Code No. 3085

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) II – Semester (Main) Examination, May / June 2017

Sub: Electrical Technology (Part – A)

Time: 1½ Hours **Max.Marks: 38**

Note: Answer all questions from Part – A and any three questions from Part – B.

PART – A (14 Marks)

1 Define the following for a.c.

i) Form factor

ii) Peak factor 2

2 State two advantages of three phase circuits over single phase circuits. 2

3 Draw the phasor diagram for the exact equivalent circuit of real transformer. 3

4 List out the applications of transformer 2

5 Define slip. Why cannot an induction motor run at synchronous speed? 3

6 Why starters are necessary for starting induction motors? 2

PART – B (3x8 = 24 Marks)

7 a) A 20 ohms resistor, a 15.9 mH inductor and a 159 micro F capacitor are connected in parallel to a 240 V, 50 Hz supply. Calculate the supply current and power factor. 4

b) Obtain the voltage and current relations for a three phase delta connection and represent them with a phasor diagram. 4

8 A single phase, 6 KVA, 250/500 V transformer gave the following results:

Open circuit test: 250 V, 1 A, 90 W on l.v side

Short circuit test: 20 V, 12 A, 100 W on h.v side

Calculate the circuit constants and show them on an equivalent circuit. 8

9 a) Describe with neat sketches the construction of three phase wound type induction motor.

b) A 4 pole 50 Hz, three phase cage induction motor has rotor resistance and standstill rotor reactance of 0.04 ohms and 0.16 ohms per phase respectively. Calculate the value of the external rotor resistance per phase to be inserted to obtain 75% of maximum torque at starting. 4

10 a) Describe with the construction diagram the working of direct on line starter. 4

b) Obtain the expression for power in a balanced three phase circuits. 4

11 a) Obtain the expression for energy stored in capacitor. 4

b) Brief the necessary steps to calculate the street lighting. 4

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Code No. 3086

FACULTY OF ENGINEERING

B.E. 2/4 (Civil) II – Semester (Main) Examination, May / June 2017

Sub: Mechanical Technology (Part – B)

Time: 1½ Hours **Max.Marks: 37**

Note: Answer all questions from Part – A and any three questions from Part – B.

PART – A (13 Marks)

1	What is cable excavator?	3
2	Differentiate cable and clamshell excavator.	3
3	What is Aerial ropeway?	2
4	Where Guyed and Stiffy derricks are used?	3
5	What are the applications of Hammer crusher?	2

PART – B (3x8 = 24 Marks)

6	a)	What precautions to be taken while operating any earth moving equipment?	5
	b)	Briefly list out the functions of a Tractor.	3
7	a)	Which is faster and more secure – Belt conveyor or Screw conveyor and why?	3
	b)	Explain the applications of Fork lift truck, its need and how the name is derived.	5
8	a)	Explain salient features of Swing and Non-swing mobile crane and its specific applications.	4
	b)	What are the functions of a Crusher's jaw and Roll crushers?	4
9	a)	Explain with a neat sketch the functioning of a Pneumatic jack hammer.	5
	b)	Why concrete vibrator is required? Explain.	3

10 Write short notes on the following: 8

a) Apron conveyor

b) Cable excavator

c) Trencher

d) Shaking and vibrating screen

11 List out the functions of Shovels and concrete pumps with a neat sketch. 8

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Code No. 3092

FACULTY OF ENGINEERING

B.E. 2/4 (EE) II – Semester (Main) Examination, May / June 2017

Sub: Electrical Machines – I

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 Give an example for singly and multiply excitation systems.

2 What is electromechanical energy conversion? State three types of a electromechanical energy conversion devices with practical examples.

3 What is the difference between Lap winding and Wave Winding of a DC machine armature?

4 Define Commutation and Commutation period.

5 Why DC series motor called variable speed motor?

6 Write the torque equation of a DC motor.

7 What are the merits and demerits of Hopkinson's test?

8 A 500 V dc shunt motor running at 700 rpm takes an armature current of 50A. Its effective armature resistance if 0.4Ω. What resistance must be placed in series with the armature to reduce the speed to 600 rpm, the torque remaining constant?

9 The emf per turn for a single-phase 2200/220 V, 50 Hz transformer is 11V. Calculate the number of primary and secondary turns.

