Code No. 3120 / O / S

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I – Semester (Suppl.) Examination, May / June 2017

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	Explain the significance of Froude number.	2
2	What do you understand by back water effect and afflux?	3
3	What is the maximum discharge that a rectangular channel of bed width 4 m can carry given that the specific energy is 2.6 m?	3
4	Define laminar sub layer.	2
5	Explain water hammer.	2
6	What is meant by dimensional homogeneity?	2
7	What is kinematic similarity?	2
8	What type of turbine is best suited to the condition of changing loads on the turbine and why?	3
9	What is cavitation? How can it be avoided in reaction turbine?	3
10	Plot the typical characteristic curves of a centrifugal pump.	3

PART – B (5x10 = 50 Marks)

11 a) Derive an expression for the most economical section of a trapezoidal channel section.

b) Explain how to compute critical slope, normal depth and critical depth for the flow in a given channel.

12 a) Explain the classification of channel bottom slopes and surface profiles with neat sketches.

b) A rectangular channel has a loss of head in hydraulic jump of 4.85 m. The Froude number just before the jump is 8. Find:
   i) Discharge per meter width of channel
   ii) Depth before and after jump
   iii) Length of the jump.

13 a) Obtain an expression for the rise of pressure when the flowing water in a pipe is brought to rest by closing the valve gradually and suddenly when the pipe is rigid.

b) Calculate the friction drag on a plate 15 cm wide and 45 cm long placed longitudinally in a stream of oil (specific gravity 0.925 and kinematic viscosity 0.9 stokes) flowing with a free stream velocity of 6 m/s. Also find the thickness of the boundary layer.

14 a) A 120 m long surface vessel is to be tested by a 3 m long model. If the vessel travels at 10 m/s, at what speed must the model be towed for dynamic similarity between model and prototype? If the drag on the model is 9.5 N, what is the drag force expected on the prototype.

b) Explain different types of models and their scale ratios.

15 a) A centrifugal pump is discharging 0.04 m^3/s of water against a total head of 20 m. The diameter of the impeller is 400 mm and it is rotating at 1500 rpm. Calculate the head, discharge and ratio of powers of a geometrically similar pump of diameter 250 mm when it is running at 3000 rpm.

b) State and advantages and disadvantages of a Francis turbine over a Pelton wheel.

16 a) A rectangular channel 40 m wide carries water at a normal depth of 2.5 m at a slope of 1 in 10000. A weir constructed across the channel rises the water behind it by 2 m. Taking n=0.03, compute the backwater profile created by the weir using direct step method.

b) Explain significance of characteristic curves of turbine.

17 Write short notes on:

a) Surges in open channel

b) Principle of stream lining

c) Buckingham PI theorem.

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Code No. 3399 / N

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I – Semester (New) (Suppl.) Examination, May / June 2017

Subject: Fluid Mechanisms - II

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 specific energy and critical flow. [2]

2 Supercritical flow at a Froude number of $Fr_1 = 2.0$ occurs at a depth of 0.63 m in a rectangular channel. What is the critical depth. [2]

3 Define displacement thickness and momentum thickness. [2]

4 Explain three kinds of similitude. [2]

5 Enumerate various conditions under which a hydraulic jump can occur. [2]

6 Explain the significance of channels of most efficient section. [3]

7 What are the applications of hydraulic jump? [3]

8 Define stream lining. [3]

9 What are the uses of dimensional analysis? [3]

10 Explain the terms: Manometric Efficiency and Mechanical Efficiency as applicable to a Centrifugal Pump. [3]

PART – B (5x10 = 50 Marks)

11 a) Derive the condition for the best side slope of the most economical trapezoidal channel. [5]

b). A trapezoidal channel has side slope of 1 horizontal to 2 vertical and the slope of the bed is 1 in 2000. The area of the section is 42 m^2. Find the dimensions of the section if it is most economical. Determine the discharge of the most economical section if C = 60.

