

SUBJECT CODE NO:- P-7
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination May/June 2017
Special Purpose Electrical Machines
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Q.No.1 & Q.No.6 are compulsory.
 - ii) Attempt any two questions from each section from remaining. (Total Six questions.)

Section A

- Q.1 Attempt any five from following. 10
- a) What is an induction Regulator?
 - b) How the CTs are rated?
 - c) How the transformers are rated?
 - d) Draw Torque –slip characteristics of Induction Machine.
 - e) Write applications of Induction Generator?
 - f) Write composition of shaft position sensing unit.
 - g) Why induction generator is called as asynchronous generator.
 - h) What is maximum Rating of FHP motor?
- Q.2 a) Describe a scheme of Turbine & induction generator which enable maximum amount of energy to 6 e 08
extracted from wind all times. Draw sketches.
- b) With neat diagram, explain the principle of operation of induction generator. 07
- Q.3 a) Explain the working of Doubly fed induction machine with neat diagram. 08
- b) With neat sketches, explain the construction & working of BLDCM. 07
- Q.4 a) With neat sketch, explain constructional features of an axial air gap synchronous reluctance motor. 08
- b) Draw & explain the basic configuration & working of stepper motor. 07
- Q.5 a) List out various methods of Voltage control for an induction generator & explain any one with neat 08
diagram.
- b) Write various applications of an Isolating transformer, and explain any one specific application with its 07
equivalent circuit.

Section B

- Q.6 Attempt any Five from following. 10
- i. Write applications of resistance oven.
 - ii. Write classification of welding processes.
 - iii. State the second Law of Electrolysis.
 - iv. Define BUCK & BOOST.
 - v. What is most common use of Rectifier Transformer?
 - vi. Define Heat convection & Heat conduction.
 - vii. Write in full form, any two modern welding Techniques.
 - viii. Define SPOT WELDING process.
- Q.7 a) Write in brief about MIG welding equipment, with sketch. 08
- b) Explain with sketches, how the building is Heated? 07

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- Q.8 a) Explain in Details TIG welding process, with sketches. 08
b) Explain with diagram, working of core type Induction furnace. 07
- Q.9 a) With neat diagram, compare direct Arc & indirect Arc furnaces. 08
b) Write short note, with neat diagram on Resistance oven & its application. 07
- Q.10 a) Describe with suitable diagram the process of Electrode position. 08
b) With neat sketches, explain the process of extraction & refining of metals. 07

SUBJECT CODE NO:- P-32
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination May/June 2017
Electromagnetic Fields
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i)Q.No.1 and Q.No.6 are compulsory.
 - ii)Attempt any two other questions from the remaining questions of each section.
 - iii)Assume suitable data wherever necessary.

Section A

- Q.1 Attempt any five 10
- i)What do you mean by scalar and vector field.
 - ii) $\vec{A} = 4ax + 6ay$
 $\vec{B} = 2ax + 3ay - 2az$
Find $\vec{A} \times \vec{B}$
 - iii) Give the expression for differential vector length in Cartesian, cylindrical and spherical co-ordinate system.
 - iv) A charge of $7 \mu\text{C}$ located at the centre of sphere of radius 6cm. What is the flux passing through the sphere.
 - v) State Coulomb's law.
 - vi) Transfer the co-ordinates of point P(2,3,-4) to spherical co-ordinate.
 - vii) What do you mean by gradient.
 - viii) Define Electric dipole and dipole moment.
- Q.2 a)Transfer the following vector to cylindrical co-ordinates. 07
 $F = 10ax - 8ay + 6az$ at P(10,-8,6)
- b)Derive the expression for electric field intensity due to line charge located along z-axis of infinite extent. 08
- Q.3 a)State and explain Gauss's Law? What do you mean by Gaussian surface? 07
- b)In a free space line charge $q = 100\text{nc/m}$ lies along entire z-axis. find Electric field intensity at P(4,3,2) 08
- Q.4 a)What do you mean by divergence. Give its physical significance. Also state divergence theorem. 07
- b)In free space let 08
 $D = 8xyz^4 ax + 4x^2z^4 ay + 16x^2yz^3 az \text{ pc/m}^2$
Find total electric flux passing through the rectangular surface $z=2, 0 \leq x \leq 2, 1 \leq y \leq 3$, in the az direction.
- Q.5 a)Derive the expression for potential and Electric field due to dipole. 07
- b)Given the potential field. 08
 $V = x^2yz + 20y^2$ volts in free space
Find a)V at P
b) \vec{E}_P
c) $\frac{dv}{dN}$ at P
d) a_N at P.

