Code No. 3120 / O

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I-Semester (Old) Examination, Nov. / Dec. 2016

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	State the characteristics of the critical state of flow through a channel section.	3
2	What do you understand by steady and unsteady flow?	2
3	Enumerate the characteristics of flow profiles.	2
4	Discuss the applications of Hydraulic jump.	3
5	What do you understand by Laminar sub layer?	2
6	Define the term critical period of the pipeline.	2
7	Discuss the importance of dimensionless numbers.	2
8	What are the drawbacks of Rayleigh's method?	3
9	Define the specific speed of a centrifugal pump and write the expression for the same.	3
10	Explain with neat sketches, the method of governing of Pelton wheel.	3

PART – B (5 x 10 = 50 Marks)

11 a) Explain in detail about the energy and momentum correction coefficients in case of open channel flows.

b) A flow of 120 litres / second flows down in a rectangular laboratory flume of width 0.7 m and having adjustable bottom slope. If chezy's C is 56 determine the bottom slope necessary for uniform flow with a depth of flow 0.3 m. Also find the conveyance.

12 a) Derive the equation to determine the absolute velocity of the positive surge due to sudden increase of flow.

b) A rectangular channel 8.5 m wide has a uniform depth of flow of 3.0 m and has a bed slope of 1 in 3000. If due to weir constructed at the d/s end of the channel water surface at a section is raised by 1.2m, determine the water surface slope with respect to horizontal at this section. Assume manning's n = 0.02.

13 a) A solid sphere of diameter 100 mm moves in water at 5 m/s. It experiences a drag of magnitude 19.62 N. What would be the velocity of 5 m diameter sphere moving in air in order to ensure similarity? What will be the drag experienced by it? State which law governs the similarity.

b) Explain the concept of boundary layer along a long thin plate along with its characteristics.

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14 a) Calculate the friction drag on a plate 0.25 m wide and 0.65 m long placed longitudinally in a stream of oil flowing with a free stream velocity of 6.2 m/s. Also find the thickness of the boundary layer and shear stress at the trailing edge. Sp.gravity of oil is 0.925 and its kinematic viscosity is 0.9×10^{-4} m^2/s.

b) Show that the head loss in a hydraulic jump formed in a rectangular channel may be expressed as

$$\Delta E = \frac{(V_1 - V_2)^3}{2g(V_1 + V_2)}$$

15 a) Explain about various hydraulic models. List out the merits and limitations of distorted models.

b) Explain in detail about pressure rise due to gradual and sudden valve closure with appropriate equations.

16 a) An inward flow reaction turbine discharges radially and the velocity of flow is constant and equal to the velocity of discharge from the turbine. Show that the hydraulic efficiency can be expressed by

$$\eta_h = \frac{1}{1 + \frac{\frac{1}{2}(\tan 2\sim)}{1 - \frac{\tan^0 \sim}{\tan\theta}}}$$

b) Explain briefly the principles on which a Kaplan turbine works.

17 a) Find the rise in pressure in the impeller of a centrifugal pump through which water is flowing at the rate of 20 lts/sec. The internal and external diameters of the impeller are 200 mm and 400 mm respectively. The widths of the impeller at inlet and outlet are 16mm and 9mm respectively. the pump is running at 1300 rpm. The water enters the impeller radially at inlet and impeller radially at inlet and impeller vane angles at outlet is 30^0. Loss of head through the impeller may be assume as 1.20 m.

b) Discuss the various methods adopted to increase the efficiency of a centrifugal pump by altering the shape of the casing of chamber surrounding the impeller.

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Code No. 3399 / N

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I-Semester (New) (Main) Examination, Nov. / Dec. 2016

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	Enumerate the characteristics of specific energy curve.	3
2	Give the detailed classification of Hydraulic jump.	3
3	A C.I. pipe 50 cm diameter 1 km long (wall thickness 15mm) carries water at a velocity of 4 m/s. A valve fitted at the end is closed in 20s to stop the flow. What is the maximum rise of pressure due to water hammer at the valve?	3
4	Define the terms : Laminar and Turbulent boundary layer.	3
5	Explain the concept of Froude's model law along with the examples.	3
6	A 7.5 cm diameter having a velocity of 35 m/s strikes a flat plate, the normal to which is inclined at 45^0 to the axis of jet. Find the normal pressure on the plate, when it is stationary.	2
7	Differentiate between a dimensionless constant and a dimensioned constant with suitable examples.	2
8	What scale ratios would you recommend for the following? a) Spillways b) Retaining walls c) Canals	2
9	What is speed ratio of a Kaplan Turbine?	2
10	State the role of volute chamber of a centrifugal pump.	2

PART – B (50 Marks)