12 a) What is specific energy curve? Draw specific energy curve, and then derive expression for critical depth and critical velocity. [5]

b) Find the slope of the free water surface in a rectangular channel of width 15m, having depth of flow 4m. The discharge through the channel is 40 m^3/s. The bed of the channel is having a slope of 1 in 4000. Take the value of Chezy's constant, C = 50. [5]

13 a) What do you mean by separation of boundary layer? What is the effect of pressure gradient on boundary layer separation? [5]

b) A valve is provided at the end of a cast iron pipe of diameter 150 mm and of thickness 10mm. The water is flowing through the pipe, which is suddenly stopped by closing the valve. Find the maximum velocity of water, when the rise of pressure due to sudden closure of valve is 196.2 N/c^2. Take K for water as 19.62 X 10^4 N/cm^2 and E for cast iron pipe as 11.772 X 10^6 N/cm^2. [5]

14 a) What do you mean by repeating variable? How are the repeating variable selected for dimensional analysis? [5]

b) A1: 15 model of a flying boat is towed through water. The prototype is moving in sea – water of density 1024 kg/m^3 at a velocity of 20 m/s. Find the corresponding speed of the model. Also determine the resistance due to waves on model if the resistance due to waves of prototype is 600N. [5]

15 a) Describe briefly the function of various main components of Pelton turbine with neat sketches. [5]

b) A turbine develops 7357.5 kW S.P. when running at 200 r.p.m. The head on the turbine is 40 m. If the head on the turbine is reduced to 25m, determine the speed and power developed by the turbine. [5]

16 a) Define laminar boundary layer, turbulent boundary layer, laminar sub – layer and boundary layer thickness. [5]

b) A centrifugal pump is to discharge 0.118 m^3/s at a speed of 1450 r.p.m. against a head of 25m. The impeller diameter is 250mm, its width at outlet is 50mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller. [5]

17 Write short notes on any **Two** of the following: [10]

a) Pressure distribution in channel section

b) Mild sloped channel

c) Minimum starting speed.

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Code No. 3126 / O / S

FACULTY OF ENGINEERING

B.E. 3/4 (EEE) I – Semester (Old) Examination, June 2017

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 What is the effect on parallel operation of transformers when the ratio of $\frac{Xe}{re}$ is different but per unit leakage impedance is same for two transformers. 3

2 State the essential and desirable conditions to be satisfied for parallel operation of transformers. 2

3 Mention the yearly and monthly tests to be performed on transformers. 2

4 Is it possible to connect phasor group I and phasor group II transformers in parallel? Justify the answer. 3

5 A 400/200 V transformer has a full-load voltage regulation of "x" per unit at 0.8 pf lag. If this transformer is used as a autotransformer with voltage rating 400/600 V or 200 V / 600 V. what would be its regulation? 3

6 Why the air gap between stator core and rotor of an induction motor is made small. 2

7 Why the slot on the rotor of an induction motor are skewed. 2

8 What is the effect on the speed-torque characteristic of an induction motor when half of the applied voltage and rated frequency is supplied? 2

9 What is the role of transformer between converter and supply in the motor circuit in a slip power recovery scheme? 2

10 What are the drawbacks in open loop V/f control of 3 phase induction motor? 2

PART – B (5x10 = 50 Marks)

11 a) Discuss in detail the various cooling methods for power and distribution transformers. 5

b) Two single phase transformers of 500 KVA and 400 KVA at 0.8 p.f. lag the resistance and leakage resistance of transformers are 2.5% and 6% for first transformer and of the second transformer are 1.6% and 7% respectively. Calculate the KVA loading and power factor at which each transformer operates. 5

…2.

12 a) Explain the method of testing of transformer for calculating no-load current and insulation resistance. 5

b) A 2400 V, 5000 KVA, 3-ϕ power is transformed to 2-phase power at 600 V by Scott-connected transformers. Determine the voltage and current rating of both primary and secondary of each transformer. 5

13 a) Explain the need for tertiary winding in a Y-Y connected 3-ϕ transformer. 5

b) A 5000 KVA, 3-phase transformer of 6600/33 KV, 50 Hz, Δ/Y connection has a no-load loss of 15 K watt and a full load loss of 50 K watt. The impedance drop at full load is 7%. Calculate the primary voltage when a load of 3200 Kwatt at 0.8 p.f is delivered at 33 KV. 5

14 a) Explain how to obtain the equivalent circuit parameters of a 3-phase induction motor from its test result. 5

b) The input to a 3-phase induction motor is 65 Kwatt and the stator loss is 1 K watt. Find the mechanical power developed and rotor copper losses per phase at a slip of 3%. 5

15 A 400 V, 3-phase, 6-pole, 50 Hz induction motor gave the following test results. 10
No-load test: 400 V, 8 A, 0.16 pf
Blocked rotor test: 200 V, 39 V, 0.36 pf
From the circle diagram determine the mechanical power output, torque and slip when the motor draws a current of 30 amps from the main. Assume the stator and rotor coffer losses to be equal.