Section B

- Q.6 Solve any five 10

- i) State ampere's circuital law.
- ii) What do you mean by steady magnetic field? What are the sources of steady magnetic field.
- iii) What are the properties of perfect metallic conductor?
- iv) Define scalar magnetic potential.
- v) State Faraday's law of Electromagnetic induction.
- vi) What do you mean by Capacitance? Write the expression for parallel plate capacitor.
- vii) Define self and mutual inductance.
- viii) Define polarization in dielectric.
- Q.7 a) State and Explain Biot Savart law for steady magnetic field. 07
- b) Find the incremental field ΔH at point P_2 caused by source at P_1 of $I \Delta \vec{L} = 2\pi a \vec{z} \mu A/m$. 08
 given $P_1(4,0,0)$ and $P_2(0,3,0)$
- Q.8 a) Derive the expression for magnetic field intensity in free space due to infinite filament carrying current I in z - direction. 07
- b) Calculate value of vector current density J in Cartesian co-ordinates at $P(4,3,4)$ if $\vec{H} = x^2 z \hat{a}_y - y^2 x \hat{a}_z$ 08
- Q.9 a) For a time varying field show that $\Delta \times E = -\frac{\partial B}{\partial t}$ 07
- b) Evaluate the closed line integral of \vec{H} about a rectangular path $P_1(2,3,4)$ to $P_2(4,3,4)$ to $P_3(4,3,1)$ to $P_4(2,3,1)$ to P_1 given $H = 3z \hat{a}_z - 2x^3 \hat{a}_z$ A/m 08
- Q.10 Attempt any three 15
- i) Explain the nature of dielectric material.
- ii) Derive the boundary conditions at the interface between two different magnetic material.
- iii) Explain Uniqueness theorem.
- iv) State and explain Stoke's theorem.

SUBJECT CODE NO:- P-65
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination May/June 2017
Control System Engineering
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Attempt any three questions from each section.
- ii) Q.no.1 & Q.no.6 are compulsory.
- iii) Solve any two questions from remaining from each section.

Section A

Q.1 Solve any five. 10

- a) Give the important features of feedback.
- b) Give the advantages of open loop system.
- c) What is time variant & time invariant?
- d) List the steps to reduce the block diagram.
- e) Define self loop and loop gain.
- f) What is difference between type & order of system?
- g) What is acceleration error coefficient?
- h) Define Rise time and settling time.

Q.2 a) Obtain the close loop transfer function $C(S)/R(S)$ of the system as shown in fig 1. 08

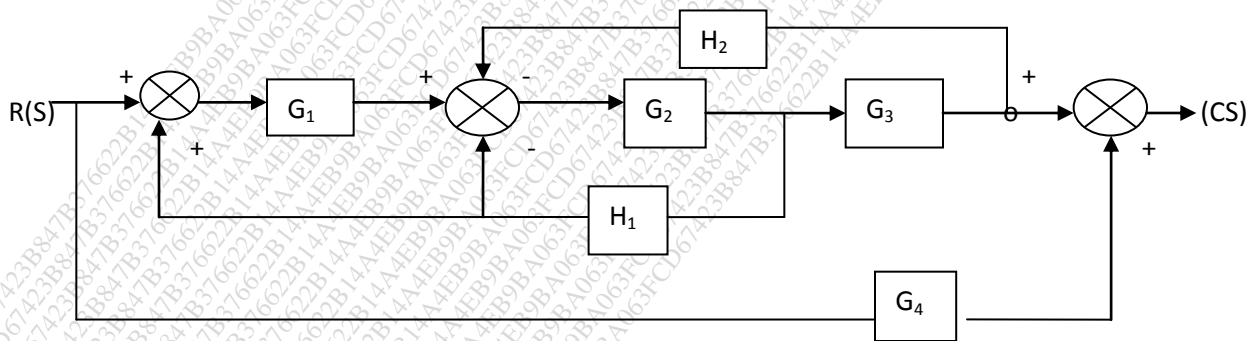


Fig. 1

b) Determine the overall gain $C(S)/R(S)$ for the signal flow graph as shown in fig.2

07

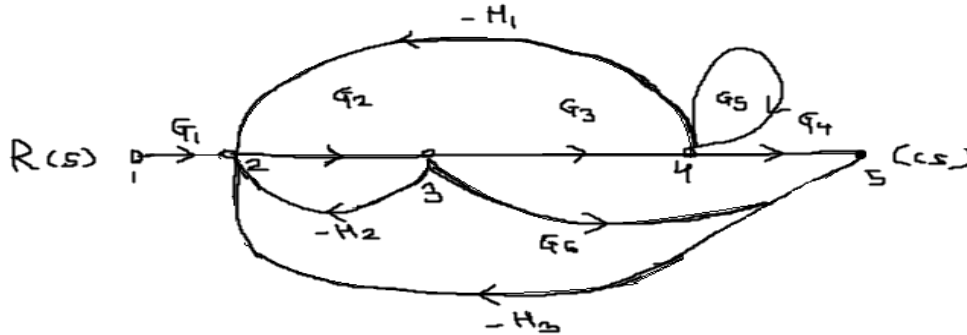


Fig. 2

Q.3 a) Derive the expression and draw the response of the first order system for unit step input. 08

b) The open loop transfer function of a servo system with a unity feedback is given by-

07

$$G(S) = \frac{10}{(S+3)(S+6)}$$

Determine the damping ratio, undamped natural frequency of oscillation. What is percentage overshoot of the response to a unit step input.

Q.4 a) Explain the DC servomotor working. 07

b) Find the static error coefficients for a system whose

08

$$G(S) H(S) = \frac{10}{S(1+S)(1+2S)}$$

Also find the steady state error for $r(t) = 1+t+t^2/2$

Q.5 a) A feedback system by the following transfer function. 08

$$G(S) = \frac{12}{S^2+4S+16}, \quad H(S) = Ks$$

The damping factor of the system is 0.8. Determine the overshoot of the system & the value of K.

b) The characteristics equation of feedback control system is

07

$$S^4 + 20S^3 + 15S^2 + 2S + K = 0$$

Determine the range of K. For marginally stable find the frequency of sustained oscillation.