11	a)	A channel of trapezoidal section has to discharge 65cumec at a velocity of 2.25 m/s. If the bed width is 7 times the depth of flow and side slopes are 1 vertical to 2 horizontal find the bed width, depth of flow and bed slope. Take n = 0.016.	6
	b)	Enumerate the features of uniform flows with suitable examples.	4
12	a)	Give the detailed classification of channel bed slopes and water surface profiles with neat sketches.	5
	b)	In a rectangular channel of 1.6m wide, Q = $2m^3$/sec, upstream depth is 0.35m. If the hydraulic jump occurs, what will be the depth after the jump and H.P or kW lost in the jump.	5
13	a)	In a stream of oil of specific gravity 0.95 and kinematic viscosity 0.92 stoke moving at 5.95 m/s a plate of 600mm length and 200 mm width is placed parallel to the direction of motion. Calculate the friction drag on one side of the plate. Find also the thickness of the boundary layer and shear stress at the trailing edge of the plate.	7
	b)	Show the equation by usual notations for pressure rise due to gradual and sudden valve closure, critical period of the pipeline.	3

..2

14 a) State Buckingham's pi theorem. Explain how dimensionless constants can be framed from a set of variables influencing a phenomenon. 5

b) Show that the torque 'T' on a shaft of diameter 'd' rotating at a speed 'N' in a fluid of density 'ρS' and viscosity 'μ' is given by

$$T = \rho d^5 N^2 \left[\frac{\mu}{\rho N d^2} \right]$$ 5

15 The inner and outer diameters of an inward flow reaction turbine are 1.125m and 1.60m respectively. The vane angle at inlet is 95^0, while the guide blade angle is $22^0 30'$. The axial depth of the wheel of inlet and outlet is 0.65m. The turbine runs at 150 rpm. Determine i) the discharge of the turbine ii) outlet vane angle iii) shaft power. Assume the mechanical efficiency to be 85% and that the turbine discharges radially at outlet. 10

16 a) State the various expressions used for manometric head. Also explain how do you determine the minimum speed required to start a centrifugal pump. 6

b) Explain and sketch the velocity distribution for an open channel. 4

17 Write short note on the following :

a) Applications and assumptions in Buckingham's 5

b) Surges and its classification 5

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Code No. 3126 / O

FACULTY OF ENGINEERING

B.E. 3/4 (EEE) I - Semester (Old) Examination, November / December 2016

Subject : Electrical Machinery - II

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 How does the parallel operation of a transformer effect if the wrong polarities of the transformers are connected in parallel? (3)
2 Two transformers to be operated in parallel must have the same KVA rating. Justify this statement is correct or not. (2)
3 What is the reason for delta connected tertiary winding in star-star connected transformers? (3)
4 What happens if Yyo transformer connected in parallel with Yd11 transformer? (2)
5 What purpose does an open delta connection of transformer serve and what % rated delta load it can feed? (3)
6 A 20KVA, 2300/230 volt, two winding transformer is to be used as an auto transformer to give 2300/2530V. What must be its rating? (2)
7 What is meant by crawling? How it can be minimized in 3 phase induction motors? (3)
8 Why an induction motor is not operated under maximum load condition? (2)
9 What is effect on speed-torque characteristics of an induction motor when applied voltage and frequency both are applied half of its rated value? (2)
10 What is behaviour in operation of a 3-phase induction motor fed from an unbalanced supply? (3)

PART – B (50 Marks)

11 (a) Describe the routine tests and special tests to be performed on a 3-phase transformers. (5)
(b) Two single phase transformers of 1000 KVA and 500 KVA are connected in parallel on both HV and LV sides. They have equal voltage ratings of 11 KV/400 V and their per unit impedances are (0.02 + 50.07) and (0.025 + 50.0875) respectively. What is the largest value of the unity power factor load that can be delivered by the parallel combination at the rated voltage? (5)

12 (a) Discuss the various coding mechanisms of transformers? (5)
(b) Two T-connected transformers are used to supply a balanced load of 100 KVA at 400V from a balanced 11KV, 3-ϕ, 50Hz supply. Determine (i) current and voltage rating of each transformer (ii) KVA rating of main Transformer and teaser transformer. (5)

13 (a) What is meant by on load tap changing ? Explain the on-load tap changing mechanism of 3-phase transformer. (5)
(b) A 400/100V, 10 KVA, 2- winding transformer is to be employed as an auto transformer to supply a 400V load from a 500V source. When used as a 2-winding transformer at rated load, 0.85 pf lagging, its efficiency is 0.97.
(i) Determine its KVA rating as an auto transformer and
(ii) Find its efficiency as an auto transformer (5)

..2

14 (a) Explain the principle of production of rotating magnetic field in a 3-phase induction motor. (5)

(b) Starting torque of a 3-phase, induction motor is 40% of its maximum value. Calculate the torque developed when running with a full load slip of 5%. If the rotor resistance of the motor is doubled, what is the value of starting torque and full load slip? (5)