16 a) Discuss the slip power recovery scheme of speed control of 3-phase induction motor with neat circuit. 5

b) The outer and inner cages of double cage induction motor has standstill impedance of (1+J1.5) ohm and (0.3 + J2.5) ohm respectively. If the slip at full load is 4%, calculate the starting torque in terms of full load torque. 5

17 a) Discuss the behaviour of a 3-phase induction motor when: 5
i) Unbalanced voltages are applied and
ii) During single phasing operation.

b) How does a three phase transformer behave when an unbalanced load is connected to it? 5

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Code No. 3405 / N /S

FACULTY OF ENGINEERING

B.E. 3/4 (EEE) I-Semester (New) (Suppl.) Examination, June 2017

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	Draw the schematic diagram of no load tap changer.	3
2	Mention the applications of auto transformer.	2
3	What are the conditions to be fulfilled for parallel operation of 1-phase transformers?	2
4	Write short notes on maintenance of transformers.	3
5	Mention various types of 3-phase induction motors and compare them.	2
6	How rotating magnetic field is produced in 3-phase induction motor?	3
7	Mention the various methods of starting of 3-phase induction motors.	2
8	Explain the pole changing method of speed control of 3-phase induction motor.	3
9	What happens if single-phasing occurs when 3-phase induction motor is running?	3
10	A 3-phase 4-pole induction motor with rotor resistance to be 0.5Ω is running 1050 rpm. What is the equivalent load resistance.	2

PART – B (50 Marks)

11 Two 6600/440V transformers have ratings of 250 kVA and 600kVA respectively. On short circuit test, the 250 kVA transformer requires 5% of normal voltage to circulate full load current, the power factor being 0.23. The corresponding figures for the 600 kVA transformer are 4% and 0.16. How will they share a load of 680 kW at 0.8 p.f. lagging. 10

12 a) Explain the principle operation of auto transformer with help of neat circuit diagrams. 5

b) Explain the Scott connected transformer with help of neat circuit diagram. 5

13 Write short notes on the following :

a) Cooling arrangement in transformer

b) Routine test

c) Measurement of insulation resistance 3+3+4

14 a) Derive the torque equation of a 3-phase induction motor from basics. 5

b) A squirrel cage induction motor develops a maximum torque of 2.25 times its full load normal torque and has a standstill reactance which is four times its resistance per phase. Determine its slip when working on full load. 5

..2

15 Explain the following methods of speed control of 3-phase induction motor with help of neat diagrams :
   a) Cascading of 3-phase induction motor 5
   b) Variable frequency control 5

16 a) Explain the unbalanced operation of 3-phase induction motor. 5
   b) Explain the single phase load on 3-phase transformer 5

17 Write short notes on the following :
   a) Equivalent circuit of 3-phase induction motor 5
   b) Induction generator 5

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Code No. 3132 / O

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) I – Semester (Suppl.) Examination, June 2017

Subject: Signals and 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 Check whether the signal is an energy signal or power signal $x(n)=\left(\frac{1}{2}\right)^n u(n)$. 3

2 Find whether the signal is Periodic or Aperiodic $x(t)=3\sin 200®t+4\cos 200t$. 2

3 Determine exponential Fourier series coefficients for $x(t)=\cos \mu_0 t$. 3

4 Write Trigonometric and Exponential Fourier series Equations. 2

5 State and Prove the Modulation property of Fourier Transform. 3

6 Find the Fourier Transform of step function. 2

7 Find the Laplace Transform of signal $x(t)=e^{-2t}u(-t)+e^{-3t}u(-t)$. 3

8 Find the Laplace transform of Impulse function. 2

9 Find Z-transform and ROC of the signal $x(n)=(1/3)^n u(-n)$. 3

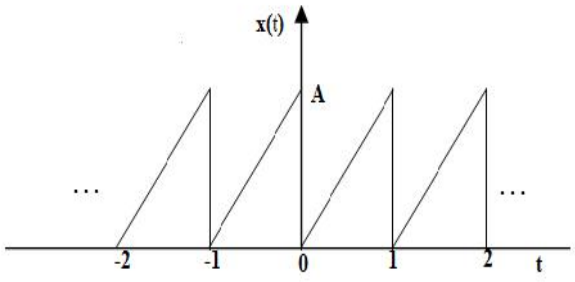
10 Define ROC for Z-transform. 2

PART – B (5x10 = 50 Marks)

11 a) Explain classification of systems with examples. 6

b) Check the stablility of the system $h(t)=(2+e^{-3t})u(t)$. 4

12 a) Find the trigonometric Fourier series of the following waveform. 6



b) Prove that exponential functions $e^{jn\mu_0 t}$ and $e^{jm\mu_0 t}$ are mutually orthogonal. 4

13 a) Determine the Fourier Transform of a constant function $x(t)=A;\ for(-\infty,\infty)$ 5

b) Find the inverse Fourier Transform of $X(\mu)=\frac{j\mu}{(2+j\mu^2)}$. 5

…2.

