Code No. 5086 / S

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) II – Semester (Suppl.) Examination, January 2016

Subject: Fluid Mechanics– I

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 vapour pressure. How does it vary with temperature?	2
2	Why shear stresses are non-existent in a static fluid?	2
3	Why irrotational flow is called potential flows?	2
4	What is stagnation pressure?	2
5	Define surface forces and body forces.	2
6	Why it is necessary to assume that the flow is steady before integrating Euler's equation to derive Berroulli's equation?	3
7	What is equivalent pipe diameter? Explain in detail?	3
8	A velocity head of free jet of water is 10 m. What is the power of the jet, if the jet discharge is 0.1 m^3/s.	3
9	What are the inferences if the hydraulic gradient line falls below the pipe line?	3
10	Explain Reynold's number and its significance.	3

PART – B (5x10 = 50 Marks)

11 a) Explain velocity potential and stream function in detail and also distinguish between them.

b) The velocity distribution of flow over a plate is parabolic with vertex 40 cm from the plate where the velocity is 158 cm/s. If the viscosity of the fluid is 0.55 $N.s/m^2$,find the velocity gradients and shear stresses at a distance of 0 cm, 15 cm and 30 cm from the plate.

12 a) Derive the continuity equation in Cartesian coordinates.

b) The velocity components in a fluid flow are given by $U = 3xy$ and $V = 14 + x^2 – y^2$. Find whether the flow is possible or not and also find the stream function and velocity potential function.

13 a) Derive Bernoulli's equation along the stream line from Euler's equation stating the assumptions clearly.

b) A 200 x 100 mm venturimeter is provided in a vertical pipe carrying water flowing in the upward direction. A differential mercury manometer connected to the inlet and throat gives a reading of 200 mm. Find the rate of flow. Take $C_d = 0.97$.

14 a) Water flows down an inclined tapering pipe 50 m long at a slope of 1 in 10. The areas at the upper and lower ends of the pipe are 6 m^2 and 2m^2 respectively. If the velocity at the lower end is 4m/s, find the pressure difference in the pipe.

b) Prove that the maximum velocity in a circular pipe for viscous flow is equal to two times the average velocity of flow.

…2.

15 a) Calculate Mach number at a point on a jet propelled aircraft which is flying at 900 km/hr at sea level where air temperature is 15^{o}C. Take K = 1.3 and R = 285 J / Kg.K.

b) Briefly explain about differential U-tube manometer, micro manometer and barometer.

16 a) Define vortex motion. Show that for a vortex flow pressure gradient along radial direction is proportional to square of the velocity and inversely proportional to radius.

b) Two reservoirs are connected by a pipe 2500 m long and 0.3 m in diameter. The difference in water level is 9 m. Determine the flow through the pipe in litres per minutes, friction factor is 0.03. Also find the percentage increase in the discharge if for the last 700 m a second pipe of same diameter and friction factor is laid alongside the first.

17 Write short notes:

a) Significance of Mach number
b) Wave velocity for adiabatic conditions
c) Moody's diagram

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Code No. 5094 / S

FACULTY OF ENGINEERING

B.E. 2/4 (EEE) II - Semester (Suppl.) Examination, January 2016

Subject : Electrical Machinery - I

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 Draw block diagram of flow of energy in electromechanical device. (2)
2 What is meant by field energy and coenergy? (3)
3 Draw pictorial view of DC machine and mention various parts. (3)
4 What is meant by reactance voltage in DC machines? (2)
5 What do you understand by back emf in DC motor? (2)
6 The armature resistance of a 220 V shunt motor is 0.4Ω and no-load current is 2A. When loaded taking an armature current of 50A, the speed is 1000 rpm. Find no-load speed. (3)
7 What is meant by stray load lossy in DC machines? (2)
8 What is the condition for maximum efficiency in case of DC shunt machine? (3)
9 Draw phasor diagram of a 1-phase transformer and explain. (3)
10 Define regulation of a 1-phase transformer. (2)

PART – B (50 Marks)

11 Two coupled coils have self and mutual inductance of

$L_{11} = 2 + \frac{1}{2x}$

$L_{22} = 1 + \frac{1}{2x}$

$L_{12} = L_{21} = \frac{1}{2x}$

Over a certain range of linear displacement x. The first coil is excited by a constant current of 20A, and the second by a constant current of -10 A. Find
(a) Mechanical work done if X charges from 0.5 to 1m
(b) Energy supplied by each electrical source
(c) Change of field energy (10)

12 Draw the lap winding diagram in the developed form and equivalent ring diagram for a 4-pole 12-slot armature with two coil sides / slot. Assume single turn coils. Indicate the number and position of brushes on the commutator. What is the number of parallel paths? (10)