10 Draw the phasor diagram of an ideal transformer.

PART – B (5x10 = 50 Marks)

11 a) Define the following terms:
   i) MMF and Lenz's law
   ii) Faraday's law of Electro Magnetic Induction.

   b) A smooth core armature working in a 4-pole field magnet has a gap (iron to iron) of 0.5 cm. The area of the surface of each pole is 0.1 m^2. The ampere-turns absorbed by each pole are 3000. Calculate
   i) The mechanical force exerted by each pole on the armature
   ii) Energy stored in the four air gaps.

12 a) Draw and explain the OCC characteristics and external characteristics of DC Generator.

b) Two DC shunt generators are connected in parallel to supply a load of 5000 A. Each machine has an armature resistance of 0.03Ω and field resistance of 60Ω, but the emf of one machine is 600 V and that of the other machine is 640 V. What power does each machine supply?

13 a) What are the various starting methods of DC motor? Explain about any one method.

b) A 250 V dc shunt motor runs at 1000 rpm on no load and takes 5A. The armature and shunt field resistance are 0.2Ω and 250Ω respectively. Calculate the speed when loaded and taking a current of 50A. Due to armature reaction the field weakens by 3%.

14 a) Explain in detail the various methods of speed control in DC motor.

b) A 4-pole, long shunt, lap wound generator supplies 25 kw at a terminal voltage of 500 V. The armature resistance is 0.03Ω, series field resistance if 0.04Ω and shunt field resistance is 200Ω. The brush drop may be taken as 1 V. Determine the e.m.f. generated.

15 a) With neat circuit diagram, explain the conduction of Swinburne's test.

b) A 15 kVA 2400-240-V, 60 Hz transformer has a magnetic core of 50 cm^2 cross section and a mean length of 66.7 cm. The application of 2400 V causes magnetic field intensity of 450 AT/m (RMS) and a maximum flux density of 1.5 T. Determine
   i) The turn's ratio
   ii) The number of turns in each winding
   iii) The magnetizing current.

16 a) Obtain the equivalent circuit of a single phase transformer referred to primary and secondary from fundamentals.

b) A 230/460 V transformer has a primary resistance of 0.2 ohm and reactance of 0.5 ohm and the corresponding values for the secondary are 0.75 and 1.8 ohms respectively. Find the secondary terminal voltage when supplying 10A at 0.8 p.f. lagging.

17 Define the following terms:
   a) Speed regulation of dc motor
   b) Regulation of a transformer
   c) Back pitch and front pitch
   d) Armature reaction.

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Code No. 3093

FACULTY OF ENGINEERING

B.E. 2/4 (Inst.) II – Semester (Main) Examination, May / June 2017

Sub: Electrical Machines

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		Distinguish between a motor and a generator.	2
2		Why is the starting current very high in a dc motor?	3
3		Mention different types of dc generators.	3
4		What is meant by commutation?	2
5		Why the efficiency of a transformer is higher compared to other electrical machines.	3
6		Define voltage regulation of a single phase transformer.	2
7		Draw the phasor diagram of an ideal transformer.	3
8		Define the term slip with respect to a 3-phase induction motor.	2
9		What are the applications of stepper motors?	3
10		What is meant by a synchronous condenser?	2

PART – B (5x10 = 50 Marks)

11	a)	Explain the armature reaction in DC machines.	5
	b)	An 8-pole lap-wound DC generator has 120 slots having 4 conductors per slot. If each conductor carries 150A and if the flux/pole is 0.04 Wb, calculate the speed of the generator for giving 240 V on open circuit.	5
12	a)	Explain the speed control methods of DC shunt motors.	5
	b)	With the help of a neat diagram, explain the operation of a three-point starter.	5
13	a)	Derive the emf equation of a transformer from fundamentals.	5
	b)	A single phase 50 Hz transformer has 80 turns on the primary winding and 280 turns on the secondary winding. The voltage across the primary winding is 240 V. Calculate: i) The max: flux density in the core and ii) Induced emf in the secondary. The net cross-sectional area of the core may be taken 200 sq.cm.	5

14 a) Derive the emf equation of a synchronous generator. 5

b) A 50 Hz, 3-phase star connected alternator which generates 10,000 V between lines on open-circult, has a flux / pole of 0.15 Wb. If the distribution factor of the full-pitch coil is 0.96, find the number of armature conductors in series per phase. 5