14 a) Verify initial and final value theorem for the function $x(t) = 4 - 2e^{3t}$. 6

b) State and prove two properties of Laplace Transform. 4

15 a) Find Inverse Z-Transform of 6

$H(Z) = \frac{2.Z}{3(Z-1)} + \frac{2}{3(Z-2)} + \frac{2}{(Z-3)}$, for ROC 1<|z|<2.

b) State and prove Initial value theorem of Z-Transform. 4

16 For the system with transfer function $H(s) = \frac{s+2}{s^2+4s+3}$ find the zero state response if the input is given as $x(t) = e^{-t}u(t)$. 10

17 Write short notes on: 10

a) Sampling Theorem

b) Parseval's Theorem.

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Code No. 3411/N/S

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) I - Semester (New)(Suppl.) Examination, June 2017

Subject : Signals and Systems

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

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

PART – A (25 Marks)

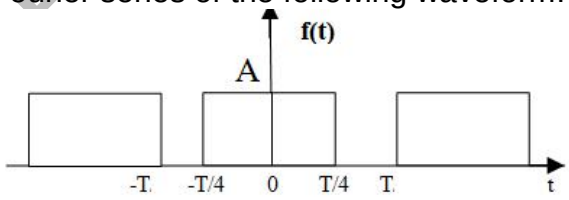
1	Define Stability and Causality of Systems.	3
2	Find whether the signal is periodic or non periodic $x(t) = e^{j4\pi t}$	2
3	Prove that signals $\sin(n\mu_0 t)$ and $\sin(m\mu_0 t)$ are mutually orthogonal.	3
4	Give necessary and sufficient condition for existence of Fourier series	2
5	Determine the Fourier Transform of the signal $x(t) = e^{-a\|t\|}$.	3
6	Prove Time Shifting Property of Fourier Transform.	2
7	Find the Laplace Transform of signal $x(t) = e^{j\mu t}.u(t)$.	2
8	Explain the transform of derivative property of Laplace transform.	3
9	Find Z-transform of $x(n) = -a^n u(-n-1)$.	3
10	Define Zero Order Hold.	2

PART – B (50 Marks)

11 Check whether the following system is a) Static or dynamic b) Linear or Non Linear. 10
c) Causal or Non Causal d) Time Invariant or Time variant

$$\frac{d^3y(t)}{dt^3} + 2\frac{d^2y(t)}{dt^2} + 4\frac{dy(t)}{dt} + 3y^2(t) = x(t+1)$$

12 Find the exponential Fourier series of the following waveform. 10



13 (a) State and Prove the Time domain Differentiation and Integration properties of Fourier Transform. 6
(b) Find Fourier transform of gate function. 4

14 (a) Verify initial and final value theorem for following system. 5

$$X(s) = \frac{s}{(s+1)(s+2)}$$

(b) Determine the Inverse Laplace Transform of . 5

$$G(s) = \frac{s^3+1}{s(s+1)(s+2)}$$

15 (a) Find the Z-transform and ROC of the following equation 5

$$x(n) = \left(\frac{1}{2}\right)^n u(-n) + 2^n u(-n-1)$$

(b) Determine all possible $x(n)$ associate with Z-transform. 5

$$X(z) = \frac{(1/4)z}{[z-(1/2)][z-(1/4)]}$$

16 (a) Find the convolution of $x_1(n)$ and $x_2(n)$ given as. 4

$$x_1(n) = \{1, 2, 3, 0, 5\}, x_2(n) = \{1, 1, 1\}$$

(b) Determine the system function of a discrete time system described by difference equation $y(n) - \frac{1}{3}y(n-1) + \frac{1}{5}y(n-2) = x(n) - 2x(n-1)$. 6

17 Write Short notes on 10

(a) Sampling Theorem

(b) Parseval's Theorem

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Code No. 3134 / O/S

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I - Semester (Old) Examination, June 2017

Subject : Digital Integrated Circuits and Applications

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

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

PART – A (25 Marks)

1 Define the following terms of Digital ICs
(i) Fan In (ii) Fan out (iii) Speed power product (2)

2 Compare the TTL family characteristics of 74 LS and 74 AS with reference to
(i) Power dissipation (ii) propagation delay (2)

