



FINAL EXAMINATION / PEPERIKSAAN AKHIR
SEMESTER 2 – SESSION 2016 / 2017
PROGRAM KERJASAMA

COURSE CODE : DDPK 2133
KOD KURSUS

COURSE NAME : ELECTRICAL MACHINES AND DRIVES /
NAMA KURSUS MESIN ELEKTRIK DAN PEMACU

YEAR / PROGRAMME : 2 DDPB
TAHUN / PROGRAM

DURATION : 2 HOURS 30 MINUTES / 2 JAM 30 MINIT
TEMPOH

DATE : MARCH / APRIL 2017
TARIKH

INSTRUCTION/ARAHAN :

1. Answer **ALL** questions in the answer booklet(s) provided.
Jawab SEMUA soalan di dalam buku jawapan yang disediakan.

(You are required to write your name and your lecturer's name on your answer script)
(*Pelajar dikehendaki tuliskan nama dan nama pensyarah pada skrip jawapan*)

NAME / NAMA	:
I.C NO. / NO. K/PENGENALAN	:
YEAR / COURSE TAHUN / KURSUS	:
COLLEGE'S NAME NAMA KOLEJ	:
LECTURER'S NAME NAMA PENSYARAH	:

This examination paper consists of ...6... pages including the cover
Kertas soalan ini mengandungi6..... muka surat termasuk kulit hadapan

Q1. (a) State the basic properties of the following semiconductor :-

- (i) diode.
- (ii) thyristor.

Nyatakan ciri-ciri asas bagi separa pengalir berikut :-

- (i) diod.*
- (ii) tiristor.*

(7.5 marks / markah)

(b) A single-phase one-pulse converter with RL load has the following data:

Supply voltage = 230 V at 50 Hz, $R = 2 \Omega$, $L = 1 \text{ mH}$, $E = 120 \text{ V}$, extinction angle $\beta = 220^\circ$, firing angle $\alpha = 25^\circ$.

- (i) Calculate the voltage across thyristor at the instant SCR is triggered.
- (ii) Find the voltage that appears across SCR when current decays to zero.
- (iii) Find the peak inverse voltage for the SCR.

Satu penukartertib satu fasa satu denyut dengan beban RL mempunyai data berikut:

Voltan bekalan = 230 V pada 50 Hz, $R = 2 \Omega$, $L = 1 \text{ mH}$, $E = 120 \text{ V}$, sudut pelupusan $\beta = 220^\circ$, sudut tembak $\alpha = 25^\circ$.

- (i) Kirakan voltan merintang tiristor pada ketika SCR dipacu.*
- (ii) Tentukan voltan yang merintang tiristor apabila arus memulau ke sifar.*

thyristor and a resistor are connected in series across an ac source. A number of positive pulses E_g is applied to the gate of sufficient amplitude to initiate conduction provided the anode is positive as in Figure Q1(c). Explain the thyristor behaviour for 0° to 90° .

thyristor dan perintang disambungkan sesiri melintang suatu bekalan a.c. Apabila bilangan denyut ringkas positif E_g dikenakan kepada get dengan amplitud yang mencukupi untuk memulakan pengaliran dengan syarat anod adalah positif seperti Rajah Q1(c). Terangkan kelakuan tiristor bagi 0° hingga 90° .

(c) A thyristor and a resistor are connected in series across an ac source. A number of positive pulses E_g is applied to the gate of sufficient amplitude to initiate conduction provided the anode is positive as in Figure Q1(c). Explain the thyristor behaviour for 0° to 90° .

Satu thyristor dan perintang disambungkan sesiri melintang suatu bekalan a.c. Apabila bilangan denyut ringkas positif E_g dikenakan kepada get dengan amplitud yang mencukupi untuk memulakan pengaliran dengan syarat anod adalah positif seperti Rajah Q1(c). Terangkan kelakuan tiristor bagi 0° hingga 90° .

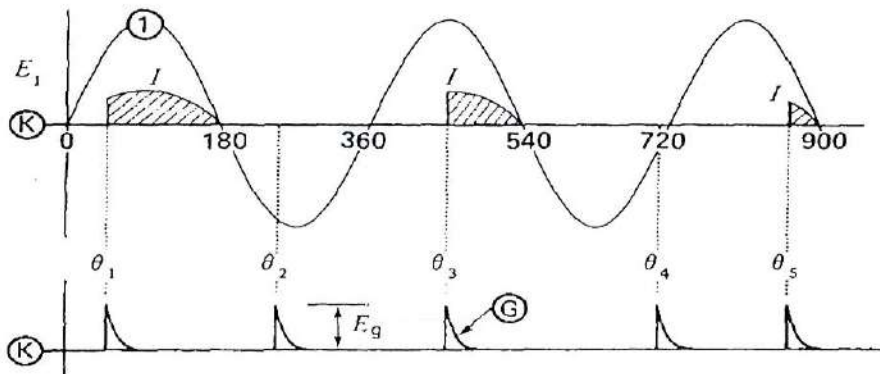
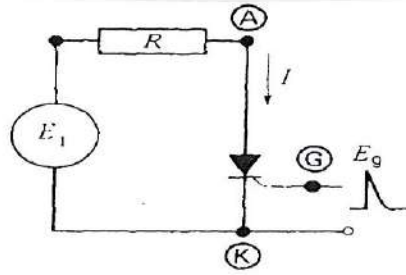


Figure Q1(c) / Rajah Q1(c)

(10 marks / markah)

- Q2. (a) With the aid of a diagram, describe the basic principles of operation for a single-phase bridge rectifier and three-phase bridge rectifier.

Dengan bantuan gambar rajah, terangkan prinsip asas kendalian tetimbang penerus satu-fasa dan tetimbang penerus tiga-fasa.

(10 marks / markah)

- (b) In describing industrial drives, the various operating modes can be best shown in graphical form. The positive and negative speeds are plotted on a horizontal axis, and the positive and negative torque on a vertical axis. This gives rise to four operating quadrants, labelled respectively quadrants 1, 2, 3 and 4. Describe the four distinct operating quadrants.

Dalam menerangkan pemacu industri, beberapa mod pengoperasian dapat dijelaskan dalam bentuk bergraf. Kelajuan positif dan negatif diplot pada paksi mendatar dan daya kilas positif dan negatif pada paksi menegak. Ini memberikan gambaran kepada empat sukuan kendalian, dilabelkan masing-masing sukuan 1, 2, 3 dan 4. Terangkan empat sukuan kendalian berkenaan.

(15 marks / markah)

- Q3. (a) High speed reliable and inexpensive semiconductor devices have produced a dramatic change in the control of dc motor. With this conditions, list the steps to be taken when field reversal and armature reversal are employed.

Peranti separa pengalir telah menggantikan ketidajuannya dengan nilai...