15 (a) Obtain the torque – sped relation of a 3-phase induction motor and also obtain the maximum torque in terms of full load torque. (5)

(b) Explain the starting method of 3-ϕ induction motor using star-delta starter. (5)

16 (a) Discuss the Scherbius method of speed control of 3-phase induction motor with neat sketch. (5)

(b) A 4-pole, 50 Hz, 3-phase induction motor has a rotor resistance of 4.5 ohm per phase and standstill reactance of 8.7 ohm per phase. With no external resistance in the rotor circuit, the starting torque of the motor is 85 N-m. What would be the rotor voltage at standstill and starting torque if a 3 ohm resistance were added in each rotor phase. (5)

17 (a) Discuss the operation of a 3-phase transformer when (5)

(i) unbalanced voltage is applied

(ii) unbalanced load on it

(b) How do we obtain the equivalent circuit of a 3-phase induction motor during unbalance operation? (5)

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Code No. 3405 / N

FACULTY OF ENGINEERING

B.E. 3/4 (EEE) I-Semester (New) (Main) Examination, Nov. / Dec. 2016

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 Give the brief note on choice of 3-phase transformer against three single phase transformer. 3
2 Compare auto transformer and two-winding transformer. 2
3 Explain the oil cooling arrangement in transformers. 3
4 For what purpose routine test conducted on transformers. 2
5 Define slip and what is rotor current frequency of 3-phase induction motor. 2
6 Draw the equivalent circuit of 3=ϕ induction motor and how the load is represented. 3
7 What is the meant by $\left(\frac{V}{f}\right)$ speed control 3=ϕ of induction motor? 2
8 Draw the schematic diagram of a star/delta starter for 3-phase induction motor. 3
9 Draw the vector diagram for delta connected resistive load across open delta transformer. 3
10 Why the locus of load current of 3-ϕ induction motor is a circle? Give the reason. 2

PART – B (50 Marks)

11 A 300 kVA, 3-phase transformer, having per phase leakage impedance of 0.016 + j0.07Ω, is connected in parallel with another transformer of same voltage ratio 11 KV/440V having a rating of 500 kVA and per phase leakage impedance of 0.006 + j0.036Ω. Find the load shared by each transformer and their operating p.f.s for the total load of 800 kVA at 0.8 pf lagging. 10

12 a) Explain the principle operation of no load tap changing transformer with help of neat circuit diagrams. 5
b) What is auto transformer and deduce expression for copper saving? 5

13 a) Explain the measurement of insulation resistance in the transformer. 5
b) Explain the measurement of no load loss and no load current in the transformer. 5

14 a) Explain slip torque characteristics of an 3-phase induction motor. 5
b) A 50 HP, 400 V, 50 Hz, 6-pole, 3-phase induction motor runs at 960 rpm on full load. The stator loss is 650W and full load efficiency is 87%. Calculate full load slip and rotor copper losses. 5

..2

15 a) Explain the speed control of 3-phase induction motor with help of neat diagrams, using pole changing method. 5

b) Explain the slip power recovery scheme method used for slip ring induction motor. 5

16 a) Explain the unbalanced operation of 3-phase transformer. 5

b) Explain the single phasing on 3-phase induction motor 5

17 Write short notes on the following :

a) Scott connected transformer 5

b) Double cage induction motor 5

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Code No. 3132 / O

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) I - Semester (Old) Examination, November / December 2016

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 Determine Linearity and causality of the following system (3)

$$\frac{d^3y(t)}{dt^3} + 4\frac{d^2y(t)}{dt^2} + 5\frac{dy(t)}{dt} + 2y^2(t) = x(t+5)$$

2 Check whether the following signal is power or energy signal $x(t)=e^{-5t}.u(t)$. (2)

3 Find exponential Fourier series coefficient of $x(t) = 3\cos\left(\frac{®t}{2} + \frac{®}{4}\right)$. (3)

4 Write Dirichlet's conditions for Fourier series. (2)

5 Find the Fourier transform of an impulse function. (3)

6 Prove the Time shifting property of Fourier Transform. (2)

7 Find 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 of $x(n) = (1/3)^n u(n)$. (3)

10 Define Zero Order Hold. (2)

PART – B (50 Marks)

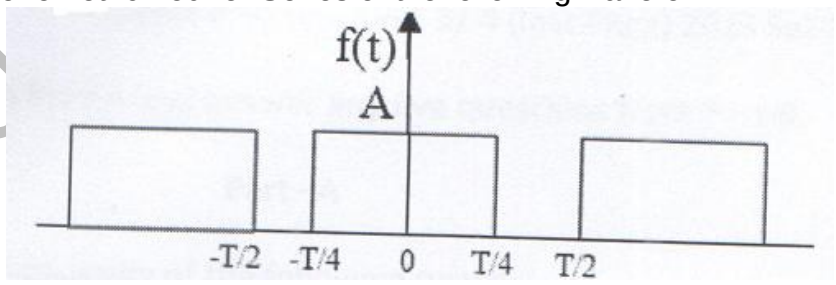
11 (a) Find the convolution of x(n) and h(n) define as (5)