15 a) Explain the effects of varying excitation on armature current and power factor. 5

b) A 75 Kw, 400 V, 4 pole, 3 phase, 6 star connected synchronous motor has a resistance per phase of 0.04 ohms and synchronous reactance per phase of 0.4 ohms. Compute for full load 0.8 pf (leading) the open circuit emf per phase.. 5

16 a) Explain the principle of operation of a three phase induction motor. 5

b) An 8-pole, 3-phase, 50 Hz, induction motor is running at a speed of 710 rpm with an input power of 35 kW. The stator copper loss at this operating condition is 1200 W, while rotational losses are 600 W. Find

i) Gross mechanical power output

ii) Rotor copper loss 5

17 Explain the principle of operation of the following with neat diagrams.

i) Stepper motors 5

ii) Shaded pole motor 5

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Code No. 3099

FACULTY OF ENGINEERING

B.E. 2/4 (ECE) II – Semester (Main) Examination, May / June 2017

Sub: Signal Analysis and Transform Techniques

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 A Discrete Time system is described by $y(n) = e^{x(n)}$, check the system for linearity, time invariance and stable. 2

2 What is aliasing effect? 2

3 List the properties of Continuous Time Fourier Transform. 3

4 Define Orthonormality and completeness. 2

5 State initial and final value theorems for Laplace Transform. 3

6 Write the properties of autocorrelation. 2

7 Find the average power of the signal $x(t) = (e^{-5t}+1)u(t)$. 3

8 State any three properties of Z-transform. 3

9 Find out the linear convolution of 3
$X(n) = \{1, 4, 3, -6)$ wit $h(n) = \{1, 7, -1, 3, 5\}$
↑ ↑

10 Find whether the signal $x(t) = 2\cos(10t+1) – \sin(4t-1)$ is periodic or not. 2

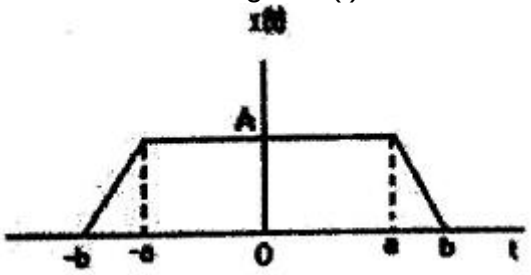
PART – B (5x10 = 50 Marks)

11 a) Derive the condition for stability for LTI system. 5

b) Explain the basic operations that can be performed on signals. 5

12 a) Explain the analogy between vectors and signals. 5

b) Find the Fourier Transform of the signal x(t) shown in the Fig. 5



13 a) Find the convolution of $x_1(t) = u(t+1)$ and $x_2(t) = u(t-2)$ where u(t) is a unit step function. 5

b) Find the Laplace transform of $x(t) = t^2e^{-2t}u(t)$. 5

14 a) State and prove time-shifting and convolution properties of the Z-transform. 5

b) Find the Z-transform X(Z) and sketch the pole-zero with the ROC 5

$$x(n) = \left(\frac{1}{3}\right)^n u(n) + \left(\frac{1}{2}\right)^n u(-n-1)$$

15 a) A casual system is represented by the following difference equation. 6

$$y(n) + \frac{1}{4}y(n-1) = x(n) + \frac{1}{2}x(n-1)$$

i) Find the system function H(z) and give the corresponding region of convergence.

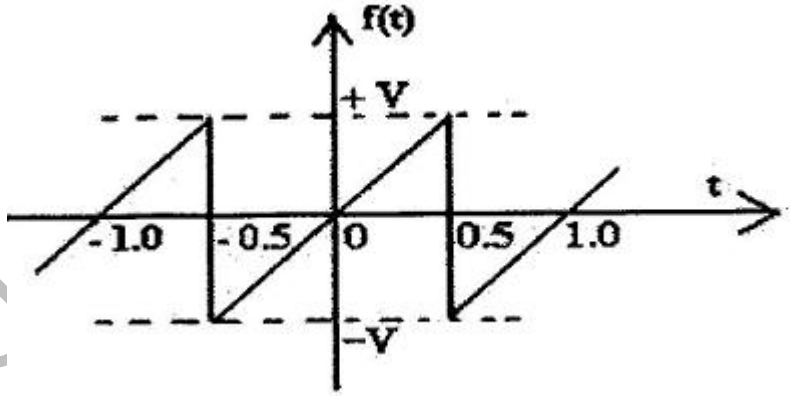
ii) Find the unit sample response of the system.