13 A D.C. shunt motor runs at 1200 rpm on no-load drawing 5A from 220V mains. Its armature and field resistances are 0.25Ω and 110Ω respectively. When loaded at motor shaft draws current of 62 A from the mains. What would be its speed? Assume that the armature reaction demagnetizes the field to the extent of 5%. Also calculate the internal torque developed at no-load and on-load. What is the motor shaft torque at load? (10)

..2

14 Explain the Swinburnis test conducted on DC shunt motor with help of neat circuit diagram. A 200V, 15 KW, DC shunt motor when tested by Swinburnis test gave the following results:
Running tight:
Armature current = 6 A
Field current = 2 A
With armature blocked : Current = 70 A
Voltage applied = 3V
Estimate the efficiency of motor when working under full load condition. (10)

15 The Following data were obtained on a 20 KVA, 50 Hz, 2000/200 V distribution 1-phase transformer.

O.C. test (H.V. opened) :	200 V	4A	110W
S.C. test (L.V. shorted)	50 V	10A	290W

Draw the appropriate equivalent circuit of the transformer referred to H.V and L.V. sides. Calculate efficiency and regulation at full load and half load. Assume p.f. 0.8 lagging. (10)

16 (a) Derive emf equation of a D.C. machine from basics. (5)
(b) Explain 3-point starter to start DC motor with the help of neat schematic diagram. (5)

17 Explain the following tests with help of neat schematic diagrams: (10)
(a) Polarity test (1 – phase transformer)
(b) Retardation test (DC machine)

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Code No. 5095 / S

FACULTY OF ENGINEERING

B.E. 2/4 (Inst.) II - Semester (Suppl.) Examination, January 2016

Subject : Electrical Machines

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 Draw the OCC of a DC generator. (2)
2 Explain the importance of "Critical Field Resistance". (2)
3 Name the losses in a transformer. (3)
4 Explain the principle of operation of a Transformer with diagram. (3)
5 What is synchronous condenser? (3)
6 Give the purpose of open circuit test in a transformer. (2)
7 What is armature reaction? (2)
8 With a neat sketch, give the principle of operation of shaded pole of single phase induction motor. (3)
9 Write the expression for torque developed in a DC Motor. (2)
10 Draw the torque-slip characteristics of a 3-phase Induction Motor and also give applications. (3)

PART – B (50 marks)

11 (a) Explain the constructional features of a D.C machine with the help of a neat sketch.
(b) Why is a starter necessary for a DC motor?
(c) The armature resistance of a 220 V D.C. shunt motor is 0.4W and it takes a no-load armature current of 2 A and runs at 1350 rpm. Find the speed when taking an armature current of 50 A if armature weakens the flux by 2%.

12 (a) Name the main parts of a D.C machine and state the materials of which each part is made.
(b) What is the main purpose of laminating the armature core of a D.C. Generator.
(c) A 4-pole, long shunt, lap wound generator supplies 25kw at a terminal voltage of 500 V. The armature resistance is 0.03W, series field resistance is 0.04W and shunt field resistance is 200W. The brush drop may be taken as 1 V. Determine the e.m.f. generated.

13 (a) Obtain the equivalent circuit of a single-phase transformer. Explain how to evaluate the equivalent circuit of a transformer from open circuit & short circuit tests.
(b) A 5 kVA, 220 / 110 volts, 1-phase transformer has a maximum efficiency of 96.97 % at 0.8 p.f. lagging. It has a core loss of 50 watts and the full load regulation at 0.8 p.f. lagging is 5 %. Find the efficiency and regulation at full load 0.9 p.f. lagging.

14 (a) With a neat sketch, explain clearly the principle of operation of alternator.
(b) A 2500 V, 3-phase, star connected motor has a synchronous reactance of 5 ohm per phase. The motor input is 1000 kW at rated voltage and an excitation emf of 3600 V (line). Calculate the line current and power factor.

..2

15 (a) Explain the terms: Maximum torque, Full load torque, Starting torque & No-load torque of a 3-phase Induction Motor.
(b) An 8-pole, 50 Hz, 3 phase slip ring IM has effective resistance of 0.08 /phase. The speed correspond to maximum torque is 650 rpm. What is the value of resistance to be inserted in rotor circuit to obtain maximum torque at starting?

16 (a) Why a single-phase induction motor is not self-starting? Explain.
(b) With a neat sketch, explain the working principle of split-phase capacitor-run single phase induction motor.