X(n)=(1, -2, 1), h(n) = {1, 2, 3, 2, 1}

(b) Find even and odd component of the following signal. (5)

X(n) = {=3, 1, 2, -4, 2}

12 Find the Trigonometric Fourier Series of the following waveform. (10)



13 (a) Find the Fourier Transform of a Rectangular Pulse. (5)

(b) Find Fourier transform of the given function $x(t)=e^{-d|t|}sgn(t)$. (5)

14 (a) Find initial and final values for the function

$$X(s) = \frac{s+4}{s^2+3s+5}$$ (5)

(b) Determine the inverse Laplace Transform of (5)

$$X(s) = \frac{s^2+3s+4}{s^3+5s^2+7s+3}$$

..2

15 (a) Determine the impulse response of the following system using z-transform method. (6)

$$y(n) - 2y(n-1)+y(n-2)=x(n)+x(n-1)$$

(b) State and prove atleast two properties of z-Transform. (4)

16 Determine all possible x(n) associated with z-Transform of the following equation. (10)

$$X(z) = \frac{\left(\frac{1}{4}\right)z^{-1}}{\left(1-\frac{1}{2}z^{-1}\right)\left(1-\frac{1}{4}z^{-1}\right)}$$

17 A system is described by the following differential equation (10)

$$\frac{d^2y(t)}{dt^2} + \frac{6dy(t)}{dt} + 8y(t) = \frac{dx(t)}{dt} + x(t) \quad ; \frac{dy(0)}{dt} = 3, y(0) = 1, x(t) = u(t)$$

Find the transfer function and the output signal y(t).

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Code No. 3411/N

FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) I - Semester (New)(Main) Examination, November / December 2016

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 Find even and odd component of the signal $x(n)=\{3,1,\underset{\uparrow}{2},-4,2\}$. 3

2 Find out whether the system is linear or non linear $y(t)=2x^2(t)$. 2

3 Determine complex exponential Fourier series coefficient f of $x(t)=\sin \mu_0 t$. 3

4 Define orthogonality of two time domain signals. 2

5 Prove the Frequency shifting property of Fourier Transform. 3

6 Find the Fourier Transform of signal $x(t)=\text{sgn}(t)$. 2

7 Find the Laplace Transform of signal $x(t)=t.u(t)$. 3

8 Explain the relation between Laplace Transform and Fourier Transform. 2

9 Find Z-transform of signal $x(n)=3\left(\frac{5}{7}\right)^n.u(n)+2\left(-\frac{1}{3}\right)^n.u(n)$. 3

10 Define ROC for Z-transform. 2

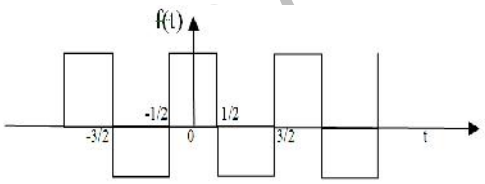
Part – B (50 Marks)

11 (a) Explain classification of systems with examples. 5

(b) Find convolution of the following two sequences 5

$x(n)=\{1,-2,1\}, h(n)=\{1,2,3,2,1\}$

12 Find the Trigonometric Fourier Series of the following waveform. 10



13 (a) Determine the convolution of the following signal using Fourier Transform 6

$x_1(t)=e^{-2t}.u(t)$ and $x_2(t)=e^{-6t}.u(t)$

(b) Find Fourier transform of a signner function. 4

14 (a) A system is described the differential equation. Find its impulse response 6

$$\frac{d^2y(t)}{dt^2}+5\frac{dy(t)}{dt}+6y(t)=x(t)$$

(b) Write properties of Laplace Transform (any four). 4

15 (a) Using any method find Inverse Z-Transform of 7

$$X(z)=\frac{z^2+2z}{z^3-3z^2+4z+1};\text{ROC}:|z|>1$$

(b) Find Z transform of $x(n)=nu(n)$. 3

16 Determine the impulse response and step response of the causal system given by difference equation. 10

$y(n)-y(n-1)-2y(n-2)=x(n-1)+2x(n-2)$

17 Write short notes on 10

a) Standard signals b) Parserval theorem

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Code No. 3134 / O

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I – Semester (Old) Examination, November 2016

Subject: Digital Integrated Circuits & Applications

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 the Digital ICS according to their circuit complexity. 2