b) Find the inverse Z transform of the following X(z). 4

$$X(Z) = \log\left[\frac{1}{1-az^{-1}}\right] |Z| > |a|$$

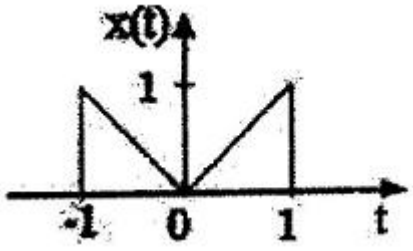
16 a) State and prove sampling theorem for low pass signals. 5

b) Find the trigonometric Fourier Series of the following wave form. Sketch the magnitude and phase spectra. 5



17 a) Find the convolution of $x(n) * \delta(n-2)$, given $x(n) = \delta(n+2) + 2\delta(n) + 3\delta(n-2)$. 5

b) Find the Fourier Transform of the signal x(t) shown in the following Fig. 5



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Code No. 3102

FACULTY OF ENGINEERING

B.E. 2/4 (M/P/AE) II – Semester (Main) Examination, May / June 2017

Sub: Kinematics of Machines

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 Robert's Law?	2
2	Write the advantages of revolutes over prismatic pairs.	2
3	Discuss the direction of coriolis acceleration component?	2
4	Differentiate fixed and moving centrodes.	2
5	Define friction circle.	2
6	Derive the condition for maximum power transmission condition in belt drive.	3
7	Define pressure angle in cams and state its effect with base circle radius	3
8	Discuss the sine acceleration follower motion characteristics.	3
9	Discuss the cycloid gear tooth profile.	3
10	Explain reverted gear trains.	3

PART – B (5x10 = 50 Marks)

11 Explain the two inversions of single slider crank chain which are used for quick return motion in machine tools.

12 The dimensions of the various links of a mechanism, as shown in Fig. 1, are as follows. The crank *AB* rotates uniformly in the clockwise direction at 120 rpm. Draw the velocity diagram for the given configuration of the mechanism and determine the velocity of the slider *E* and angular velocities of the links *BC*, *CD* and *CE*.
AB = 30mm ; *BC* = 80 mm ; *CD* = 45 mm ; and *CE* = 120 mm.

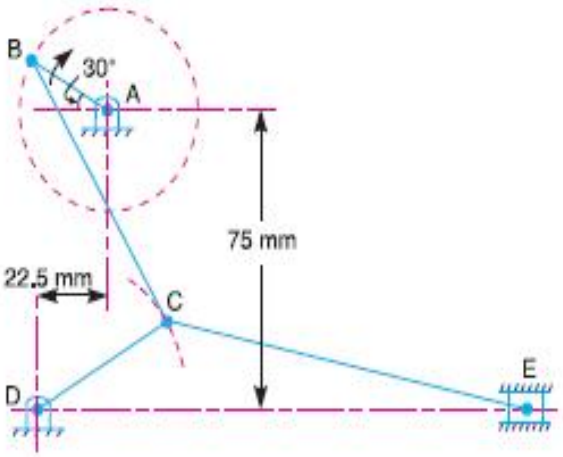

Fig.1

13 a) Derive an expression for the friction torque in conical pivot bearing.

b) An open belt 100 mm wide connects two pulleys mounted on parallel shafts with their centers 2.4 m apart. The diameter of the larger pulley is 450 mm and that of the smaller pulley 300 mm. The coefficient of friction between the belt and the pulley is 0.3 and the maximum stress in the belt is limited to 14 N/mm width. If the larger pulley rotates at 120 rpm., find the maximum power that can be transmitted.

14 Design a cam to raise a valve with simple harmonic motion through 50 mm in 1/3 of a revolution, keep if fully raised through 1/12 revolution and to lower it with harmonic motion in 1/6 revolution. The valve remains closed during the rest of the revolution. The diameter of the roller is 20 mm and the minimum radius of the cam is 25 mm. The diameter of the camshaft is 25 mm. The axis of the valve rod passes through the axis of the camshaft. If the camshaft rotates at uniform speed of 100 rpm. Find the maximum velocity and acceleration of a valve during raising and lowering.

15 a) Derive the formula for the minimum number of teeth on gear wheel in order to have
no interference.

b) A pair of 20^0 involute gears have a module of 6 mm. The number of teeth on pinion and
gear are 24 and 60 respectively. Take addendum factor for both pinion and gear are equal to one. Calculate the number of pairs of teeth in contact and maximum sliding velocity between the teeth.

