# KADI SARVA VISHWAVIDHYALAYA

## B.E. Semester IV

**Subject Code: - ME-402** **Subject :-Electrical Machines & Electronics**

**Date: 12/05/2014** **Time: 10:30 am to 1:30 pm** **Total Marks: - 70**

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**Instructions:**

1. Answer each section in separate Answer sheet.
2. Use of scientific calculator is permitted.
3. All questions are **compulsory**.
4. Indicate **clearly**, the options you attempt along with its respective Question number.
5. Use the last page of main supplementary of **rough work.**

## Section-I

**Q:1** **Answer the following question.**

**(A)** Explain construction of d.c. machine with neat sketch. **[05]**

**(B)** State application of DC series, Shunt & compound generator. **[05]**

**(C)** Draw & explain O.C.C characteristics of separately excited generator. **[05]**

**OR**

**(C)** Draw & explain Internal & External characteristics of shunt generator. **[05]**

**Q-2** **Answer the following question.**

**(A)** Explain various types of losses occurring in a D.C. Generator. **[05]**

**(B)** An 8 pole dc shunt generator has 778 wave connected armature conductors running at 500 rpm, supplies a load of 12.5Ω resistance at a terminal voltage of 250V.Armature resistance is 0.24 Ω and shunt field resistance is 250Ω. Find out armature current, the induced emf and flux per pole. **[05]**

**OR**

**(A)** Explain the basic principle of d.c. motor. Derive its torque equation. **[05]**

**(B)** A 500 V shunt motor runs at its normal speed of 250 r.p.m. when the armature current is 200 A. The resistance of armature is 0.12 ohm. Calculate the speed when a resistance is inserted in the field reducing the shunt field to 80 % of normal value and the armature current is 100 A. **[05]**

**Q-3** **Answer the following question.**

**(A)** Explain Three point dc shunt motor starter. **[05]**

**(B)** Explain speed control of dc shunt and series motor by armature control and flux control method. **[05]**

**OR**

**(A)** Explain the working principle of a transformer. Draw the construction of Shell type and core type transformer. **[05]**

**(B)** Explain the no-load operation of transformer with phasor diagram. **[05]**

**P.T.O.**

## Section-II

**Q-4** **Answer the following question.**

**(A)** Explain Open circuit and Short circuit test of transformer and their applications. **[05]**

**(B)** Sketch and explain the torque-slip characteristics of a three phase induction motor. **[05]**

**(C)** Derive the emf equation of transformer. **[05]**

**OR**

**(C)** What are the conditions to be fulfilled for parallel operation of two Synchronous machines? **[05]**

**Q-5** **Answer the following question.**

**(A)** What is Rectification? With the help of neat circuit diagram & wave form explain the operation of a centre tapped full wave rectifier. **[05]**

**(B)** Explain the principle and working of Capacitor Start Capacitor Run 1-ph.Induction Motor. What are its applications? **[05]**

**OR**

**(A)** Why Single phase induction motor is not self starting motor? Explain double field revolving theory for the same motor. **[05]**

**(B)** Explain shaded pole induction motor in detail. **[05]**

**Q-6** **Answer the following question.**

**(A)** What is Logic-Gate? Draw the Truth table & symbol for NAND, NOR, OR Gate. **[05]**

**(B)** Explain De-Morgan's theorem. **[05]**

**OR**

**(A)** What is an OP-Amp? State various applications of OP-Amp. **[05]**

**(B)** Explain Half wave rectifier circuits. **[05]**

# KADI SARVA VISHWAVIDHYALAYA

## B.E. Semester IV Examination (Nov-2014)

**Subject Code: ME-402** **Subject:-Electrical Machines & Electronics**

**Date: 03/11/2014** **Time: 10:30 am to 1:30 pm** **Total Marks: - 70**

**Instructions:**

1. Answer each section in separate Answer sheet.
2. Use of scientific calculator is permitted.
3. All questions are **compulsory**.
4. Indicate **clearly**, the options you attempt along with its respective Question number.
5. Use the last page of main supplementary for **rough work.**

## Section-I

**Q:1** **Answer the following question.**

(A) Explain working of elementary DC Generator. **[05]**

(B) State application of DC series, Shunt & compound generator. **[05]**

(C) Draw & explain O.C.C characteristics of separately excited generator. **[05]**

**OR**

(C) Draw & explain Internal & External characteristics of DC series generator. **[05]**

