SULIT

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENGAJIAN TINGGI

JABATAN KEJURUTERAAN AWAM

PENILAIAN ALTERNATIF BERIKUTAN
PELAKSANAAN PERINTAH KAWALAN BERSYARAT

SESI JUN 2020

DCB30082 : ELECTRICAL MACHINES & TELECOMMUNICATION SYSTEM

NAMA PENYELARAS KURSUS : JAMILAH BINTI HJ ABBAS

KAEDAH PENILAIAN	**: PEPERIKSAAN ONLINE**
JENIS PENILAIAN	**: SOALAN ESEI BERSTRUKTUR (2 SOALAN)**
TARIKH PENILAIAN	**: 4 FEBRUARI 2021**
TEMPOH PENILAIAN	**: (1 JAM)**

LARANGAN TERHADAP PLAGIARISM (AKTA 174)
PELAJAR TIDAK BOLEH MEMPLAGIAT APA-APA IDEA, PENULISAN, DATA ATAU CIPTAAN ORANG LAIN. PLAGIAT ADALAH SALAH SATU PENYELEWENGAN AKADEMIK. SEKIRANYA PELAJAR DIBUKTIKAN MELAKUKAN PLAGIARISM, PENILAIAN BAGI KURSUS BERKENAAN AKAN DIMANSUHKAN DAN DIBERI GRED F DENGAN NILAI MATA 0.
(RUJUK BUKU ARAHAN-ARAHAN PEPERIKSAAN DAN KAEDAH PENILAIAN (Diploma) EDISI 6, JUN 2019, KLAUSA 17.3)

INSTRUCTION:

This section consists of **TWO (2)** essay structured questions. Answer **ALL** question.

ARAHAN :

*Bahagian ini mengandungi **DUA (2)** soalan esei berstruktur. Jawab **SEMUA** soalan.*

QUESTION 1

SOALAN 1

CLO1
C4

a) Differentiate **THREE (3)** constructions between slip ring induction motor and a squirrel cage induction motor

*Bezakan **TIGA (3)** pembinaan antara motor induksi jenis gelinciran pemutar dengan motor induksi sangkar tupai*

[12 marks]

[*12 markah*]

CLO2
C3

b) An 8 poles induction motor is running by 50 Hz supply and supplies the emf in the rotor at 1.5 hz frequency. Calculate slip and speed of the motor [13 marks]

Motor induksi 8 kutub berpusing frekuensi 50Hz dan dan membekalkan daya gerak elektrik di rotor pada frekuensi 1.5hz. Kirakan slip dan kelajuan motor.

[*13 markah*]

QUESTION 2

SOALAN 2

CLO1
C3

a) Dato Azwan has built a bungalow. Choose the electricity tariff rate imposed on the building.

[5 marks]

Dato Azwan telah membina sebuah banglo. Pilih kadar tarif elektrik yang dikenakan terhadap bangunan tersebut.

[*5 markah*]

CLO2
C3

b) A shunt motor runs at 600 rpm takes 80A at 250V. The armature and shunt field resistances are 0.1 Ω and 50 Ω respectively. Iron and frictional losses amount to 2188W . Calculate:
Sebuah motor medan pirau bergerak pada 600 psm mengambil bekalan arus 80A pada 250V . Sekiranya rintangan angker 0.1 Ω dan medan pirau adalah 220 Ω. Kehilangan besi dan geseran ialah 2188W. Kirakan :

i. Armature torque [12 marks]
Kilas angker [*12 markah*]

ii. Total copper losses [4 marks]
Jumlah kehilangan kuprum [*4 markah*]

iii. Efficiency [4 marks]
Kecekapan [*4 markah*]

SOALAN TAMAT

FORMULA

DC generator

$$E_g = \frac{\phi ZN}{60} \times \frac{P}{A}$$

$$\eta = \frac{VI_L}{VI_L + losses} \times 100\%$$

Shunt wound generator

$$I_{sh} = \frac{V}{R_{sh}}$$

$$I_a = I_L + I_{sh}$$

$$V_T = E_g - I_a R_a$$

$$P_a = E_g I_a$$

$$P_L = VI_L$$

Pc = Ia² Ra + V.Ish

Series wound generator

$$I_a = I_L = I_{se} = I$$

$$V_T = E_g - I(R_a + R_{se})$$

Short shunt compound generator

$$I_{se} = I_L$$

$$I_a = I_L + I_{sh}$$

$$I_{sh} = \frac{V + I_{se}R_{se}}{R_{sh}}$$

$$V_T = E_g - I_{se}R_{se} - I_a R_a$$

Long shunt compound generator

$$I_{se} = I_a = I_L + I_{sh}$$

$$I_{sh} = \frac{V}{R_{sh}}$$

$$V_T = E_g - I_a(R_a + R_{se})$$

Losses

Pc = Ia² Ra + V.Ish (shunt)

Pc = Ia² Ra + Ise²Rse + V.Ish (compound)

Total losses = P in- P out

DC motor

$$E_b = \frac{P\phi NZ}{60A}$$

$$T_a = 0.159\phi ZP \times \frac{I_a}{A}$$

$$T_a = 9.55 \times \frac{E_b I_a}{N}$$

$$F = BLI$$

$$\eta = \frac{VI_L - losses}{VI_L} \times 100\%$$

Shunt wound motor

$$E_b = V - I_a R_a$$

$$I_L = I_a + I_{sh}$$

$$I_{sh} = \frac{V}{R_{sh}}$$

N1/N2 = Eb1/Eb2

Series wound motor

$$I_a = I_L = I_{se} = I$$

$$E_b = V - I(R_a + R_{se})$$

N1/N2 = Eb1/Eb2 (Φ1/Φ2)

Short shunt compound motor

$$I_{se} = I_L$$

$$I_L = I_a + I_{sh}$$

$$I_{sh} = \frac{E_b}{R_{sh}}$$

$$E_b = V - I_{se}R_{se} - I_a R_a$$

Long shunt compound motor

$$I_{se} = I_a$$

$$I_{sh} = \frac{V}{R_{sh}}$$

$$I_L = I_a + I_{sh}$$

$$E_b = V - I_a(R_a + R_{se})$$

AC generator

$$f = \frac{NP}{120}$$

$$K_d = \frac{\sin\left(\frac{m\beta}{2}\right)}{m\sin\left(\frac{\beta}{2}\right)}$$

$$K_p = \cos\left(\frac{\alpha}{2}\right)$$

$$E_{ph} = 2.22K_p K_d Zf\phi$$

$$E_{line} = \sqrt{3}E_{ph}$$

$$E_{line} = E_{ph}$$

AC motor

$$N_s = \frac{120f}{P}$$

$$s = \frac{N_s - N_r}{N_s} \times 100\%$$

$$N_r = N_s(1-s)$$

$$f_r = sf$$

Transformer

$$\frac{E_1}{E_2} = \frac{N_1}{N_2} = \frac{I_2}{I_1}$$

$$E = 4.44\,fN\phi_m$$

$$\eta_{FL} = \frac{(VA \times p.f)}{(VA \times p.f) + \text{IL} + \text{CL}} \times 100\%$$

$$\eta_{½FL} = \frac{\left(\frac{1}{2}VA \times p.f\right)}{\left(\frac{1}{2}VA \times p.f\right) + \text{IL} + \left(\frac{1}{2}\right)^2 \text{CL}} \times 100\%$$