16 A planetary gear train is illustrated in Fig. 2. The carrier (link 2) serves as the input to the train. The sun (gear 1) is the fixed gear and has 30 teeth. The planet gear (gear 3) has 35 teeth. The ring gear serves as the output from the train and has 100 teeth. Determine the rotational velocity of all members of this gear train when the input shaft rotates at 1200 rpm clockwise.

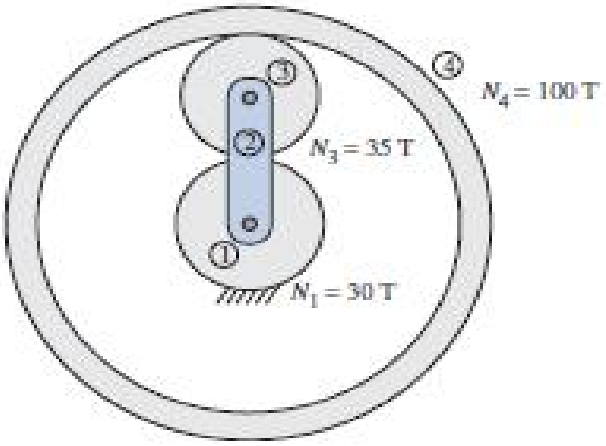

Fig.2

17 Explain any two of the following
a) Coupler curves
b) Band and Block brake
c) Slider crank mechanism velocity analysis using Instantaneous center method.

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Code No. 3112

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) II – Semester (Main) Examination, May 2017

Subject: Principles of Programming Languages

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	Write the significance of programming languages.	2
2	Draw a diagram of Von Neumann architecture.	3
3	what is a named constant? Give an example.	3
4	Differentiate static binding and dynamic binding.	2
5	Write the syntax of “for” statement in python, C and Ada languages.	3
6	What are guarded commands?	2
7	How getter and setter methods are defined in Ruby class?	2
8	Define task and synchronization. What are the two kinds of task and synchronization?	3
9	What is a scripting language? What are its characteristics?	2
10	List the scoping rule used in LISP and scheme.	3

PART – B (5x10 = 50 Marks)

11	Explain about List Processing Language.		10
12	a)	Explain the usage and implementation of union types in Ada.	5
	b)	Explain about short circuit evaluation with an example.	5
13	a)	What are the different parameter passing methods of subprograms? Explain with an example.	5
	b)	Explain how generic subprograms are implemented in C++ and java.	5
14	Explain how exceptions are handled in Ada with example.		10
15	a)	Describe negation problem in prolog.	5
	b)	Discuss the applications of logic programming.	5
16	Explain about ADT representation in Ada and C++ with example.		10
17	a)	Explain briefly about nested subprograms.	5
	b)	Discuss about packages in java.	5

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Code No. 3118

FACULTY OF INFORMATICS

B.E. 2/4 (IT) II – Semester (Main) Examination, May / June 2017

Sub: Data Communications

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 Protocol, Peer process and Network architecture	3
2	Encode the given bit stream 101010101 using NRZ coding scheme.	2
3	What is the advantage of Sliding Window protocol over Stop and Wait protocol?	3
4	What are the advantages of digital transmission over analog transmission?	2
5	Give the ATM Cell Format for UNI (user-network interface) and NNI(network-network Interface)	3
6	What is the advantage of Statistical TDM over Synchronous TDM?	2
7	Compare the data rates for traditional Ethernet, Fast Ethernet and Gigabit Ethernet.	3
8	Write about CSMA/CD.	2
9	Give the frame format of IEEE 802.11.	3
10	List the applications of Wireless LAN.	2

PART – B (5x50 = Marks)

11	a)	Explain about the different layers of TCP / IP model with a diagram.	6
	b)	Write about the different types of transmission impairment.	4
12		Explain Cyclic Redundancy Check error detection method and compute the CRC for given P= 110011 and M=11100011.	10
13	a)	Differentiate between circuit switching and packet switching?	5
	b)	Write about xDSL.	5
14	a)	Write about Layer 2 and Layer 3 switches.	5
	b)	Explain in detail about LAN protocol architecture.	5
15		Explain the IEEE 802.11 Architecture and services.	10

16 a) Explain the HDLC frame structure. 5

b) Explain Bluetooth architecture. 5

17 Write about the following: 10

i) Frequency Modulation

ii) Types of Multiplexing

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