3 Compare the merits and demerits of TTL and CMOS logic families. (2)

4 Design a 4x1 multiplexer using 2x1 multiplexer. (3)

5 Realize an EX-OR operation using minimum number of NAND gates. (3)

6 Differentiate between Synchronous and Asynchronous counters. (3)

7 Explain the following with reference to edge triggered flip flops. (3)
(i) Set uptime (ii) Hold time (iii) Propagation delay

8 Draw ECL OR / NOR gate and write its unique features. (3)

9 Draw the architecture of RAM. (2)

10 Design a Half substractor using basic gates. (2)

PART – B (50 Marks)

11 (a) Draw and explain the operation of CMOS NAND and NOR gates. (5)
(b) Explain the Electrical features of CMOS gate. (5)

12 (a) All TTL logic families cannot drive CMOS logic family explain. (5)
(b) Interface a TTL Driving CMOS and explain. (5)

13 (a) Implement the following function using multiplexer, with only 4x1 multiplexer and gates. (7)
(b) What is the speciality of carry look-ahead adder? (3)

14 (a) Prepare the Truth Table and excitation tables of JK and DFF? Convert a JKFT to DFF. (4)
(b) Design a MOD-S synchronous counter using T-FF show the circuit? Draw the timing diagram. (6)

15 (a) How many 4 bit comparators 485 are remained to derive a_{12} bit comparator? Show the circuit connections. (6)
(b) Explain the Architecture of 16x8 RAM. (4)

16 (a) Design a address decoder using 74'138 to interface 8K x 8 using 1K x 8 memories. The total address lines available are a_{12}-A_o. (6)
(b) In a 4 stage ripple counter the propagation delay of a FF is 50 n sec, if the pulse width of the strobe is 30 n sec find the maximum frequency at which the counter operates reliably. (4)

17 Write short notes on any **two** of the following:
(a) Even parity generator (5)
(b) Shift resisters (5)
(c) TTL open collection logic (5)

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Code No. 3416 / N

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I – Semester (New) (Suppl.) Examination, June 2017

Subject: Computer Organization and Architecture

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 micro operation? Write RTL code for addition and subtraction.	2M
2	Explain arithmetic and logical right shift operations with an example.	3M
3	Design 2's complement adder/subtractor using 4-bit binary adder with suitable gates.	3M
4	What is IEEE 754 standard formats for binary floating point numbers?	2M
5	Distinguish between one hot encoding and encoding.	2M
6	What is micro instruction? Compare vertical and horizontal microinstruction formats.	3M
7	What are the differences between synchronous and asynchronous data transfer?	3M
8	Draw the structure of memory hierarchy.	2M
9	Determine the number of clock cycles that it takes to process 200 tasks in a six segment pipeline.	2M
10	What are the differences among pipeline, super-pipeline and super-scalar structures?	3M

PART – B (5x10 = 50 Marks)

11	a)	Design a 4-bit common bus system using multiplexers and four registers.	4M
	b)	Explain various addressing modes in the general purpose computer with examples.	6M
12	a)	What is the principle of carry look-ahead adder? Generate two level equations for C5.	5M
	b)	Explain Booths algorithm with HDL description.	5M
13		Explain control points and control signals for the accumulator based CPU with the help of its flow chart.	10M
14	a)	Explain the block diagram of asynchronous communication interface with a neat diagram.	6M
	b)	What are the differences among ROM, PROM, EPROM, and EEPROM?	4M
15	a)	Compare between RISC and CISC processors.	3M
	b)	Derive the expression for efficiency, throughput, and speed-up for k-stage pipeline for n tasks.	7M
16	a)	A digital computer has a memory unit of 64Kx16 and a cache memory of 1k words. The cache uses direct mapping with a block size of four words. How many bits are there in the tag, index, block and word fields of the address format.	4M
	b)	What are the cache design elements? Explain set-associative cache mapping in the cache memory.	6M
17		Write short notes on any two:	
	a)	Hardware control unit of basic computer.	5M
	b)	Arithmetic micro-operations	5M
	c)	Barrel shifter	5M

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Code No. 3419 / N

FACULTY OF ENGINEERING

B.E. 3/4 (M/P/AE) I-Semester (New) (Suppl.) Examination, June 2017

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 are the conditions to be satisfied if two bodies are dynamically similar?
2 What is controlling force? What is the use of controlling force diagram?
3 Explain the functions of a Flywheel in I.C engine and in a punching machine.
4 Explain the advantage of spring loaded governors over dead-weight governors.
5 Differentiate coupled and uncoupled locomotives.
6 Define magnification factor and transmissibility.
7 Explain how multi-cylinder engines are balanced.
8 Why reciprocating engines are partially balanced?
9 Explain the terms : i) critical damping coefficient ii) Damping Factor iii) Logarithmic decrement
10 State the different modes in which a three rotor system executing torsional oscillation can vibrate. Illustrate this by drawing the elastic line for different modes.