2 Define the following and given their topical values in TTL IC's 3

a) V_{IL} b) V_{IH} c) V_{OL} d) V_{OH} e) Noise Margin

3 How many BCD counters are reassured to implement a 3.1/2 digit millimeter display. 2

4 Convert a JK-FF to D-FF. 3

5 Implement the function of (A, B, C) = Σ_n (0, 1, 6, 7) using suitable multi-planer. 2

6 Draw CMOS driver to TTL interface. Why they require an interface explain? 3

7 What are the two major components of disk access time? 3

8 Draw a two input TTL NAND gate with token pole output. Explain the operation of token pole. 3

9 Differentiate between SRAM and DRAMS. 2

10 Draw the interface of TTL to CMOS. 2

PART – B (5x10 = 50 Marks)

11 a) Draw and explain the operation of a TTL 2 input OR Gate. 5
b) Differentiate the features of TTL, family variants 74 L, 74 LS and 74 HC. 5

12 a) Write a short notes on Tri-state logic in TTL. 4
b) Compare the characteristics of TTL, CMOS and ECL. 6

13 a) Realize a 16x1 multiplexer using 4x1 and 2x1 multiplexers. 5
b) Design a 2 bit multiplier using logic gates. 5

14 a) Design a MOD-10 counter using 7490. 6
b) Show how 74490's are cascaded to count 0-9999. 4

15 a) Design 8 K x 8 memory interface using 2 K x 8 PROMS. Draw the diagram showing the circuit. 5
b) What are the advantages of Flash memory over EPROM? Explain different commands used in Flash memory. 5

…2.

16 Design a sequence detector circuit to detect a serial input sequencing of 1010. It should produce an output ‘L’ whenever the input pattern is detected. 10

Input: 1 0 1 0 1 0 1 0 …

Output: 0 0 0 1 0 1 0 1 …

17 Write a short note on any two from the following: 10

a) Saturation logic family

b) Carry look - ahead adder

c) Open drain in CMOS logic family

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Code No. 3413 / N

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I - Semester (New)(Main) Examination, November / December 2016

Subject : Pulse and Digital Circuits

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

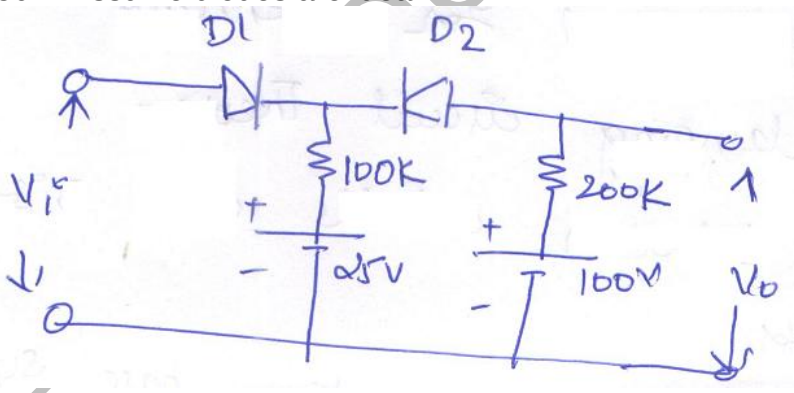
Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Explain the need for attenuation.
2 State clamping circuit theorem.
3 Difference between astable and Bistable multivibrator.
4 List the features of time base signal.
5 Define Figure of merit.
6 List the integrated circuit package type.
7 Explain Fan-in and Fan-out in CMOS.
8 Explain how a LPF acts as an Integrator.
9 List the application of clipper and clamper.
10 Compare CMOS and TTL.

PART – B (50 Marks)

11 (a) Sketch the output response for following clipper circuit when input is linearly varying from 0 to 150V. Assume diodes are ideal.



(b) Explain positive clamper.

12 (a) Define the three types of error that occur in time base generator.
(b) Draw the circuit of monostable multivibrator and derive the expression for pulse width.

13 (a) Compare differentiator and integrator.
(b) Explain the response of a low pass RC circuit for square wave input.

14 (a) Design and analyze sweep circuit using UJT.
(b) Derive Intrinsic = standoff ratio.

15 Draw and explain three input ECL OR / NOR Gate.

16 Why totempole is used in DTL draw the circuit diagram and explain a DTL gate?

17 Write short notes on any **two** of the following:
(a) Attenuator
(b) Schmitt Trigger
(c) IC characteristics

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Code No. 3139 / O

FACULTY OF ENGINEERING

B.E. 3/4 (M/P/AE) I-Semester (Old) Examination, Nov. / Dec. 2016

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 the terms : i) Inertia force and ii) Inertia Couple. How their magnitude and directions are found?
2 What is the role of Gyroscopic effect on Naval Ships?
3 Define stability and power of a Governor.
4 What is the function of a Governor in a Prime mover?
5 What if partial balancing of Primary force? Why it is necessary?
6 Define the terms Hammer Blow and Swaying Couple.
7 The successive amplitudes from a vibration test of a structure are 0.69, 0.362, 0.190, 0.099 units respectively. Determine the damping ratio of the system.
8 Define Magnification factor and Transmissibility.
9 What are the reasons for occurrence of whirling in shafts? What is meant by critical speed?
10 Explain Dunkerley's method to determine natural frequency.