Section B

Q.6 Solve any five. 10

- a) What is called a PID controller.
- b) Define gain margin.
- c) What are compensators?
- d) List advantages of Bode plot.
- e) What is meant by frequency response of system?
- f) Define BIBO stability.
- g) What is centroid? How the centroid is calculated.
- h) Define absolute and relative stability?

Q.7 A unity feedback control system has an open loop transfer function. 15

$$G(S) = \frac{K}{S(S^2+4S+13)}$$

Sketch the root locus.

Q.8 Sketch the bode plot and hence find gain crossover frequency, phase crossover frequency, gain margin & 15 phase margin

$$G(S) = \frac{10}{s(1+0.4s)(1+0.1s)}$$

Q.9 a) The state space of a system is represented by the following equations. 08

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u ; t > 0$$

$$y = [1 \quad 0] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

Find the transfer function of the system.

b) Find state transition matrix of following system. 07

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

Q.10 a) Check the observability of the system. 08

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -2 & -4 & -3 \end{bmatrix} x + \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ -1 & 1 \end{bmatrix} u$$
$$y = \begin{bmatrix} 0 & 1 & -1 \\ 1 & 2 & 1 \end{bmatrix} x$$

b) Explain Rules for root locus plotting. 07

SUBJECT CODE NO:- P-97
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination May/June 2017
Microprocessor & Interfacing
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Q.No.1 and Q.No.6 are compulsory.
 - ii) Attempt any two questions from the remaining questions in each section
 - iii) assume suitable data & addresses if necessary
 - iv) Figure to the right indicates full marks.

Section A

Q.1	Solve any five	10
	1) What is microprocessor?	
	2) Explain function of instruction register	
	3) Why program counter and stack pointer are 16 bit registers?	
	4) What is opcode & operand	
	5) How many T-states are required for opcode fetch & memory read operation	
	6) What is function of \overline{RD} & \overline{WR} control signals	
	7) Give functional categories of 8085 instructions	
	8) What happens when STA C200H instruction executed	
Q.2	a) Explain addressing modes of 8085	08
	b) Draw the interrupt structure of 8085 and explain in brief	07
Q.3	a) Draw and explain brief the flag register of 8085	08
	b) Explain in detail CALL & RET instructions	07
Q.4	a) Some numbers are stored from memory location D201H . Count of the number is stored at D200H. Write 8085 ALP to find largest number and store the result at C200 H . Handrun the program.	08
	b) Explain in detail Architecture of 8085	07
Q.5	Write short notes on (Any three)	15
	1) Stack and subroutines	
	2) Concept of looping	
	3) Features of Intel 8085	
	4) Functions of SID & SOD pin	

Section B

- Q.6 Solve any five 10
- 1) What happens when following instructions are executed
 - a) IN P_A b) OUT P_B
 - 2) What is use of 8253 PIT
 - 3) Enlist different I/O modes of 8255
 - 4) Write O/P control word of 8255 in simple I/O mode all port O/P port
 - 5) What is use of USART
 - 6) Write output control signals used in 8259 A
 - 7) Explain function of SID & SOD pin
 - 8) What is ADC & DAC ?
- Q.7 a) Explain in brief mode 0 and mode 1 of 8255 10
 b) Write an 8085 ALP to output the data 22H, 33H, 44H, on port A, port B and Port C of 8255 05
 respectively address of port A is 80H
- Q.8 a) Explain block diagram of 8259 A 07
 b) An 8253 is connected to 1 MHz clock it is used to generate a square signal of 1 Hz frequency 08
 give interfacing circuit & program to achieve 8085 based μ p system assume address of counter O is 40H
- Q.9 a) Explain the block diagram of 8279 08
 b) Draw the interfacing diagram of stepper motor and write ALP to rotate in clockwise direction 07
 Assume delay subroutine is available at "DELAY"
- Q.10 Write short notes (any three) 15
- 1) DC motor speed control
 - 2) Measurement of frequency using 8085
 - 3) Mode 0 of 8253
 - 4) 8051 USART

'Appendix A'

Programmable communication interface 8251 A :

(i) **A synchronous mode format :**

S ₂	S ₁	EP	PEN	L ₂	L ₁	B ₂	B ₁
----------------	----------------	----	-----	----------------	----------------	----------------	----------------

(ii) **Synchronous mode format :**

SCS	ESD	EP	PEN	L ₂	L ₁	0	0
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(iii) **Command Instruction :**

EH	IR	RTS	ER	SBRK	RXE	DTR	TXEN
----	----	-----	----	------	-----	-----	------

(iv) **Status read :**

DSR	SYN/ BRK	FE	OE	PE	TX EMPT	TX RDY	TX RDY
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2. **Programmable interval timer 8253 :**

(i) **Control work format :**

SC ₁	SC ₀	RL ₁	RL ₀	M ₂	M ₁	M ₀	BCD
-----------------	-----------------	-----------------	-----------------	----------------	----------------	----------------	-----

(ii) **Mode reg. for latching count :**

SC ₁	SC ₀	0	0	x	x	x	x
-----------------	-----------------	---	---	---	---	---	---

3. **Programmable peripheral interface 8255 :**

(i) **Mode definition :**

MSF	MS ₂	MS ₁	P _A	P _{CU}	MS	P _B	P _{CL}
-----	-----------------	-----------------	----------------	-----------------	----	----------------	-----------------

P.T.O.