PART – B (50 Marks)

11 The turbine rotor of a ship has a mass of 3500 kg. It has a radius of gyration of 0.45m and a speed of 3000 r.p.m. Clockwise when looking from stern. Determine the gyroscopic couple and its effect upon the ship : i) when the ship is steering to the left on a curve of 100m radius at a speed of 36 km/h. ii) 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.

12 Each arm of a Porter Governor is 180 mm long and is pivoted on the axis of rotation. The mass of each ball is 4 kg and the sleeves is 18kg. The radius of rotation of the ball is 100mm when the sleeve begins to raise, and 140mm when at top. Determine the range of speed, also find the coefficient of insensitiveness of the friction of the sleeve is 15N.

13 A vertical double acting steam engine has a cylinder 300mm diameter and 450mm stroke and runs at 200 r.p.m. the reciprocating parts has a mass of 225kg and the piston rod is 50mm diameter. The connecting rod is 1.2m long. When the crank has turned through 125^0 from the top dead centre, the steam pressure above the piston is 30 kN/m^2 and below the piston is 1.5 kN/m^2. Calculate the effective turning moment on the cranks shaft.

..2

14 The three cranks of a three cylinder locomotive are all on the same axle and are set at 120^0. The pitch of the cylinders is 1 m and the stroke of each piston is 0.6m. The reciprocating masses are 300 kg for inside cylinder and 260 kg for each outside cylinder and the planes of rotation of the balance masses are 0.8 m from the inside crank.

If 40% of the reciprocating parts are to be balanced, find :

i) The magnitude and the position of the balancing masses required at a radius of 0.6m ; and
ii) The hammer blow per wheel when the axle makes 6 r.p.s.

15 A vibrating system consists of a mass of 50kg, a spring with a stiffness of 30 kN/m and a damper. The damping provided is only 20% of the critical value. Determine the

i) Damping factor
ii) Critical damping coefficient
iii) Natural frequency of damped vibrations
iv) Ratio of two consecutive amplitudes

16 Explain in detail about the following :

a) Free torsional vibrations in two Rotor system
b) Free torsional vibrations in three Rotor system

17 Write a short notes on the following :

a) Force analysis of a 4-bar mechanism
b) Rayleigh's method for multirotor system
c) Forced vibrations

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Code No. 3139 / O / S

FACULTY OF ENGINEERING

B.E. 3/4 (M/P/AE) I-Semester (Old) Examination, June 2017

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 Explain D'Alemnberts Principle with an example.
2 What is the Gyroscopic effect on rolling and pitching of naval ships?
3 State the functions of a Governor and a Flywheel.
4 Define coefficient of fluctuation of speed, coefficient of fluctuation of energy.
5 Explain static balancing and dynamic balancing.
6 How the stability of a governor is checked?
7 Find the natural frequency of a cantilever beam, if a point load 'w' acts at the end of beam and 'Δ' is the static deflection at the end.
8 Explain the usefulness and limitation of Dunkerley's method.
9 Define torsionally equivalent shaft.
10 Explain the importance of Rayleigh's method.

PART – B (50 Marks)

11 The effective steam pressure on the piston of a vertical steam engine is 200 kN/m^2 when the crank is 400 from the IDC on the down stroke. The crank length is 300 mm and the connecting rod length is 1200 mm. The diameter of the cylinder in 800 mm. What will be the torque on the crank shaft if the engine speed is 300 rpm and the mass of reciprocating parts 250 kg.

12 The arms of a Porter governor are 300mm long. The upper arms are pivoted on the axis of rotation. The lower arms are attached to a sleeve at a distance of 40mm from the axis of rotation. The mass of the load on the sleeve is 70 kg and the mass of each ball is 10kg. Determine the equilibrium speed when the radius of rotation of the balls is 200mm. If the friction is equivalent to a load of 20N at the sleeve, what will be the range of speed for this position.

13 The flywheel of a steam engine has a radius of gyration of 1 m and mass 2500 kg. The starting torque of the steam engine is 1500 N-m and may be assumed constant. Determine i) The angular acceleration of the flywheel and ii) The kinetic energy of the flywheel after 10 second from the start.

