



SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore - 641 107

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME : 19EE504 SPECIAL ELECTRICAL MACHINES

III YEAR / Vth SEMESTER EEE

Unit 1 - PMBLDC

By

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TORQUE EQUATION OF BLPM SQUARE WAVE MOTOR

Power input = $V I$

$$= [2 e_{ph} + 2 I R_{ph} + 2 V_{dd}] I \quad \dots\dots\dots(4.22)$$

$$V I = [2 e_{ph} + 2 I R_{ph} + 2 V_{dd}] I \quad \dots\dots\dots(4.23)$$

$V I$ = electrical power input

$2 e_{ph} I$ = power converted as mechanical

$2 I^2 R_{ph}$ = power loss in the armature winding

$2 V_{dd} I$ = power loss in the device

$$\text{Mechanical power developed} = 2 e_{ph} I \dots\dots\dots(4.24)$$

$$e_{ph} = 2(2BgrlTph\omega m)I$$

$$e_{ph} = 4BgrlTph\omega m \dots\dots\dots(4.25)$$

$$\text{Mechanical power} = (2\pi N/60)T \dots\dots\dots(4.26)$$

$$= \omega m T \dots\dots\dots(4.27)$$

Where N=Speed in rpm

T=Torque in N-m

ωm =Speed in rad/sec

$$\text{Therefore } T = 4BgrlTphI \dots\dots\dots(4.28)$$

$$= K_t I \dots\dots\dots(4.29)$$
