
6. Draw the microinstruction code format and explain each field in that format (3)
7. What is the need for I/O interface? (2)
8. Draw the structure of 1-bit CAM memory cell and explain its read and write operation (3)
9. What is Flynn's classification? (2)
10. What are the limitations of Instruction Level Parallelism? (3)

PART-B (10 x 5 = 50MARKS)

11 a) Design a 4-bit Combinational incremental circuit using four full adder circuits (4)
   b) Draw the flow chart for memory reference instructions (6)

12 a) Design a single digit BCD adder using two 4-bit adders with necessary correction circuit and explain its operation with an example (7)
   b) What are the differences between restoring and non-restoring algorithm (3)

13 a) What is the significance of the control unit? Explain hardwired control unit design using classical and one –hot methods. (6)
   b) What is the micro-programmed control unit? What is the purpose of the micro program sequencer? (4)

14 a) Explain three modes of DMA transfer (3)
   b) Compare between memory mapped I/O and I/O mapped I/O (3)
   c) Explain parallel interrupt priority with a relevant diagram (4)

15 a) Explain pipelined version of the floating point adder (6)
   b) Explain possible data hazards with its resolving techniques (4)

16 a) What are the differences among sequential, direct and random access memories? (3)

b) List out the various page replacement algorithms. Explain its operation with the following example: Consider a paging system in which the memory M1 has a capacity of three pages. The execution of a program Q requires reference to five distinct pages Pi, where i = 1, 2, 3, 4, 5 and i is the page address. The page address is formed by executing Q is 2 3 2 1 5 2 4 5 3 2 5 2 (7)

17 Write short notes on any two (5)

a) Computer registers (5)

b) HDL description of array multiplier (5)

c) VLIW architecture

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