17 Write short notes on:
(i) Krammer's method of speed control
(ii) Auto Transformer

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Code No. 5101 / S

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) II – Semester (Suppl.) Examination, January 2016

Subject : Signal Analysis and Transform Techniques

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

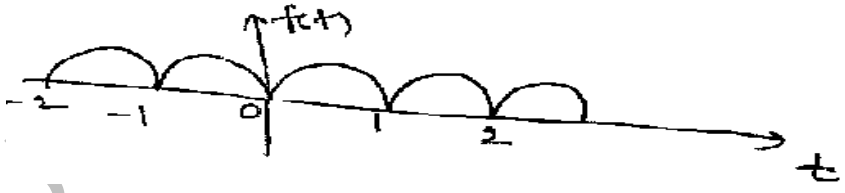
Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

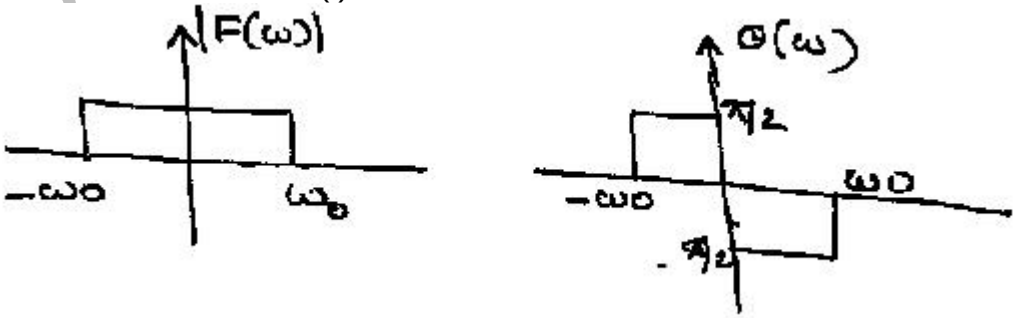
1	What is the relation between exponential and trigonometric Fourier co-efficient?	2
2	State Parseral's theorem for periodic signal.	2
3	Prove the scaling property for z-transform.	2
4	Evaluate the FT of the signum function.	2
5	Convolute the two discrete sequence. a^n u(n) and δ(n) u(n).	3
6	State and prove time shift property for DTFT.	3
7	Realise the discrete system from difference equations in canonical form.	3
8	Find IZT for $\frac{1-\frac{1}{2}\bar{z}^1}{1+\frac{3}{4}\bar{z}^1+\frac{1}{8}\bar{z}^2}$	3
9	Find the Laplace transform for $(0.64)^t$ u(t).	2
10	State properties of auto-correlation.	3

PART – B (50 Marks)

11 Find the exponential Fourier series of periodic signal. 10



12 a) Determine the function f(t) whose Fourier transform are as follows 5



b) Determine the Fourier transform of $\bar{e}^{at}$ t< 0 and t>0. 5

13 State and prove 5 properties for Laplace transform. 10

..2

14 a) Compute the DFT of the sequence x[n] for N = 5 if x[n] = $\{2, 1, 0, 1, 2\}$. 4

b) State and prove DFT property for i) Time reversal ii) Time shift 6

15 a) Solve the difference equation using z-transform x(K+2) + 3x(K+1) + 2x(K) = 0 and x(1)=1 and x(0) = 0 5

b) $x(z) = \frac{1 - a\bar{z}^1}{\bar{z}^1 - a} \; | z | > |1/a|$. 5

16 Determine whether the system is stable, causal, linear, time invariant, memory loss. 10

$$Y(n) = \sum_{K=no}^{n} x[n]$$

17 a) State and prove time integration property. 2

b) Explain graphical interpretation of convolution of two signals f(t) and g(t). 4

c) Find the unit sample response of transfer 4

$$H(z) = \frac{2 - 0.8\,\bar{z}^2}{1 - 3\,\bar{z}^1}$$

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Code No. 5104 / S

FACULTY OF ENGINEERING

B.E. 2/4 (M/P/AE) II – Semester (Suppl.) Examination, January 2016

Subject : Kinematics 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 Sketch the displacement diagram, velocity and acceleration profiles for cyclodial motion. 3
2 Explain the influence of centrifugal tension on power transmission in belts with necessary equations. 3
3 Sketch reverted gear train and deduce its train value. 3
4 Differentiate between Ackermann and Davis steering gear mechanisms. 3
5 Define degrees of freedom of a mechanism. Deduce Grubler's criterion. 3
6 What is rubbing velocity in pin joints? 2
7 Differentiate between Pitch point and Trace point in CAMS. In what type of followers both are found to coincide in the same point. 2
8 Sketch the force resolution for herringbone gears and hence prove that its axial thrust is zero. 2
9 Classify CAMS. 2
10 State Robert's Law. 2

PART – B (50 Marks)

11 Explain various inversions of a Quadratic cycle chain. 10

12 In a four link mechanism, the crank AB rotates at 36 rad/s. The lengths of the links are AB = 200 mm ; BC = 400 mm; CD = 450 mm and AD = 600 mm. AD is the fixed link. At the instant when AB is at right angles to AD, determine the velocity of 1. Midpoint of the link BC; 2. A point on the link CD, 100 mm from the pin connecting the links CD and AD. 10

