G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY (AT), KURNOOL
B.Tech – II-II Semester (R15) MID II Examinations (Descriptive)
Branch: EEE

SET 1

GPCET
Pioneering Innovative Education

Sub: EM-II   **Date:** 10-05-2017
Time: 1½ Hrs.   **Max Marks: 30M**

Question 1 is compulsory. Answer one from 2 or 3, one from 4 or 5.

	Question	Marks	Unit	CO	Cognitive level
1.a	Define slip?	2M	3	C214.3	Remember
1.b	List out advantages of slip ring induction motor over the squirrel cage induction motor.	2M	3	C214.3	Remember
1.c	Explain the effect of change of the supply voltage on speed and torque.	2M	4	C214.4	understand
1.d	Define induction generator.	2M	4	C214.4	Remember
1.e	List out different methods of starting of squirrel cage induction motor.	2M	5	C214.6	Remember
2	Analyze the principle of production of rotating magnetic field in a 3-phase induction motor?	10M	3	C214.3	Analyze
3	A 50KW, 6-pole, 50Hz,450V,3-phase slip ring induction motor furnished the following test figures: No-load: 450V, 20A, P.f =0.15, S.C Test:200V, 150A, P.f=0.3. The ratio of stator to rotor cu losses on short circuit was 5:4, Draw the circle diagram and determine for it (a) the full load current and power factor (b) the maximum torque and the maximum power input, (c) slip at full load (d) efficiency at full load	10M	4	C214.4	Apply
4	A 3-phase, squirrel cage induction motor has a short circuit current equal to 5 times the full load current. Find the starting torque as a % of full load torque if the motor is started by (a) Direct switching of supply (b) a star delta starter (c) an auto transformer.	10M	5	C214.6	Apply
5.a	Derive the torque-slip equation for a 3-phase induction motor and also the equation for the slip at which maximum torque occurs?	5M	4	C214.4	Analyze
5.b	Explain detail about the double cage induction motor?	5M	5	C214.6	understand

Signature of the Faulty   Signature of the HOD

SET 2

Sub: EM-II
Time: 1½ Hrs.

Date: 10-05-2017
Max Marks: 30M

Question 1 is compulsory. Answer one from 2 or 3, one from 4 or 5.

	Question	Marks	Unit	CO	Cognitive level
1.a	Why the rotor of the induction motor is rotates in the same direction of stator field?	2M	3	C214.3	Remember
1.b	List out the advantages of the induction generator and its limitations.	2M	3	C214.4	Remember
1.c	Explain the effect of change of the supply frequency on speed and torque.	2M	4	C214.4	understand
1.d	List out different methods of speed control of induction motor.	2M	4	C214.6	Remember
1.e	Identify the main disadvantages of rotor rheostat control?	2M	5	C214.6	understand
2	A 400V, 50 Hz, 3-phase, star connected induction motor has a full load speed of 1425 rpm. The rotor has an impedance of 0.4+j4 ohms and rotor/stator turns ratio of 0.8. Calculate (a) full load torque (b) Rotor current and full rotor copper loss (c) power output if windage and friction losses amount to 500w (d) Max torque and the speed at which it occurs. (e) Starting current (f) starting torque.	10M	3	C214.3	Apply
3	An 8-pole, 400v, 50Hz, delta connected, 3-phase induction motor has stator to rotor turns ratio 2:1. The stator impedance per phase is 0.13+j0.6 ohms and rotor circuit standstill impedance per phase is 0.035+j0.15 ohms. Find the maximum power developed and the slip at which it occurs and the starting torque.	10M	4	C214.4	Apply
4	Discuss briefly the various methods of speed control of a 3-phase induction motor.	10M	5	C214.6	Understand
5.a	Explain the torque-slip characteristics of 3-phase Induction motor.	5M	4	C214.6	Understand
5.b	Differentiate between squirrel cage and slip ring induction motor.	5M	3	C214.3	Analyze

Signature of the Faulty   Signature of the HOD

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY (AT), KURNOOL
B.Tech – II-II Semester (R15) MID II Examinations (Descriptive)
Branch: EEE

SET 3

Sub: EM-II
Time: 1½ Hrs.

