Total No. of Printed Pages:02

SUBJECT CODE NO:- P-20
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(EEP/EEE/EE) Examination May/June 2017
Electrical Drives
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q. No.1 from section A and Q.No.6 from section B are compulsory.
ii) Attempt any two questions from Q.No.2 to Q.No.5 and any two questions from Q.No.7 to Q.No.10.
iii) Assume suitable data whenever necessary.

Section A

Q.1 Attempt any FIVE:- 10
a) What is meant by electric drives?
b) What is meant by "load equalization"
c) State essential parts of electric drives.
d) What are the choices of electrical drives?
e) What is meant by regenerative braking?
f) What is called continuous and discontinuous conduction?
g) Give some applications of DC drives.

Q.2 a) Derive the expression to find the equivalent load torque and equivalent inertia of loads in translational and rotational motion. 08
b) Prove that torque developed by the motor is given by. 07
$T=T_l+j\frac{d_{wm}}{d_f}+W_m\frac{d_j}{d_t}$

Q.3 a) Describe relative merits and demerits of four quadrant D.C. drives employing Non-circulating and circulating current dual convertors. 08
b) Describe how the speed of a dc series motor can be controlled by means of a dc chopper. 07

Q.4 a) A fully controlled rectifier is feeding a separately excited motor driving a friction load. Motor is operating in steady state with a rectifier firing angle of 30^0, Firing angle is now changed from 30^0 to 60^0. Explain how the motor current and speed will change with time. Draw relevant waveform. 08
b) Explain current limit control in detail with bock diagram. 07

Q.5 Write short notes on the following:- 15
a) Phase locked loop control.
b) Constant torque and constant power control.
c) Chopper fed DC drives.

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Section B

Q.6 Answer any FIVE:- 10

a) What are the advantages of squirrel cage induction motor over dc motor.
b) What is meant by soft start?
c) What do you meant by self-control mode in synchronous motor?
d) Mention the special features of BLDC motors.
e) What is meant by V/F control?
f) What do you meant by self-control mode in synchronous motor?

Q.7 a) 3 Kw, 400 V, 50 Hz, 4 pole 1370 rpm, delta connected squirrel cage induction motor has the following parameters referred to stator. 08

R_s= 2Ω, X_s=X'_r=5Ω, R'_r=5Ω, X_m=90 Ω

Motor speed is controlled by stator voltage control. When driving a fan load it runs of rated speed at rated voltage, calculate.

1. Motor terminal voltage, current and torque of 1200 rpm.

b) Explain the operation of brushless d.c. motor drive and its applications. 07

Q.8 a) Explain the operation of current source invertors fed induction motor drive. 07

b) Explain in detail, why the load commutated invertor fed synchronous motor drive is found suitable for high power applications. 08

Q.9 a) In a stator frequency control of a 3-phase induction motor, explain why. 08

i. Ratio V/F is maintained constant for speed below base speed.
ii. Terminal voltage s maintained constant for speeds above base speeds.

c) Explain in detail with relevant circuit diagram why cycloconvertors control is suitable only for low speed drives? 07

Q.10 Write short notes on the following:- 15

a) Advantages of BLDC over conventional DC motor.
b) Synchronous motor drive.
c) Applications and advantages of AC drives.

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