PART – B (50 Marks)

11 The turbine rotor of a ship weights 8 tonnes and has a radius of gyration 60 cm. It rotates at 1800 rpm clockwise when viewed from front. Determine the gyroscopic effect :
   a) If the ship when traveling at 1860 m/hour steers to the right in a curvature of 100m radius
   b) If the ship is rolling and at a certain instant has an angular velocity of 0.02 radians per second clock-wise from the stern.

12 A horizontal steam engine running at 120 rpm has a beore of 250mm and a stroke of 400mm. The connecting rod is 0.6m and mass of the reciprocating parts is 60 kg. When the crank has turned through an angle of 45^0 from the inner dead centre, the steam pressure on the cover end side is 550 kN/m^2 and that on the crank end side is 70 kN/m^2. Considering the diameter of the piston rod equal to 50mm, determine : i) Turning moment on the crank shaft ii) Thrust on the bearings and iii) Acceleration of the flywheel, if the power of the engine is 20 kW, mass of the flywheel is 60 kg and radius of gyration 0.6m.

..2

13 In a spring loaded governor of Hartnell type, the mass of each ball is 1 kg, length of vertical arm of the bell crank lever is 100 mm and that of the horizontal arm is 50mm. The distance of fulcrum of each bell crank lever is 80 from the axis of rotation of the governor. The extreme radii of rotation of the balls are 75mm and 112.5mm. The maximum equilibrium speed is 5 percent greater than the minimum equilibrium speed which is 360 rpm. Find, neglecting the obliquity of the arms, initial compression of the spring and equilibrium speed corresponding to the radius of rotation of 100mm.

14 A certain machine requires a torque of $(5000 + 500 \sin\theta)$ N-m to drive it, where θ is the angle of rotation of shaft measured from certain datum. The machine is directly coupled to an engine which produces a torque of $(5000 + 600 \sin 2\theta)$ N-m. The flywheel and the other rotating parts attached to the engine has a mass of 500kg at a radius of gyration of 0.4m. If the mean speed is 150 r.p.m., find : i) the fluctuation of energy ii) The total percentage of fluctuation of speed, and iii) The maximum and minimum angular acceleration of the flywheel and the corresponding shaft position.

15 The following data refer to two cylinder locomotive with cranks at 90^0. Reciprocating mass per cylinder = 300 kg; Crank radius = 0.3m; Driving wheel diameter = 1.8m; Distance between cylinder centre lines = 0.65m; Distance between the driving wheel central planes = 1.55m.
Determine :
a) The fraction of the reciprocating masses to be balanced, if the hammer blow is not to exceed 46 kN at 96.5 kmph
b) The variation in tractive effort and
c) The maximum, swaying couple

16 A shaft 50 mm diameter and 3 meters long is simply supported at the ends and carries 3 loads of 1000N, 1500N and 750N at 1m, 2m and 2.5m from the left support. The Young's modulus for shaft material is 200 GN/m^2. Find the frequency of transverse vibration.

17 Determine the natural frequency of torsional vibrations of a shaft with two circular discs of uniform thickness at the ends. The masses of the discs are M_1 = 500 kg : M_2 = 1000 kg and the outer diameters are D_1 = 125 cms; D_2 = 190cm. The length of the shaft is 300 cms and its diameter d = 10 cms. Modulus of rigidity of shaft material G = 0.83×10^{11} N/m^2. Find the natural frequency of the shaft if along half the length of the shaft, the diameter is increased from 10cm to 20cm.

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Code No. 3419 / N

FACULTY OF ENGINEERING

B.E. 3/4 (M/P/AE) I-Semester (New) (Main) Examination, Nov. / Dec. 2016

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 the terms : i) Inertia Force ii) Inertia Couple. How their magnitude and direction are found?
2 Explain the terms Precisional motion and Gyroscopic Couple.
3 Explain i) Hammer blow and ii) Swaying Couple as applied to locomotive balancing
4 Why Flywheel is required for multi cylinder I.C. Engine?
5 Explain the term stability concerning to governors.
6 Define Governor Effort and Governor Power.
7 What are the different methods to derive Natural Frequencies of Vibrating system? Explain one of them briefly.
8 Why only a part of the unbalanced force due to reciprocating masses is balanced by revolving mass?
9 What is damped vibration?
10 Give an expression for finding natural frequency by Holzer's method.