Date: 10-05-2017
Max Marks: 30M

Question 1 is compulsory. Answer one from 2 or 3, one from 4 or 5.

	Question	Marks	Unit	CO	Cognitive level
1.a	Why the rotor slots of a 3-phase induction motor are skewed?	2M	3	C214.3	Remember
1.b	Give the reason why the no load current of an induction motor is much higher than that of an equivalent transformer.	2M	3	C214.3	Remember
1.c	State the effect of rotor resistance on starting torque and power factor.	2M	4	C214.4	Remember
1.d	What is mean crawling of induction motor?	2M	4	C214.4	Understand
1.e	What is the function of rotary converter? Where it is used.	2M	5	C214.6	Understand
2	From power stage diagram, deduce a relationship between rotor power input, Rotor cu loss and mechanical power developed in case of induction motor.	10M	3	C214.3	Analyze
3	A 415V, 29.8KW,50Hz, delta connected motor gave the following test data: No-load: 415V, 21A, 1250W Locked-rotor test: 100V, 45A, 2730W Construct the circle diagram and determine (a) The line current and power factor for rated output (b) The maximum torque. (c) Slip (d) efficiency. Assume stator and rotor cu losses equal at standstill.	10M	4	C214.4	Apply
4	The rotor of a 4-pole, 50Hz, slip ring induction motor has a resistance of 0.30 ohms/phase and runs at 1440 rpm at full load. Calculate the external resistance per phase which must be added to lower the speed to 1320 rpm. The torque being same as before.	10M	5	C214.6	Apply
5.a	Explain the principle operation of induction motor? And obtain the rotor current frequency $f^1 = Sf$	5M	3	C214.3	understand
5.b	Explain about speed control of induction motor by pole Changing.	5M	5	C214.6	understand

Signature of the Faulty   Signature of the HOD

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY (AT), KURNOOL
B.Tech – II-II Semester (R15) MID II Examinations (Descriptive)
Branch: EEE

SET 4

GPCET
Pioneering Innovative Education

Sub: EM-II   Date: 10-05-2017
Time: 1½ Hrs.   Max Marks: 30M

Question 1 is compulsory. Answer one from 2 or 3, one from 4 or 5.

	Question	Marks	Unit	CO	Cognitive level
1.a	Why an induction motor will never run at its synchronous speed?	2M	3	C214.3	Understand
1.b	Define- Asynchronous torque.	2M	3	C214.4	Remember
1.c	Define cogging?	2M	4	C214.4	Remember
1.d	How is speed control achieved by changing the number of stator poles?	2M	4	C214.6	Apply
1.e	What are the advantages of Kramer system of speed control?	2M	5	C214.6	Understand
2	A 3-phase, 4-pole, 415V,50Hz, delta connected induction motor running at a slip of 4%. The stator winding id delta connected with 240 conductors per phase and the rotor winding is star connected with 48 conductors per phase. The per phase rotor winding resistance is 0.03 ohms and a leakage reactance of 0.048 ohms at standstill. Calculate the following. a) The per phase rotor emf at standstill with the rotor open circuit. (b) The rotor emf and current at 4% slip.(c) The per phase difference between rotor emf and rotor current.	10M	3	C214.3	Apply
3	Enumerate the steps involve to construct the circle diagram.	10M	4	C214.4	Apply
4	Enumerate the deep bar and double cage rotors?	10M	5	C214.6	Understand
5.a	A 746 kw,3-phase, 50Hz, 16-pole induction motor has a rotor impedance of 0.02+j 0.15 at standstill. Full load torque is obtained at 360 rpm. Calculate (a) the speed at which maximum torque occurs.(b) the ratio of maximum to full load torque.	5M	4	C214.4	Apply
5.b	Explain the auto transformer starter for 3-phase squirrel cage induction motor with neat sketch and obtain the expression for starting current and torque.	5M	5	C214.6	Analyze

Signature of the Faulty   Signature of the HOD