Bachelor of Electrical Engineering 2nd Year 2nd Semester Examination, 2017(OLD)
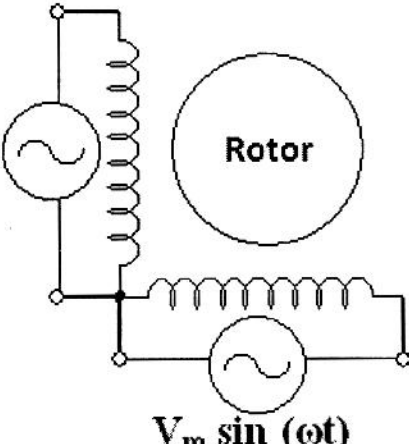
SUBJECT: ELECTRICAL MACHINES - I

Time: Three Hours

Full Marks: 100 (50 each part)

Use a separate Answer-Script for each part.

Question No.	PART - I	Marks
	Answer question no. 6 and any two from the rest.	
1.	Justify the following (any five) :	**5x4**
i)	O.C.C or no-load characteristics cannot be obtained for series connected DC generator.	
ii)	A wound rotor induction motor (WRIM) may fail to start if it does not have the same number poles in the rotor as in the stator.	
iii)	Commutator acts as an inverter in a DC motor.	
iv)	Induction motor can be called an asynchronous machine.	
v)	A DC series motor may run in equivalent AC supply as well.	
vi)	All practical rotating machine takes a power even at no-load.	
2. i)	As shown in the figure alongside, the stator of a rotating machine is wound with two phase AC armature winding and is excited by a balanced two phase supply. Show that there will be a rotating magnetic field in the air gap.	**9 + 6**

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Time: Three Hours   Full Marks: 100 (50 each part)
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Question No.	PART - I	Marks
ii)	A 4-pole machine has 60 slots and 8 conductors per slot. The total flux per pole is 20 mWb. For relative speed of 1500 r.p.m. between field flux and armature winding, calculate the generated armature voltage if the machine is a DC machine with wave connected winding.	
3. i)	A shunt generator, when driven at its nominal speed, fails to build up voltage. Discuss briefly the most likely reasons for this, and state how you would proceed to remedy the fault.	8 + 7
ii)	The armature of a 2-pole, 200V DC generator has 400 conductors and runs at 300 r.p.m. Calculate the useful flux per pole. If the number of turns in each field coil is 1200, what is the average value of the e.m.f. induced in each coil on breaking the field if the flux dies away completely in 0.1 sec?	
4. i)	Why the rotor of a three phase induction motor always rotates in the direction of the rotating magnetic field and at a sub-synchronous speed?	4 + 6 +5
ii)	Derive the equivalent circuit of a three phase induction motor.	
iii)	Derive an expression of electromagnetic torque in three phase induction motor.	
5.	Write short notes on :	8+7
i)	e.m.f induced in a three phase alternator	
ii)	Rotor construction of three phase induction motors	

Bachelor of Engineering in Electrical Engg. Examination, 2017(old)
2ⁿᵈ Year 2ⁿᵈ Semester Examination, 2017(old)

SUBJECT: - ELECTRICAL MACHINES-I

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

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART II	Marks
	Answer Question no. 6 and any two Questions from the rest	
	Two marks reserved for brief and to the point answer	
Q6.	Write short notes on (any four):	4X4
	a) Conservator.	
	b) Arching horn.	
	c) Breather.	
	d) Temperature indicator.	
	e) Cruciform core construction.	
Q7.	a) Develop equivalent circuit of a single phase transformer. State the assumptions clearly.	8
	b) How the equivalent circuit parameters are determined in the laboratory.	8
Q8.	a) Derive the expression for maximum efficiency of a transformer .	8
	b) In a 30 kVA , 1100 V/ 230 V , two winding transformer, the rated iron loss and copper loss are 400 W and 450 W respectively. Calculate:	8
	i) Max. efficiency of the transformer.	

Ref No: EX/EE/T/222/2017(old)

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Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART II	Marks
Q9.	a) Derive an expression for voltage regulation of a transformer?	8
	b) A 5kVA ,230V/ 115V , 50 Hz, single phase transformer gave the following test results: Open circui test: 115V, 1.2 A, 50W Short circuit test : 10.2V ,21A, 80W Find the equivalent circuit parameters referred to H.V. side and calculate voltage regulation of the transformer at full load, 0.8 p.f. (lagging)	8
Q10.	Write short notes (any two) a) No-load current of a transformer b) Parallel operation of single phase transformer. c) Auto transformer	8X2