Code No.

Symbol Number: _____ Invigilator's Sign: _____ Superintendent's Sign: _____

Symbol No. in Words: _____

**Faculty: Engineering** **Level: Bachelor** **Exam Year:2080, Push** **Year/Part: II/I**

**Program: Electrical and Electronics** **Subject: Electrical Machine(EG506EE)**

**GROUP A (Multiple Choice Questions)** **[10x1=10]**

*i. Answers should be given by filling the Objective Answer Sheet.*
*ii. Rough can be done in the main answer sheet*
*iii. Maximum time of 20 minutes within the total time is given for this group.*

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1. A 0.5mm air gap has a Cross Sectional area of 7cm$^2$.In Order to generate a Total Flux of 50 μWb in the air gap, the mmf required is ,
   a. 28.4AT b. 14.6AT
   c. 14.6 AT d. 73.5AT

2. The Full Load Copper Loss and Iron loss of a Transformer are 6400W and 5000 W Respectively. The Copper loss and Iron loss at half full load will be
   a. 3200 W& 2500 W b. 1600 W &5000 W
   c. 3200 W & 5200 W d. 1600 W&1250 W

***3. A Transformer action requires***
   a. Constant Magnetic Flux b. Increasing Magnetic Flux
   c. Alternating Magnetic Flux d. Alternating Electric Flux

4. In an Electro-Mechanical Energy Conversion device, the developed torque depends upon
   a. Stator Field Strength & Torque angle. b. Stator Field& Rotor Field Strength.
   c. The Stator Field & Rotor field strength and the Torque angle. d. The Stator Field Strength only.

5. The armature resistance of 6 Pole Lap wound dc machine is 0.05Ω, If the armature is Rewound as wave Winding, what is the armature resistance?
   a. 0.45Ω b.0.3Ω
   c. 0.15Ω d. 0.10Ω

6. The direction of rotor current produced in an induction motor can be determined by
   a. Lenz Law b. Induction law
   c. Fleming Right hand Rule d. Flemings left hand rule

7. Stepper Motor are widely used because of
   a. Wide speed range b. Control system applications
   c. Very high speed of Operation d. Very low speed of Operation

8 . In a synchronous motor
   a.The rotor mmf and stator mmf are stationary with respect to each other
   b. Rotor mmf rotates slightly faster in comparison to stator mmf
   c. Stator mmf rotates slightly faster than rotor mmf
   d. None of the above

9. In which of the Following the excitation is required?
   a. Synchronous generator b. Induction generator
   c. Both a & b d. None

10. When the induction motor runs faster than the synchronous speed, the induction motor runs as:
   a. Asynchronous generator b. Induction generator
   c. Synchronous motor d. Such condition is not possible



**Multiple Choice Questions' Answer Sheet**

Code No. _____ Marks Secured: _____

In Words: _____

Examiner's Sign: _____ Date: _____

Scrutinizer's Marks: _____

In Words: _____

Scrutinizer's Sign: _____ Date: _____

Corrected Fill: Ⓐ ● Ⓒ Ⓓ

Incorrected Fill: ~~Ⓐ~~ Ⓑ ● Ⓓ✓

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | Ⓐ | Ⓑ | Ⓒ | Ⓓ | 6. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 2. | Ⓐ | Ⓑ | Ⓒ | Ⓓ | 7. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 3. | Ⓐ | Ⓑ | Ⓒ | Ⓓ | 8. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 4. | Ⓐ | Ⓑ | Ⓒ | Ⓓ | 9. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |
| 5. | Ⓐ | Ⓑ | Ⓒ | Ⓓ | 10. | Ⓐ | Ⓑ | Ⓒ | Ⓓ |

# MANMOHAN TECHNICAL UNIVERSITY
## Office of the Controller of Examinations
Budhiganga-4, Morang, Province 1, Nepal

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|---|---|---|
| **Faculty: Engineering** | **Exam Year:2080 , Push** | **Year/Part: II/I** |
| **Program: Electrical and Electronics** | **Level: Bachelor** | **F.M.: 50** |
| **Subject: Electrical Machine (EG506EE)** | **Time: 3 Hours** | **P.M.: 20** |

- ✓ *Group A contains Multiple Choice Questions of 10 marks.*
- ✓ *Candidates are required to give their answers in their own words as far as practicable.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary*.



**Group B [2*8=16]**

**Attempt Any Eight Questions**

1. A circular ring iron core has a mean length of 20cm and cross-sectional area of 1 $cm^2$. The relative permeability of the iron is 2400. The core is wound with 2000 turns of windings. Calculate magnitude of dc current to be passed through the winding so that a magnetic flux of 0.2 mWb circulates in the core.
2. Prove with Suitable assumptions that copper saving in Auto Transformer is Significant when Transformation Ratio is Nearly Equal to Unity.
3. An 11000/230V, 150 KVA, 50 Hz, 1-phase transformer has a core loss of 1.4 KW and full load Cu loss of 1.6 KW. Determine (a) the KVA load for maximum efficiency and the maximum efficiency (b) the efficiency at half full load and full load at 0.8 p.f. lagging.
4. Explain the open delta Connection of Transformer.
5. Classify Electrical Rotating Machine. State working Principle of Rotating machine.
6. Why dc series generator is not started on no Load?
7. What are the difference between Squirrel Cage Rotor and Phase wound Rotor?
8. Define pitch factor and Distribution factor and their significance in synchronous machine. Derive EMF equation of alternator.
9. State and Explain double Field Revolving theory of single phase induction motor with suitable diagram.

**Group C**

**Attempt any six Questions [6*4=24]**

1. What is hysteresis Curve and Prove that Energy lost per unit Volume in Magnetization is Equal to the area of the Loop.
2. What is meant by Transformer Inrush Current? Discuss the Term **Doubling Effect in Transformer.**
3. A 6 pole wave-wound dc shunt generator has 1200 armature conductors. The useful flux per pole is 0.02wb, the armature resistance is 0.4Ω and the speed is 400 rpm. If the shunt resistance is 220Ω, calculate the maximum current which the generator can deliver to an external load if the terminal voltage is not to fall below 440V.
4. Explain with necessary vector diagram how rotating magnetic field is Produced in 3 Phase induction Motor. Also, explain how this Rotating field helps the motor to rotate.
5. In What manner does a Synchronous Motor adjust itself to an Increasing shaft load.
6. A 200 Watts, 230 v, 50 Hz Capacitor Start Motor has Following windings constants :
   Main windings: R= 4.5Ω ; XL= 3.7Ω
   Starting winding: R= 9.5Ω ; XL= 3.5Ω
   Find the Value of starting capacitance that will Result in Maximum Starting torque?
7. Discuss the Effect of Excitation on armature current of synchronous Motor.

∞∞***All the Best*** ∞∞