PART – B (50 Marks)

11 The turbine rotor of a ship has a mass of 2000 kg and rotates at a speed of 3000 r.p.m. clockwise when looking from a stern. The radius of gyration of the rotor is 0.5m. Determine the Gyroscopic couple and its effects upon the ship when the ship is steering to the right in a curve of 100 m radius at a speed of 16.1 knots (1 knot = 1855 m/hr). Calculate also the torque and its effects when the ship is pitching in simple harmonic motion, the bow falling with its maximum velocity. The period of pitching is 50 seconds and the total angular displacement between the two extreme positions of pitching is 12^0. Find the maximum acceleration during pitching motion.

12 Each arm of a Porter Governor is 250 mm long. The upper and lower arms are pivoted to sleeve at points 40 mm and 50 mm respectively from the axis of rotation. Each ball has a mass of 5 kg and the sleeve mass is 50 kg. The force of friction on the sleeve of the mechanism is 40 N. Determine the range of speed of the governor for extreme radii of rotation of 125 mm and 150 mm.

..2

13 A riveting machine is driven by a motor of 3kW. The actual time to complete one riveting operation is 1.5 seconds and it absorbs 12 kN-m of energy. The moving parts including the flywheel are equivalent to 220 kg at 0.5m radius. Determine the speed of the flywheel immediately after riveting it is 360 rpm before riveting. Also, find the number of rivets closed per minute.

14 Four masses A,B,C and D carried by a rotating shaft at radii 80mm, 100mm, 160mm and 120mm respectively are completely balanced as shown in Fig.1. B, C and D are 8kg, 4kg, and 3kg respectively. Determine the mass A and the relative angular positions of the four masses if the planes are spaced 500mm apart.

15 A machine mounted on springs and fitted with a dashpot has a mass of 60kg. There are 3 springs, each of 12 N/mm. The amplitude of vibrations reduces from 45 to 8 mm in two complete oscillations. Assuming that the damping force caries as the velocity, determine the
   i) Damping coefficient
   ii) Ratio of frequencies of damped and undamped vibrations
   iii) Periodic time of damped vibrations

16 A shaft of 55 mm diameter and 2.5m long is simply supported at ends and carries 3 loads of 1500N, 900N and 500N at 1m, 1.5m and 2m from left end. Take E = 200 GN/m^2 and find frequency of transverse vibrations.

17 Write a short notes on the following :
   i) Rayleigh's method to find the natural frequency of multi rotor system
   ii) Torsionally equivalent shaft
   iii) Dynamic balancing and Hysterisis loop

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Code No. 3151 / O

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I - Semester (Old) Examination, November / December 2016

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 are two goals of Operating System? (2)
2 What is a virtual machine? Give any two benefits of virtual machines. (3)
3 Distinguish between a thread and a process. (3)
4 What is compaction? Under what circumstances it is not possible. (3)
5 What is thrashing? Give the reasons of thrashing. (3)
6 What is RAG? How it can be used for deadlock detection? (3)
7 Distinguish between NAS and SAN. (2)
8 What is a device driver? (2)
9 What is an inode? (2)
10 List the schemes used for bad sector handling. (2)

PART – B (50 Marks)

11 (a) What is PCB? Briefly explain. (5)
(b) Discuss about various thread models. (5)

12 (a) Write about virtual memory. (4)
(b) Let there are five process and all arrived into the system at time 0. Their burst Time and priority are given as follows:

Process	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

(i) Draw the Gantt charts SJF, non-preemptive Priority and RR (quantum=2). (3)
(ii) Compute the turnaround time and average waiting time for all those algorithm? (3)

13 (a) Why are segmentation and paging sometimes combined into one scheme? (4)
(b) What is a page fault? Explain the procedure of page fault handling. (6)

14 (a) Give the requirements of the critical section problem solution. (4)
(b) What is a monitor? Give the monitor solution for the dining-philosopher problem. (6)

15 (a) Explain about disk scheduling Algorithm. (5)
(b) Explain about RAID structure. (5)

16 Describe the architecture of Windows – XP? (10)

17 Write short notes on the following: (2x5)
(a) Access Matrix
(b) Android Features

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Code No. 3432 / N

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I – Semester (New) (Main) Examination, November / December 2016

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 a system call? List the types of system calls provided by Unix.	3
2	What is a thread? List the benefits of threads.	2
3	What is thrashing? Give the reasons of thrashing.	3
4	Give the structure of Unix / Linux inode.	3
5	Why do *solaris, linux, and windows XP* use spinlocks as a synchronization mechanism only on multiprocessor systems and not on single-processor systems?	2
6	Consider a logical address space of 32 pages with 1024 words per page, mapped onto a physical memory of 16 frames. How many bits are required in the logical address and in the physical address?	2
7	Distinguish between blocking and non-blocking I/O.	2
8	Define latency, transfer and seek time with respect to disk I/O.	3
9	List the design principles of windows.	3
10	What are the components of Linux system?	2

