

B.ELECTRICAL ENGG(EVENING) 2<sup>nd</sup> YEAR 1<sup>st</sup> SEM EXAMINATION 2017 .....

( 1ST Semester Supplementary)

SUBJECT ELECTRICAL MACHINE--I  
(Name in full)

PAPER .....

Full Marks 30/ 100

(15/50 marks for each part)

Time : ~~Two hours~~/~~Three hours~~/~~Four hours~~/~~Six hours~~

Use a separate Answer-Script for each part  
PART -- I

No. of questions	Answer any three from the following.	Marks
1)	Answer any six statements from the following with proper correction if require.	6x3
a)	Helical coil or continuous disc coil is used in sandwich winding.	
b)	Mitre joint reduces copper cost weight and total cost of transformer.	
C)	Stepped core is recommended for small transformer ..	
d)	Lamination is used to reduce copper loss and voltage regulation .	
e)	Arcing horn protect a transformer from ground fault .	
f)	Buchholz relay operate when short circuit fault occur .	
g)	Explosion vent protect a transformer from lightening .	
h)	Cost of auto- transformer is higher than two winding transformer. .	
i)	Use of capacitive load increases efficiency .	
2)	Explain the operating principle of a single phase transformer . Develop E M F equation of a transformer .	8
a)	An ideal transformer has 200 turns in the primary and 360 turns in the secondary .The primary has excited at 600V.The secondary has a resistive load of 8 Kw .The secondary has also a tapped at 240 turns which supplies pure inductive load of 10 KVA. Find the primary current and power factor .	8
b)		
3)	Develop the equivalent circuit of a single phase transformer ,mention the assumptions taken .And also draw the phasor diagram at lagging pf load.	8
a)		
b)	A 100 KVA 2400/240 V 50 Hz single phase transformer has an exciting current of 0.65A and a core loss of 700 W when high voltage side is energized at rated voltage and frequency give the value of exciting current flow in hv side .	8

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- 4)  
a) Establish the condition for maximum voltage regulation with variation of load power factor .And also draw regulation vs pf characteristics. 8
- b) A 160V/16V 50 Hz single phase trans former draws a short circuit current of 30A at 0.2pf lag when connected to 16V 50Hz source .What will be the short circuit current when it will be connected across a 160V source 8
- 5)a) What is all-day efficiency? Why it is consider as an important parameter for distribution transformer? 8
- b) A transformer has its maximum efficiency of 0.98 at 20 KVA with unity power factor . During day it is loaded as follows. 8
- 12 hour : 2 Kw at a power factor of 0.6
- 6 hours :10 Kw at a power factor of 0.8
- 6 hours : 20Kw at a power factor of 0.9
- Calculate the ALL-DAY efficiency of the transformer .

SUBJECT: ELECTRICAL MACHINES - I

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Time: Three Hours

Full Marks: 100 (50 each part)

Use a separate Answer-Script for each part.

Question No.	PART - II	Marks
	<b>Answer Question No.1 and any two from the rest.</b>	
1.		
i)	Lap connected D.C. machines require equalizer connection-Justify.	6x3
ii)	Due to armature reaction the magnetic neutral axis shifted in the direction of rotation for a D.C. motor-Justify.	
iii)	D.C. series motor should not be operated under no-load condition-Justify.	
iv)	For high current and low voltage D.C. machines, lap connection is preferred-Explain.	
v)	D.C. shunt generator has poor voltage regulation than the separately excited D.C. generator-Explain.	
vi)	Swinburnes method of testing of D.C. machines can not be performed on D.C. series motor-Explain.	
2.		
(i)	What are the effects of armature reaction in D.C. machines and what are the methods of reducing the effects of armature reaction ?	8
(ii)	Explain the linear commutation in D.C. machines and what are the roles of interpole for achieving it?	8
3.		
(i)	Derive the expression of torque in D.C. motor.	8
(ii)	A 250 V shunt motor on no—load runs at 1000 rpm and takes 5 A. The total armature and shunt field resistances are respectively 0.2 ohm and 250 ohms. Calculate the speed when loaded and taking a current of 50 A, if armature reaction weakens the field by 3%.	8

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- (i) Derive the torque-current characteristics of a D.C. series motor. Why D.C. series motor is preferred in traction drive? 8
- (ii) A shunt machine, connected to 250 V mains has an armature resistance of 0.12 ohm and resistance of the field is 100 ohms. Find the ratio of the speed as generator to the speed as a motor, the line current in each case being 80 A. 8
5. Write short notes on any two of the following: 8X2
- (i) Parallel operation of D.C. shunt generators.
- (ii) Hopkinsons method of testing of D.C. machines.
- (iii) Speed control of D.C. motors.