(ii) Bit set reset format :

BSR	×	×	×	BS ₂	BS ₁	BS ₀	BS/R
F							

(iii) Mode 1-input status :

I/O	I/O	IBF	INTE	INTR	INTE	IBF	INTR
A	A	A	A	B	B	B	B

(iv) Mode 1-output status :

OBF	INTE	I/O	I/O	INTR	INTE	OBF	INTR
A	A			A	B	B	B

(v) Mode 2 status :

OBF	INTE	IBF	INTE	INTR	×	×	×
A	1	A	2	A			

Programmable DMA controller 8257 :

(i) Mode set register :

EAL	ETCS	E _{EW}	ERP	ECH ₃	ECH ₂	ECH ₁	ECH ₀
-----	------	-----------------	-----	------------------	------------------	------------------	------------------

(ii) Count register :

R/W/V	RWV	D ₁₃	D ₁₂	D ₁	D ₀
1	0						

(iii) Status register :

0	0	0	UF	TCS ₃	TCS ₂	TCS ₁	TCS ₀
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5. Programmable interrupt controller 8259 :

(i) ICW₁ :

A ₇	A ₆	A ₅	1	LT1	AD1	BMG ₁	ICW ₄
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(ii) ICW₂ :

A ₁₅	A ₁₄	A ₁₃	A ₁₂	A ₁₁	A ₁₀	A ₉	A ₈
-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	----------------	----------------

(iii) ICW₃ (Slave) :

0	0	0	0	0	ID ₂	ID ₁	ID ₀
---	---	---	---	---	-----------------	-----------------	-----------------

(iv) ICW₃ (Master) :

S ₇	S ₆	S ₅	S ₄	S ₃	S ₂	S ₁	S ₀
----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------

(v) ICW₄ :

0	0	0	SFN	BUF	M/S	AE0 ₁	MPM
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(vi) OCW₁ :

M ₇	M ₆	M ₅	M ₄	M ₃	M ₂	M ₁	M ₀
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(vii) OCW₂ :

R	SL	EOI	0	0	L ₂	L ₁	L ₀
---	----	-----	---	---	----------------	----------------	----------------

(viii) OCW₃ :

0	ESM M	SMM	0	1	P	RR	RIS
---	----------	-----	---	---	---	----	-----

P.T.O.

nable KBD/Display controller 8279 :
D/Display Mode Set :

0	0	0	D	D	K	K	K
---	---	---	---	---	---	---	---

(ii) Program clock :

0	0	1	P	P	P	P	P
---	---	---	---	---	---	---	---

(iii) Read FIFO/Sensor RAM :

0	1	0	A ₁	x	A	A	A
---	---	---	----------------	---	---	---	---

(iv) Read Display RAM :

0	1	1	A ₁	A	A	A	A
---	---	---	----------------	---	---	---	---

(v) Write Display RAM :

1	0	0	A ₁	A	A	A	A
---	---	---	----------------	---	---	---	---

(vi) Display write Inhibit/Blanking :

1	0	1	x	IW A	IW B	BL A	BL B
---	---	---	---	---------	---------	---------	---------

(vii) Clear :

1	1	0	C _D	C _D	C _D	C _F	C _A
---	---	---	----------------	----------------	----------------	----------------	----------------

(viii) End Interrupt/Error mode set :

1	1	1	E	x	x	x	x
---	---	---	---	---	---	---	---

(ia) Scanned KBD data format for key code :

CNTL	SHFT	SC ₂	SC ₁	SC ₀	RL ₂	RL ₁	RL ₀
------	------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------

(x) Sensor matrix data format for key code (switch) :

RL ₇	RL ₆	RL ₅	RL ₄	RL ₃	RL ₂	RL ₁	RL ₀
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SUBJECT CODE NO:- P-132
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination May/June 2017
Power Systems Analysis
(Revised)

[Time: Three Hours]

[Max.Marks:80]

- N.B
- i. Question No.1 & question No.6 are compulsory.
 - ii. Attempt from each section any two questions from the remaining questions
 - iii. Assume suitable data wherever necessary

Section A

Q.1 Solve any five questions. 10

- i) What are the components of power system? Write the equation for converting the p.u impedance expressed in one base to another.
- ii) What are advantages of per unit computations?
- iii) If the reactance in ohms is 15Ω , find the p.u value for a base of 15KVA and 10 kv.
- iv) What is bus admittance matrix?
- v) What are four ways of adding an impedance too an existing system so as to modify bus impedance matrix?
- vi) How a load flow study is performed?
- vii) What is need of slack bus?
- viii) Why. Do we go for iterative methods to solve load few problems?