..2

14 The following data refers to a two cylinder locomotive with cranks at 90^o reciprocating mass per cylinder = 300 kg; crank radius = 0.3m; Driving wheel diameter = 1.8 m; Distance between cylinder centre lines = 0.65m; Distance between the driving wheel central planes = 1.55m.
Determine :
a) The fraction of the reciprocating masse to be balanced, if the hammer blow is not to exceed 46kN at 96.5 km per hour.
b) The variation in tractive effort and
c) Maximum swaying couple

15 A vibrating system consists of a mass of 8 kg, spring of stiffness 5.6 N/mm and a dashpot of damping coefficient 40 N/m/sec. Find :
a) Damping factor
b) Logarithmic decrement, and
c) Ratio of two consecutive amplitudes

16 Three rotors A, B and C having amount of inertia of 2000; 6000; and 3500 Kg-m^2 respectively are carried on a uniform shaft of 0.35m diameter. The length of the shaft between the rotors A and B is 6m and between B and C is 32m. Find the natural frequency of the torsional vibrations. The modulus of rigidity for the shaft materials is 80 GN/m^2.

17 Write a short notes on the following :
a) Hartnell and Hartung Governors
b) Force analysis of 4-bar mechanism
c) Damped vibrations

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Code No. 3432 / N/S

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I – Semester (New) (Suppl.) Examination, May / June 2017

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 Differentiate System call and User defined function. 2

2 List the parameters to evaluate CPU scheduling algorithms. 3

3 Draw a neat diagram to convert logical address to physical address using Relocation and Base Registers. Compute the Physical address when the logical address is 356 and relocation register is 45320. 3

4 Compute the Internal fragmentation using First fit and Best fit. Given
Memory partitions = 100, 500, 200, 300, 600
Process size = 212, 417, 112, 426 3

5 Define Race Condition. Give an example. 2

6 Draw the Resource Allocation Graph for the following instance
{P1 -> R1, P2 -> R3, R1 -> P2, R2 -> P2, R2 ->P1, R3 -> P3}. 3

7 List the fields in the iNode structure. 3

8 Define Seek time and rotational latency. 2

9 List the methods for Process Scheduling in Windows XP. 2

10 Define the design principles of Linux. 2

PART – B (5x10 = 50 Marks)

11 a) Describe various structures of Operating system with neat diagram. 4

b) Compute turnaround time and waiting time for the following process given by using FCFS, SJF and Round Robin CPU scheduling algorithms, where time slice = 2 msec. 6

	Burst time	Priority	Arrival time
P1	10	3	0
P2	1	1	2
P3	2	3	3
P4	1	4	1
P5	5	2	1

12 a) Find the number of page faults in FIFO, LRU, OPTIMAL and LFU Page Replacement algorithms for the following reference string.
1,2,3,4,21,5,6,2,1,2,3,7,6,3,2,1,2,1,2,3,6 (no. of frames = 3) 7

b) Describe various file allocation methods. 3

13 a) Explain the Bankers algorithm for deadlock avoidance for the following example and find the safe sequence after the request by P1 for (A B C) = (1 0 2). 7

	Max			Allocation			Available		
	A	B	C	A	B	C	A	B	C
P0	7	5	3	0	1	0	3	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			

b) Write the process synchronization pseudocode for Readers-Writers problem with Semaphores. 3

14 a) Explain Disk scheduling algorithms for the following example, initially the read/write head is at 53 cylinder and total number of cylinders are 200 i.e. 0 to 199. 6

b) Describe the steps to convert an I/O operation to the hardware implementation level with a neat sketch. 4

15 a) Compare the methods used to implement Access matrix. 5

b) Explain the Architecture of Windows 10 operating system with a neat diagram. 5

16 a) Describe the role of schedulers with process state transition diagram. 5

b) Explain the hardware implementation of segmentation. 5

17 Answer any two of the following: 5x2=10

a) Dining Philosophers problem with monitors

b) RAID levels

c) Process Management in Linux

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Code No. 3151 / O / S

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I – Semester (Old) Examination, June 2017

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	What is the purpose of Operating System?	2
2	Distinguish between a system call and system program.	3
3	Mention the advantages and disadvantages of virtual machines.	3
4	What are the functions of dispatcher?	3
5	What is thrashing?	2
6	Distinguish between protection and security.	3
7	What are the two major components of disk access time?	2
8	What is sector sparing?	2
9	What is the use of PnP module of Windows-XP?	2
10	What is the purpose of command interpreter? Why is it usually separate from the kernel?	3

PART – B (5x10 = 50 Marks)