**Q-2** **Answer the following question.**

(A) Explain various types of losses occurring in a DC Generator. **[05]**

(B) Calculate the voltage induced in the armature winding of a 4-pole, wave wound dc machine having 728 conductors and running at 1800 rpm. The flux per pole is 35mWb. **[05]**

**OR**

(A) Explain the basic principle of DC motor. Derive its torque equation. **[05]**

(B) A 230 V DC series motor has an armature resistance of 0.2 Ω and Series field resistance of 0.10 Ω .Determine:(i) The current required to develop a torque of 70Nm at 1200 rpm(iii) percentage reduction in flux when the machine runs at 2000 rpm at half the current. **[05]**

**Q-3** **Answer the following question.**

(A) Explain Three point dc shunt motor starter. **[05]**

(B) Explain speed control of dc shunt and series motor by armature control and flux control method. **[05]**

**OR**

(A) Explain the working principle of a transformer. And compare shell type and core type transformer **[05]**

(B) Explain the no-load operation of transformer with phasor diagram. **[05]**

**P.T.O.**

## Section-II

**Q-4 Answer the following question.**

(A) Explain Open circuit and Short circuit test of transformer and their applications. [05]

(B) Sketch and explain the torque-slip characteristics of a three phase induction motor. [05]

(C) Derive the emf equation of transformer. [05]

**OR**

(C) What are the conditions to be fulfilled for parallel operation of two Synchronous machines? [05]

**Q-5 Answer the following question.**

(A) What is Rectification? With the help of neat circuit diagram & wave form explain the operation of a centre tapped full wave rectifier. [05]

(B) Explain the principle and working of Capacitor Start Capacitor Run 1-ph.Induction Motor. What are its applications? [05]

**OR**

(A) Why Single phase induction motor is not self starting motor? Explain double field revolving theory for the same motor. [05]

(B) Derive EMF equation of AC Generator. [05]

**Q-6 Answer the following question.**

(A) What is Logic-Gate? Draw the Truth table & symbol for NAND, NOR, OR Gate. [05]

(B) Explain De-Morgan's theorem. [05]

**OR**

(A) What is an OP-Amp? State various applications of OP-Amp. [05]

(B) Explain Half wave rectifier circuits. [05]

# KADI SARVA VISHWAVIDHYALAYA

**B.E. Semester IV**

**Subject Code: ME/AE-402** **Subject:-Electrical Machines & Electronics**

**Date: 30/04/2015** **Time: 10:30 am to 1:30 pm** **Total Marks: - 70**

**Instructions:**

1. Answer each section in separate Answer sheet.
2. Use of scientific calculator is permitted.
3. All questions are **compulsory**.
4. Indicate **clearly**, the options you attempt along with its respective Question number.
5. Use the last page of main supplementary of **rough work.**

## Section-I

**Q:1** **Answer the following question.**

(A) Draw and explain the construction of a D.C generator. Mention the material used and functions of : 1) Yoke 2) Poles 3) Armature [05]

(B) Explain characteristic of D.C shunt generator. [05]

(C) Explain various types of losses occurring in a DC Generator. [05]

**OR**

(C) Draw & explain Internal & External characteristics of DC series generator. [05]

**Q-2** **Answer the following question.**

(A) Explain the basic principle of D.C.motor. Derive its torque equation. [05]

(B) Calculate the voltage induced in the armature winding of a 6-pole, wave wound dc machine having 728 conductors and running at 1200 rpm. The flux per pole is 25mWb. [05]

**OR**

(A) Draw the characteristic curves and state two applications for (i) a D.C shunt motor (ii) a D.C series motor. [05]

(B) A D.C motor takes an armature current of 110A at 480 V. The armature circuit resistance is 0.2 ohm. The machine has 6-pole and armature is lap connected with 864 conductors. The flux per pole is 0.05 Wb. Calculate (i) the speed and (ii) the gross torque developed by the armature. [05]

**Q-3** **Answer the following question.**

(A) Why starters are used in D.C. shunt motors? Explain 3 point starter with neat diagram. [05]

(B) Explain briefly how speed control is achieved for DC shunt motors ? [05]

**OR**

(A) Define transformer and derive EMF equation for single phase transformer. [05]

(B) Explain the working of a single phase transformer. [05]