Q.2 a) Choosing a common base of 20 MVA, compute the p.u reactance of the power system. Shown in fig1. And draw the reactance diagram. 8



- $G_1 : 20\text{MVA}, 10.5\text{KV}, X''=1.4\Omega$
 $G_2 : 10\text{MVA}, 6.6\text{KV}, X'' = 1.2 \Omega$
 $T_1 : 10\text{MVA}, 33/11\text{KV}, X = 15.2 \text{ ohms per phase on HT side}$
 $T_2 : 10\text{MVA}, 33/6.2 \text{ KV}, X = 16.0 \text{ ohms per phase on HT side}$
 $TL : 22.5 \text{ ohms per phase.}$

b) Derive the expression for per unit impedance referred to base value 7

- Q.3 a) Derive the expression for primitive network. 8
 b) For the power system as shown in fig2. Obtain the B, B^A & K. Take ground as reference. 7

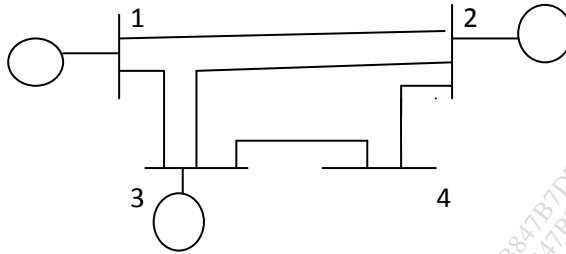
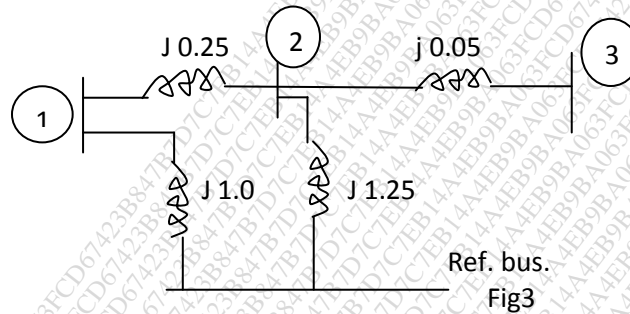


Fig2.

- Q.4 a) Explain the step by step procedure for NR method of load flow studies. 8
 b) Find the bus impedance matrix for the system whose reactance diagram is as from in fig 3. All the impedances are in p.u. 7



Ref. bus.
Fig3

- Q.5 a) Derive an expression for symmetrical components of current. 8
 b) Write the advantages of fast decoupled methods over other methods. 7

Section B

- Q.6 Solve any five questions of the following 10

- i) How the reactive power of a generator is controlled?
- ii) What is meant by fault?
- iii) Name the difference in representation of power system for load flow & short circuit studies
- iv) What is the reason for transient during short circuits?
- v) What is the significance of sub transient reactance in short circuit studies?
- vi) How symmetrical faults are analyzed?
- vii) Why the circuit breaker interrupting current is asymmetrical? Write equation.
- viii) What are the complex number operator properties?

- Q.7 a) Explain the phenomenon of transient on transmission line with waveform 8
 b) A delta connected impedance load takes $10\angle 30^\circ$ A and $15\angle -60^\circ$ A currents in its terminals a & b. 7
 find the current in terminal c and determine the sequence components for each line.

- Q.8 a) Explain Z_{BUS} Building. For Type 3 & Type 4 modification. 8
 b) Build Z_{BUS} , by using Z Bus algorithm for the network shown in fig4 7

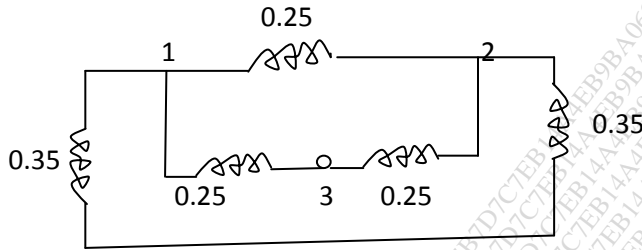


Fig 4.

- Q.9 a) Derive an expression to determine fault current for line to line fault and draw the sequence network. 8
 b) Determine the fault current and MVA at faulted bus for a line to ground fault at bus 4 as shown in figure 5. 7

$G_2, G_2 : 100 \text{ MVA}, 11\text{KV}, x' = x'' = 15\%$,
 $x_0 = 5\%, x_n = 6\%$
 $T_1, T_2 : 100\text{MVA}, 11\text{KV}/220\text{KV}$
 $x \text{ network} = 9\%$
 $L_1, L_2 : X' = X'' = 10\%, X_0 = 10\%$
 All values are on 100MVA base, 11kv

- Q.10 a) Explain the static security analysis at control centers. 8
 b) Explain the sequence impedance of synchronous machine. 7

SUBJECT CODE NO:- P-214
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EEP/EE/EEE) Examination May/June 2017
Electrical Machine Design
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Q. No. 1 and Q. No.6 are compulsory
- ii) Attempt any two question from remaining question of each section
- iii) Assume suitable data wherever necessary