11	a)	Explain paging.	5
	b)	What is athread? Give the benefits of multithreaded programming.	5
12		Describe the Round Robin CPU scheduling algorithms with a suitable example. Also discuss about the effect of quantum time on the performance of RR algorithm?	10
13	a)	What is file? What are the attributes of a file?	5
	b)	Discuss about various file allocation methods.	5
14	a)	List and explain the components of Linux System.	5
	b)	What are the different file systems supported by Linux?	5
15	a)	Give the necessary condition for deadlock occurrence.	5
	b)	Briefly explain about banker's algorithm.	5
16	a)	Explain about disk scheduling algorithms.	6
	b)	Describe the disk attachment.	4
17		Write short notes on the following:	
	a)	RAID	5
	b)	Android OS.	5

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Code No. 3439 / N/S

FACULTY OF INFORMATICS

B.E. 3/4 (IT) I - Semester (New)(Suppl.) Examination, June 2017

Subject : Operating Systems

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

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

PART – A (25 Marks)

1	What is a bootstrap program?	(2)
2	Define light weight process.	(2)
3	What are counting semaphore and binary semaphore?	(3)
4	When does a race condition occur? Explain.	(2)
5	Define compaction.	(2)
6	Define demand paging.	(2)
7	How does DMA increase systems concurrency?	(3)
8	What problems could occur if the system allows a file system to be mounted simultaneously at more than one location?	(3)
9	Write the differences between seek time and latency time.	(3)
10	What is the advantage of lock-key mechanism for protection?	(3)

PART – B (50 Marks)

11	(a) What are the functions of OS? Explain the virtual machine view of an operating system.	(6)
	(b) Discuss about distributed systems and real time systems.	(4)
12	(a) What are monitors? Give the solution to dining philosopher problem using monitor.	(6)
	(b) Explain different methods of recovery from deadlocks.	(4)
13	(a) Compare and contrast contiguous allocation, linked allocation and indexed allocation schemes.	(6)
	(b) What is the criteria for comparing CPU scheduling algorithms.	(4)
14	(a) What resources are used when a thread is created and how do they differ from those used when a process is created?	(6)
	(b) What would be an advantage of using different time quantum sizes different levels of a multilevel queuing systems.	(4)
15	(a) Explain disk scheduling in distributed operating systems.	(5)
	(b) How does an operating system allow multiple types of file systems to be integrated into a directory structure?	(5)
16	(a) What are the main differences between capability lists and access lists?	(6)
	(b) Discuss the strengths and weaknesses of implementing an access matrix using access lists that are associated with objects.	(4)
17	Write short notes on any **two** of the following:	
	(a) Thrashing	(3)
	(b) RAID Structure	(3)
	(c) File system Mounting	(4)

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Code No. 3158 / O / S

FACULTY OF INFORMATICS

B.E. 3/4 (IT) I-Semester (Old) Examination, June 2017

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	Differentiate between a process and a thread.	2
2	What are the advantages of multiprocessor systems?	3
3	Define semaphore and its operations.	2
4	What is a deadlock state? State the conditions that cause deadlock.	3
5	What is an inverted page table?	2
6	Differentiate between page fault and page replacement with an example.	3
7	How is reliability and performance achieved in RAID?	2
8	What are the different disk space allocation methods for files?	3
9	Give the computer security classification.	3
10	Define an access matrix.	2

PART – B (50 Marks)

11 a) What is a system call? Explain any five process related system calls. 5

b) What are the advantages of multithreading? Describe the different types of multi threading models. 5

12 a) Define a cooperative process. What are the three criteria a critical section problem solution needs to satisfy. 4

b) Write and explain Readers – Writers problem solution. 6

13 a) For the given page reference string, calculate the total number of page faults caused by the following page replacement algorithms for given frame size = 3. Initially all frames are empty. 6

i) FIFO ii) LRU iii) Optimal page replacement

Page Reference string : 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 5, 1, 3, 2.

b) What are the steps required to service a page fault? 4

14 A disk drive has 1000 cylinders which are numbered 0 to 999 currently the drive is seeking request at 130. Previous request served was at cylinder 150. The pending request in FIFO order in the queue are ;

86, 470, 913, 774, 948, 509, 22, 750.

Compute the total disk arm movement made to serve all the requests using the following methods and depict the arm movement under each method.

i) FCFS ii) SSTF / Elevator iii) SCAN iv) C-SCAN

v) LOOK 10

..2

15 a) Write the RSA public key cryptography algorithm. Explain with example. 7
b) Differentiate between symmetric key and asymmetric key encryption technique. 3

16 a) Explain the steps of transforming an I/O request to hardware operations. 7
b) Define Fragmentation and write about the two types of fragmentation that exist. 3

17 Write about the following : 10
i) Deadlock recovery
ii) Layered file system
iii) Atomic transactions

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