## Section-II

**Q-4** **Answer the following question.**

**(A)** Give classification of induction motor based on principle of operation. **[05]**

**(B)** Sketch and explain the torque-slip characteristics of a three phase induction motor. **[05]**

**(C)** Derive the equation of torque under running condition for three phase induction motor. **[05]**

**OR**

**(C)** Explain the construction of a three phase transformer from the view point of its working principle. **[05]**

**Q-5** **Answer the following question.**

**(A)** Explain various types of losses occurring in induction motor. **[05]**

**(B)** Explain different types of single phase induction motor. **[05]**

**OR**

**(A)** Explain universal motor. **[05]**

**(B)** Derive EMF equation of AC Generator. **[05]**

**Q-6** **Answer the following question.**

**(A)** What is Rectification? With the help of neat circuit diagram & wave form explain Half wave rectifier circuits **[05]**

**(B)** Explain multistage amplifier. **[05]**

**OR**

**(A)** What is Logic-Gate? Draw the Truth table & symbol for NAND, NOR, OR Gate. **[05]**

**(B)** Explain De-Morgan's theorem. **[05]**

**----------All the Best ----------**

# KADI SARVA VISHWAVIDHYALAYA

## B.E. Semester IV

**Subject Code: ME/AU-402** **Subject Name:-Electrical Machines and Electronics**

**Date: 26/10/2015** **Time: 10:30 am to 1:30 pm** **Total Marks:- 70**

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**Instructions:**

1. Answer each section in separate Answer sheet.
2. Use of scientific calculator is permitted.
3. All questions are **compulsory**.
4. Indicate **clearly**, the options you attempt along with its respective Question number.
5. Use the last page of main supplementary of **rough work.**

## Section-I

**Q:1** **(All compulsory)**

(A) Explain internal and external characteristic of DC shunt generator. **[05]**

(B) Explain various types of losses occurring in a D.C. Generator. **[05]**

(C) Explain characteristics of DC compound generator. **[05]**

**OR**

(C) Explain the basic principle of D.C.motor. Derive its torque equation. **[05]**

**Q-2** **Answer the following question.**

(A) Explain briefly how speed control is achieved for DC shunt motors ? **[05]**

(B) Draw a neat sketch of a D.C.machine with label, Describe its different parts their material and functions. **[05]**

**OR**

(A) Draw the characteristic curves and state two applications for (i) a Dc shunt motor (ii) a Dc series motor. **[05]**

(B) A 4-pole machine running at 1400 rpm has an armature with 90 slots having 6 conductors per slot. The flux per pole is $6x10^{-2}$Wb. Determine the induced emf as a dc generator if the coils are lap connected. If the current per conductor is 100 amps, determine the electrical power output of the machine. **[05]**

**Q-3** **Answer the following question.**

(A) Define transformer and derive EMF equation for single phase transformer. **[05]**

(B) Explain briefly the construction and working principle of the single phase transformer. **[05]**

**OR**

(A) Explain the construction of a three phase transformer from the view point of its working principle. **[05]**

(B) A 230 V d.c. series motor has an armature resistance of 0.3 Ω and Series field resistance of 0.15 Ω . Determine: (i) The current required to develop a torque of 70Nm at 1400 rpm(iii) percentage reduction in flux when the machine runs at 2000 rpm at half the current. **[05]**

## Section-II

**Q-4** **(All compulsory)**

(A) Derive the equation of torque under running condition for three phase induction motor. **[05]**

(B) Describe the two types of rotor construction of three phase Induction motor. **[05]**

(C) Explain Open circuit and Short circuit test of transformer and their applications. **[05]**

**OR**

(C) The 3000/200 V, 50 Hz, single phase transformer is built on a core having an effective cross sectional area of 150 $cm^2$ and has 80 turns in the low voltage winding. Calculate (a) the value of the max. flux density in core, (b)the number of turns in the high voltage winding. **[05]**

**Q-5** **Answer the following question.**

(A) Explain the speed torque characteristic of a 3-phase induction motor with necessary diagram. **[05]**

(B) Write a short note on Synchronizing procedure of A.C Generator with system. **[05]**

**OR**

(A) Explain different methods to control speed of three phase induction motor. **[05]**

(B) Give comparison between Rotating &Pulsating magnetic field. **[05]**

**Q-6** **Answer the following question.**

(A) Explain construction and type of A.C. Generator. **[05]**

(B) Explain multistage amplifier. **[05]**

**OR**

(A) Explain different Logic gates with its truth tables. **[05]**

(B) Explain De-Morgan's theorem. **[05]**

**----------All the Best ----------**