Section A

- Q.1 Attempt any Five 10
- a) List out the design factor considered in electrical machine design.
 - b) What do you mean by Electrical machine design?
 - c) Enlist the factors affecting air gap length of induction motor
 - d) What do you mean by specification of electrical machines?
 - e) What do you mean by standardization in design of rotating machines?
 - f) Define specific magnetic loading.
 - g) Define magnetic pull in rotating machine.
 - h) State various design limitation.
- Q.2 a) Explain the criterion for selection of No stator slots in 3-ph induction motor 07
- b) Calculate the following design information for 30 kw, 440 v, 3-ph, 6 pole, 50 Hz delta connected sq . cage induction motor 08
- i) main dimension of stator frame
 - ii) No of turns per phase in stator winding
 - iii) no of stator slots
- Q.3 a) Derive the output equation of 3- phase induction motor 07
- b) During the stator design of 3- phase 30kw, 400v, 6 pole, 50 Hz, sq.cage induction motor following information has been obtained 08
- Gross length of stator = 0.17 m
 Internal dia. of stator = 0.33 m
 No. of stator slots = 45
 No. of conductors /slot = 12
 Based on above data design a suitable cage rotor
- Q.4 a) What do you mean by real and apparent flux density? Derive the relation between them 07
- b) The stator of machine has smooth surface but its rotor has open type of slots with slot width w_s , = tooth width, $w_t = 12$ mm and length of air gap $l_g = 2$ mm Find the effective length of air gap if the Carter's coefficient 08

2017

$$= \frac{1}{1 + 5 \lg / ws} . \quad \text{There are no radial ducts.}$$

- Q.5 Attempt any three 15
- Modern trend in electrical machine design
 - phenomenon of crawling and cogging in induction motor
 - Design of end ring 3- ph induction motor
 - Carter's coefficient and its significance

Section B

- Q.6 Attempt any five 10
- List out the method of cooling of transformer
 - Define heating time constant
 - what is the use of choke coil
 - give the advantages of stepped core of transformer
 - Define window space factor
 - write output equation of 3- phase transformer and write meaning of each parameter
 - define heating cycle of transformer
 - Explain the causes of temp. rise in transformer

- Q.7 a) Explain in detail the steps for determination of main dimension for core ,window and yoke 07
- b) Determine the dimension of core & yoke for 200 KVA, 50Hz, single phase core type transformer. A cruciform core is used with distance between adjacent limbs equal to 1.6 times width of core laminations Assume voltage per turn 14 v ,maximum flux density 1.1 wb / m² window space factor 0.32, current density 3 Almm² and stacking factor = 0.5 .the net iron area is 0.56d² in a cruciform core where d is the diameter of circumscribing circle .Also the width of largest stamping is 0.85 d 08

- Q.8 a) Give in detail the design steps for LV & HV winding design of transformer 07
- b) Calculate the core and window area required for 1000 KVA, 6.600/400V, 50Hz single phase core type transformer. Assume max flux density of 1.2 wb / m² and current density of 2.5 Almm² ,voltage per turn = 30 volts, and window space factor = 0.32 08

- Q.9 a) Explain in detail the various cooling methods of transformer 07
- b) explain why cooling tubes are provided on transformer tank surface. Derive the expression for calculating no. of cooling tubes 08

- Q.10 Attempt any three 15
- Explain the conservator and breather with dia, used in transformer
 - Explain Evolution of leakage reactance & winding of transformer
 - Design of choke coil
 - Explain the various mechanical forces developed under short circuit condition of transformer

SUBJECT CODE NO:- P-237
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination May/June 2017
Power Electronics
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Q.No.1 and Q.No.6 are compulsory.
 - ii) Solve any two questions from remaining in each section
 - iii) Assume suitable data it required
 - iv) Draw appropriate waveforms it required

Section A

- Q.1 Solve any five 10
- a) Which PNP device is describe the following statement
 - i) Can be turned "on" or "off" at either gate
 - ii) Can be turned "on" by negative pulse
 - iii) A unilateral device turned "off" by a negative gate signal
 - iv) Can be turned "off" by reducing current by I_H .
 - b) Draw the output characteristics of n channel enhancement MOSFET
 - c) What is difference between non-punch through. IGBT_s and punch through IGBT_s
 - d) Draw the switching characters of GTO
 - e) Define the term gate recovery time
 - f) Compare IGBT and MUSFET
 - g) What is the lowest harmonic frequency present in dc output of six pulse converter
 - h) What is circuit turn off" time?
- Q.2 07
- a) What is freewheeling diode? What are its functions?
 - b) Explain with near circuit & wave form the operation of single phase full controlled rectifier with inductive load 08
- Q.3 08
- a) A three phase half wave controlled rectifier supplying a constant load current of 30A, operated from three phase 400V (line) supply. Find the average load voltage at firing angle 45° . What value of current & peak reverse voltage rating will the thyristor require 08
 - b) Explain the operation of 3-ph half controlled converter with RL load 07
- Q.4 08
- a) Draw V-I characteristics of SCR & explain the effect of gate current variation on the V-I characteristics 08
 - b) A single phase full controlled bridge converter supplies an inductive load supply voltage is 230v/50Hz firing angle is $\pi/3$. As some that the output current is continuous & ripple free and is equal of 15amp Determine
 - (i) Average output voltage
 - (ii) Input PF
 - (iii) Fundamental PF
 - (iv) Average & rms values of SCR current
- Q.5 08
- a) What is dual converter? Explain the basic principle of operation of ideal dual converter 08
 - b) A simple phase semi converter? Operating from a simple phase 220V, 50Hz, supply. The RLE load with 07