13 A flat faced mushroom follower is operated by a uniformly rotation cam. The follower is raised through a distance of 25mm in 120^0 rotation of the cam, remains at rest for the next 30^o and is lowered during further 120^0 rotation of the cam. The raising of the follower takes place with uniform acceleration and deceleration. However the uniform acceleration is 3/2 times of the uniform deceleration. The lowering of the follower follows cycloidal motion. The least radius of the cam is 25 mm which rotates at 300 rpm. Draw the cam profile and determine the values of the maximum velocity and uniform acceleration and deceleration values during the ascent and the maximum velocity and maximum acceleration during descent. 10

..2

14 A multi plate disc clutch transmits 28 kW of power at 1500 rpm. It has four discs on the driving shaft and three discs on the driven shaft. The external and internal diameters of the contact surfaces are 230mm and 120mm respectively. a) Assuming the clutch to be brand new, find the total spring load pressing the plates together. Coefficient of friction is 0.3. b) Determine the maximum power transmitted when the contact surfaces have worn away by 0.5 mm. There are 6 springs and the stiffness of each spring is 1.5 kN/m. 10

15 a) Derive the condition for maximum power transmission in flat belts. 5

b) In a belt drive, the mass of the belt is 1 kg/m length and its speed is 5 m/s. the drive transmits 9.5 kW of power. Determine the initial tension in the belt and the strength of the belt. The coefficient of friction is 0.3 and the angle of lap is 210^0. 5

16 The following data relate to two meshing involute gears : Number of teeth on gear wheel = 60 ; pressure angle = 20^0; gear ratio = 2; speed of gear wheel = 120 rpm; Module = 8 mm. The addendum of each wheel is such that the path of approach and path of recess on each side are 40% of the maximum possible length each. Determine a) The addendum for the pinion and the gear b) The length of arc of contact. 10

17 Write short notes on the following :

a) Absorption dynamometers 3

b) Influence of centre distance modifications in Involute and Cycloidal gears 4

c) Freudstein synthesis for four bar chain 3

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Code No. 5113 / S

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) II – Semester (Supplementary) Examination, January 2016

Subject : Data Communications

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	List the key elements of a Communication model.	2
2	Represent frequency modulation with a waver form.	2
3	What is error detection? Mention error detection techniques performed in the data link layer.	3
4	Define piggy backing.	2
5	Distinguish between FDM and TDM.	3
6	List the different types of packet switching.	2
7	Compare the data rates for traditional Ethernet, Fast Ethernet and Gigabit Ethernet.	3
8	What is CSMA/ CD?	2
9	Describe handoff in cellular networks.	3
10	Distinguish between piconet and scatternet	3

PART – B (50 Marks)

11	Explain TCP/IP reference model. Enumerate the protocols used at each of these layers.	10
12 a)	What is Line coding? Discuss any two line coding schemes in detail.	5
b)	Differentiate between asynchronous transmission and synchronous transmission modes.	5
13 a)	Explain HDLC frame structure.	5
b)	Discuss flow control mechanism with neat diagrams.	5
14	Explain in detail about ATM cell format.	10
15 a)	How are bridges different from routers?	4
b)	Draw and explain in detail Ethernet MAC frame format. Give the significance of each field.	6
16 a)	Discuss the third generation systems of cellular wireless networks.	5
b)	List and explain key requirements for wireless LAN's. Explain IEEE 802.11 services.	5
17	Write short notes on a) Pulse code modulation b) ADSL c) Error correction techniques	4+3+3

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Code No. 5118 / S

FACULTY OF INFORMATICS

B.E. 2/4 (I.T.) II - Semester (Suppl.) Examination, January 2016

Subject : OOP Using JAVA

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	Differentiate overloading an overriding.	(3)
2	Explain Public, Private, Protect access modifiers.	(3)
3	What is a final variable?	(2)
4	Write an example for method local Inner class.	(2)
5	Define Package in Java.	(2)
6	What do you mean by multithreading?	(3)
7	What is the difference between string and string buffer class?	(2)
8	What is the Collections API?	(3)
9	Explain the static modifier briefly.	(2)
10	What is Character Stream?	(3)

PART – B (50 Marks)

11 Explain the control statements in Java with suitable examples for each. (10)

12 (a) What is an Inheritance? Explain briefly with an example program. (6)
(b) How many types of exceptions in Java what are they with suitable examples. (4)

13 What are the Legacy classes defined by java. util (10)

14 Explain any six methods in graphics class. (10)

15 Write short notes on given below:
(a) Scroll Bars (5)
(b) Checkbox Group (5)

16 (a) Describe the different stages in the life cycle of an Applet. (5)
(b) Why synchronization is needed? Give an example. (5)

17 (a) Define Serialization with a neat sketch. (7)
(b) What is Character Stream in Java? Explain any three Character Streams with examples. (3)

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