PART – B (5x10 = 50 Marks)

11	a)	Give the criteria used for evaluating CPU scheduling algorithms.	5
	b)	Distinguish between user level threads and kernel level threads.	5
12	a)	What is a page fault? List the steps involved in handling a page fault.	5
	b)	Consider the page reference string of **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 according to FIFO and LRU page replacement algorithm with **3** page frames?	5
13	a)	What is critical-section problem? Write the solution for Readers – Writers problem with semaphores.	4
	b)	Explain Banker's algorithm for deadlock avoidance.	6
14	a)	Discuss the relative advantages and disadvantages of sector sparing and sector slipping.	5
	b)	Explain the steps to transform I/O operation to hardware level.	5
15	a)	List and briefly explain the design principles of Windows OS.	5
	b)	What is Android? Discuss about the Android architecture.	5
16	a)	What is PCB? Briefly explain.	5
	b)	Discuss about various file allocation methods.	5

17 Write short notes on any two of the following: 2x5=10

a) Paged segmentation
b) Banker's Algorithm
c) Program and system threats.

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Code No. 3157 / O

FACULTY OF INFORMATION

B.E. 3/4 (IT) I - Semester (Old) Examination, November / December 2016

Subject : Database Management 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 List out few Database system applications. (3)
2 What are Entity sets and Relationship sector? (2)
3 What are the operations on relations. (3)
4 List the standard types that SQL supports. (2)
5 How to ship SQL statements to the Database system? (3)
6 Write about Decomposition using Functional Dependencies. (3)
7 Write short notes on B^+ trees Index Files. (2)
8 Write the properties of transactions maintained by database system. (3)
9 Write the modes of data items that can be locked. (2)
10 How does transaction Roll back is done? (2)

PART – B (50 Marks)

11 Draw Database System Architecture and explain its components. (10)

12 (a) Consider the relational database. (5)
Employee (person-name, street, city)
Works (person-name, Company-name, salary)
Company (Company-name, city)
What are its appropriate primary keys?
(b) Express each of the following queries for the relational algebra given above.
(i) Find the names of all employees who lives in Miami city.
(ii) Find the names of all employees who lives in Miami and whose salary is greater than $ 1,00,000. (5)

13 (a) Explain Advanced Aggregation features. (5)
(b) Write short notes on OLAP. (5)

14 (a) Differentiate between static Hashing and Dynamic Hashing. (5)
(b) Since, every conflict serializable schedule is view serilization, why do are emphasize conflict serializability rather than view serializability. (5)

15 (a) Explain Time stamp ordering Protocol. (5)
(b) Explain Thomas' Write Rule. (5)

16 Suppose we are using extendable hashing on a file that contains records with the following: (10)
Search – key values 2, 3, 5, 7, 11, 17, 19, 23, 29, 31
Show the extendable hash structure for this site if the hash function is h(x)=x mod 18 and buckets can hold three records.

17 Write short notes on the following: (10)
(a) Bitmap indices
(b) Concurrency in Index Structures

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Code No. 3438 / N

FACULTY OF INFORMATICS

B.E. 3/4 (IT) I – Semester (New) (Main) Examination, November 2016

Subject: Database Management 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 logical data independence and why is it important?	3
2	What is the difference between weak entity set and strong entity set?	3
3	What is Natural join and Theta join.	2
4	What is super key and a candidate key?	2
5	What are the features of dynamic SQL?	2
6	Defined multivalued dependency.	2
7	Differentiate between Dense and Sparse indexing.	2
8	What are the ACID properties of a transaction?	3
9	Write the features of ARIES recovery method.	3
10	Define one-safe, two-very-safe and two-safe in remote backup system.	3

PART – B (5x10 = 50 Marks)

11	a)	Explain the conceptual design for large enterprises with example.	5
	b)	What are various advantages and disadvantages of Database Management System?	5
12	a)	Discuss in detail E-R diagram design issues.	5
	b)	Explain various set operations used in SQL queries.	5
13	a)	Explain briefly various integrity constraints.	6
	b)	Write about functional dependency.	4
14	a)	Construct a B+ tree for the following keys where the order of tree is (i)n=3 (ii)n=6 2,3,5,7,9,11,17,19,23,29,31.	5
	b)	Discuss conflict serialzability.	5
15	a)	Explain various approaches in log based recovery.	5
	b)	Discuss about remote backup system.	5
16	a)	Explain TCL commands with suitable example.	4
	b)	Explain various operations of relational algebra.	6
17		Write short notes on the following:	
	a)	Types of attributes	3
	b)	Nested queries	4
	c)	Hashing.	3

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