R = 5Ω, L = 10MH , & E = 100V is connected to the output of converter. Find the average value of load current for a firing angle of 45° for continuous conduction. Draw the output voltage waveforms and indicate the conducting periods of devices

Section B

- Q.6 Solve any five 10
- What is chopper? Draw the circuit diagram of step up chopper
 - A chopper operating on TRC at a frequency of 5KHz on a 200V dc supply. If low voltage is 40% of supply voltage, find conduction & blocking period of SCR in each cycle
 - What is inverter? What are the different types of inverters?
 - What is different between 180° and 120° mode of operation of 3 phase inverters?
 - What are the specifications of power supplies used in industrial applications?
 - What is SMPs?
 - What is the difference between fly back and forward converter?
 - What is duty ratio of chopper?
- Q.7 a) Prove that the average output voltage of step up chopper is given by 07

$$V_0 = \frac{V_{dc}}{1-\alpha}$$

Where Vdc – supply (dc) voltage
- α- duty ratio

- b) A chopper circuit supplied from 80v dc battery, supplies a R-L load with L = 40MH and R = 6Ω. The load has a freewheeling diode across it. It is required to vary the load current between 10A & 12A. Calculate the time ratio of chopper? 08
- Q.8 a) What are the drawbacks of square wave inverter? What are the techniques used to overcome the drawbacks of square wave inverter? 07
- b) Explain with neat circuit diagram & wave form the operation of single phase half bridge VSI with R-L load 08
- Q.9 a) Explain with neat circuit & waveform the operating modes of buck converter. 07
- b) What is cyclo converter? Explain the basic principle of operating of a cyclo converter 08
- Q.10 a) A single phase half wave AC- AC voltage controller supplying a resistive load. Prove that the average load voltage is given by 07

$$V_{0av} = \frac{V_m}{\alpha\pi} (\cos \alpha - 1)$$

- b) A single phase full bridge inverter is operated from a 24 v battery and is supplying a resistive load of 5 ohm. Determine 08
- Fundamental output voltage
 - fundamental output power
 - switch rating's

SUBJECT CODE NO:- P-268
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination May/June 2017
Testing & Maintenance of Electrical Equipment
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i) Q.No.1 and Q.No.6 are compulsory.
 - ii) Attempt any two questions from the remaining in each section.

Section A

- Q.1 Solve any five: 10
- i. Define testing.
 - ii. What is the objective of acidity testing of transformer oil?
 - iii. What is the objective of low voltage testing?
 - iv. Define tolerance
 - v. What is the objective of type testing?
 - vi. Define maintenance.
 - vii. Define objective of testing?

- Q.2
- a. What do you mean by indirect testing? Explain with any example 07
 - b. List out the probable faults in manufacturing of transformers. 08

- Q.3
- a. Draw the block diagram indicating the flow chart of manufacturing of transformer. 08
 - b. What are the reasons behind the excessive vibrations in transformer core, explain. 07

- Q.4
- a. What faults can be observed because of the reasons of blow holes in the motor body? 07
 - b. Write down the reasons of failure of 3-ph. I.M. in field, because of winding? 08

- Q.5 Write short notes on any three. 15
- i. List down the faults during manufacturing of winding in transformers?
 - ii. List down the faults during operation of power transformer in operation
 - iii. Significance of ISS
 - iv. TPM.

Section B

- Q.6 Solve any five: Explain the reasons behind the faults listed below. 10
- i. Motor gets over heated
 - ii. Rotor had bend
 - iii. Motor has excessive vibrations
 - iv. Bearings are jammed.
 - v. Not supplying power with full capacity
 - vi. Magnetic flux leakage from stator core
 - vii. Motor is not rotating with required speed.

- Q.7
- a. What do you mean by duty cycle? What are the parameters, deciding the duty cycles? 07
 - b. What ISS is used for testing of motor? What is the significance this ISS. 08

- Q.8
- a. Draw the block diagram indicating working of industrial sonography & explain working of each 08

block.

- Q.9
- b. What do you meant by impregnation of paper insulating material? Explain how it is done. 07
 - a. Explain the requirement of Megger testing. How it is done? When it is required & why it is required? Explain in details. 07
 - b. What are the testing methods for testing the jammed bearing? 08
- Q.10 Write short note on any three 15
- i. Duty cycle of a motor
 - ii. Detection of internal cracks.
 - iii. Heat run testing
 - iv. DGA
 - v. HV withstand test.

SUBJECT CODE NO:- P-300
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/ EEE) Examination May/June 2017
Microcontrollers & Applications
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B	i)Solve three questions from each section. ii)Q.1 & Q.6 are compulsory. iii)Assume suitable data if necessary.	
	Section A	
Q.1	Solve--- 1.In what way is the LCALL instruction differs from ACALL instruction. 2.What is stack? How much space can be used for stack in 8051 microcontroller? 3.What is the function of Data pointer in 8051 microcontroller. 4.What are the differences in execution of following instructions- a)MOVA, #28H b)MOV A,28H. 5.Explain how bit addressing is distinguished from byte addressing in 8051 microcontroller. 6.Enlist the features of 8051 microcontroller. 7.Name the register of 8051, which do not have address. Why?	14
Q.2	a)Draw and explain programming model of 8086 microprocessor. b)Explain following instructions of 8086- i)MOV [BX],12 ii)LAHF iii)XCHG AL,BL iv)ADDAC,80	07 06
Q.3	a)Write an assembly language program to add two 8-bit numbers which are stored at internal RAM location 20H and 21H. Store the 16bit result at 30H and 31H. b)Explain the execution of following instruction (Assume suitable data if required) i)MOV @R1,#20H ii)POP DPH iii)XCH A,RO iv)ADDC A,R1 v)MOVX @DPTR,A vi)DAA	07 06
Q.4	a)Draw and explain block diagram of 8051 microcontroller. b)Write an instruction to load 55 in by. -Immediate addressing mode -Register addressing mode -Direct addressing mode -Register indirect addressing mode	07 06
Q.5	Write short note on – (any three) i)Branch instructions of 8051 ii)Memory organization of 8086 iii)Flags in 8086 iv)Comparison of microprocessor & microcontroller v)Overview of 8051 family.	05 04 04 04 04

Section B

- Q.6 Solve- 14
- What is the rate played by timer 1 in serial communication.
 - What is the function of the chip. MAX 232 in serial communication.
 - Calculate the step size of ADC 0808/0809, when operated at 5V.
 - What is the difference between the operation of timer and counter.
 - Does 8051 microcontroller support serial and parallel data transfer? How.
 - Differentiate between vectored and non vectored interrupt.
 - What is the role of ALE pin in ADC 0808/0809.
- Q.7
- Take the data in through port 0 and port 1 of 8051, one after the other and transfer this data serially continuously. Use either assembly or C language for program. 07
 - Interface DC motor to 8051 microcontroller. Write a program to rotate it in clockwise direction. 06
- Q.8
- Write a program to create a pulse of 5ms on P2.3 using timer 0 of 8051. 07
 - Draw and explain bit format of TMDD & TCON registers of 8051 microcontroller. 06
- Q.9
- Interface ADC 0808/0809 to 8051 microcontroller. Write a program to convert analog i/p into its. 07
Corresponding digital output.
 - Interface a key to P1.7 and a LED to P2.7. Write a program to read the status of Key & to display it on LED. 06
- Q.10 Write short note on - (any two)
- Interfacing of relay 06
 - 8051 interrupts 06
 - Interfacing of stepper motor 07
 - DAC interfacing. 06

SUBJECT CODE NO:- P-365
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination May/June 2017
Energy Conservation & Audit
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Q. No. 1 & 6 are compulsory.
 - ii. Attempt any other two questions each from SECTION –A & SECTION – B.
 - iii. Assume suitable data. If required.

Section A

- Q.1 Attempt any five. 10
- a) What are the different greenhouse gases? List out it.
 - b) Define “Energy – Audit” as per the energy conservation Act – 2001.
 - c) What is 2nd law of thermodynamics?
 - d) What is meant by evaporation ratio in case of steam boiler?
 - e) Define ‘ton’ of refrigeration.
 - f) What is meant by Global – warming potential?
 - g) Enlist any four instruments which are used for measurement with its application.
 - h) What is difference between direct & indirect method of boiler efficiency? Write any two points.
- Q.2
- a) What are the duties and responsibilities of energy auditor as per energy conservation Act – 2001. 07
 - b) Explain various steps involved in carrying out energy – audit with one example. 08
- Q.3
- a) Explain in detail the steps to calculate boiler efficiency by indirect method. 10
 - b) List out 5 energy conservation opportunities in boiler – plant of a thermal power station. 05
- Q.4
- a) What is need of co – generation? Explain its principles. And briefly explain the types of steam turbine cogeneration. 08
 - b) Explain “Affinity laws” applicable to pumping systems, and list the energy conservation opportunities in pumping system in an industry. 07
- Q.5 Write short notes on any three 15
- a) CDM and its objectives.
 - b) Role of Renewable energy sources in energy management of a nation.
 - c) Energy audit of heating, ventilation and air – conditioning system
 - d) BEE

Section B

- Q.6 Attempt any five 10
- a) Define – room index.
 - b) Define NPV with its standard formula.
 - c) What is IRR?
 - d) What is DSM?

- e) What is meant by TOD – tariff?
- f) Define power factor? Write the specification for P. E. improvement capacitors.
- g) What is PI?
- h) Calculate the fixed – energy consumption for a rolling mill consuming 3, 00,000 units electricity to produce 500MT product per month and having specific energy consumption of 500K.

- Q.7 a) Explain in detail the importance of power factor in energy conservation program. 08
 b) Explain IRR with advantages & limitations. 07

- Q.8 a) A proposed energy improvement project requires an initial investment of Rs. 5,00,000, & generates cash flows as 07

Year	Savings
1	1,20,000
2	1,15,500
3	1,30,000
4	1,16,500
5	1,17,250
6	2,00,000

Calculate the NPV of the proposal at the discount rate of 11%.

- b) Which points we want to consider to make motors more energy efficient? 08

- Q.9 Explain in detail the produce carry – out the energy audit of a typical steel plant. 15

- Q.10 Write short notes on any three 15

- a) Electronic Ballasts
- b) Energy conservation opportunities in thermal power plant.
- c) Net present value.
- d) E. A. 2003 and energy sector reforms.