## First/Second Semester B.E. Degree Examination, June / July 2014 **Basic Electrical Engineering**

Max. Marks:100 Time: 3 hrs.

				PART - A	<u>4</u>			
1	a.	Cho	ose the correct answers	(04 Marks)				
		i)	The resistance of a co	onductor is directly	$\prime$ proportional to its $\_$	and inversly		
			proportional to its	<u> </u>				
			A) Length & Area		B) Area & Lengt			
		C) Length & Current D) Length &						
		ii)	When the conductor r					
			A) Minimum	B) Maximum	C) Zero	-		
		iii)				0.8  H and $0.2  H$ , have a		
			co-efficient of coupling	ng 0.9 is	,	D) 0 144 II		
			A) 0.36 H	B) 0.4 H	C) 0.16 H			
		iv)				ne heater coil is,		
		en 1	Α) 10 Ω	Β) 0.1 Ω	,	,		
	b.	b. Show that the equivalent resistance of two resistors connected in parallel in the ratio product of these two resistances divided by the sum of those two resistance values.						
		pro	duct of these two resista	inces divided by the	e sum of those two res	sistance values. (04 Marks		
	c	2. Davis an assuration for demandable induced and						
		<ul><li>c. Derive an expression for dynamically induced emf.</li><li>d. Two coils having 1000 turns and 1600 turns respectively are placed close to</li></ul>						
	4	Tur				close to each other such		
	d.		coils having 1000 turn	ns and 1600 turns re	espectively are placed	close to each other such		
	d.	that	coils having 1000 turn 60% of the flux produced	ns and 1600 turns rouced by one coil. I	espectively are placed f a current of 10 A,	close to each other such flowing in the first coil		
	d.	that	coils having 1000 turn	ns and 1600 turns rouced by one coil. I	espectively are placed f a current of 10 A,	close to each other such		
2	d. a.	that pro	coils having 1000 turn 60% of the flux produced	ns and 1600 turns reuced by one coil. In Find the inductan	espectively are placed f a current of 10 A, ce of the second coil.	close to each other such flowing in the first coil		
2		that prod Cho	coils having 1000 turn 60% of the flux produces a flux of 0.5 mwb	ns and 1600 turns reuced by one coil. In particular, Find the inductant of the following:	espectively are placed f a current of 10 A, ce of the second coil.	close to each other such flowing in the first coil (06 Marks		
2		that pro	coils having 1000 turn 60% of the flux produces a flux of 0.5 mwb	ns and 1600 turns reuced by one coil. In particular, Find the inductant of the following:	espectively are placed f a current of 10 A, ce of the second coil.	close to each other such flowing in the first coil (06 Marks		
2		that prod Cho	o coils having 1000 turn 60% of the flux produces a flux of 0.5 mwb cose the correct answers An alternating curren	ns and 1600 turns reuced by one coil. In particular, Find the inductant of the following:	espectively are placed f a current of 10 A, ce of the second coil.	close to each other such flowing in the first coil (06 Marks		
2		that prod Cho	coils having 1000 turn 60% of the flux produces a flux of 0.5 mwb cose the correct answers.  An alternating curren amperes.	as and 1600 turns reuced by one coil. It is, Find the inductant of the following:  the tis given by $i = 14$	espectively are placed f a current of 10 A, ce of the second coil. $14\sin\left(\omega t + \frac{\pi}{6}\right) \text{ has an}$	close to each other such flowing in the first coil (06 Marks (04 Marks		
2		that prod Cho i)	o coils having 1000 turn 60% of the flux produces a flux of 0.5 mwb cose the correct answers.  An alternating curren amperes.  A) 10 A	as and 1600 turns reuced by one coil. It is, Find the inductant of the following:  t is given by $i = 14$ B) 14.14	espectively are placed f a current of 10 A, ce of the second coil.  14 $\sin\left(\omega t + \frac{\pi}{6}\right)$ has an C) 20 A	close to each other such flowing in the first coil (06 Marks) (04 Marks) n rms value of  D) 0.707		
2		that prod Cho	o coils having 1000 turn 60% of the flux produces a flux of 0.5 mwb cose the correct answers.  An alternating curren amperes.  A) 10 A In an a.c circuit, the r	as and 1600 turns reduced by one coil. In the inductant of the following:  a for the following:  a t is given by $i = 14$ B) 14.14  atio of kW/KVA reduced	espectively are placed f a current of 10 A, ce of the second coil.  14 $\sin\left(\omega t + \frac{\pi}{6}\right)$ has an C) 20 A expresents	close to each other such flowing in the first coil (06 Marks) (04 Marks) n rms value of  D) 0.707		
2		that prod	o coils having 1000 turn 60% of the flux produces a flux of 0.5 mwb cose the correct answers.  An alternating curren amperes.  A) 10 A In an a.c circuit, the r A) Power factor	ns and 1600 turns reuced by one coil. It is, Find the inductant is for the following:  It is given by i = 14  B) 14.14  atio of kW/KVA realistics of the factor	espectively are placed f a current of 10 A, ce of the second coil.  14 $\sin\left(\omega t + \frac{\pi}{6}\right)$ has an C) 20 A expresents  C) Form factor	close to each other such flowing in the first coil (06 Marks) (04 Marks) n rms value of  D) 0.707 . D) Peak factor		
2		that prod Cho i)	o coils having 1000 turn 60% of the flux production of the flux production and the correct answers.  An alternating current amperes.  A) 10 A  In an a.c circuit, the r  A) Power factor  A current drawn by a	ns and 1600 turns reuced by one coil. It is for the following: it is given by i = 14  B) 14.14 atio of kW/KVA real capacitor of 20 μ	espectively are placed f a current of 10 A, ce of the second coil.  14 $\sin\left(\omega t + \frac{\pi}{6}\right)$ has an C) 20 A expresents  C) Form factor	close to each other such flowing in the first coil (06 Marks) (04 Marks) n rms value of  D) 0.707		
2		that prod	o coils having 1000 turn 60% of the flux produces a flux of 0.5 mwb cose the correct answers.  An alternating curren amperes.  A) 10 A  In an a.c circuit, the r  A) Power factor  A current drawn by a supply frequency is	ns and 1600 turns reuced by one coil. In the inductant is for the following:  t is given by i = 14  B) 14.14  atio of kW/KVA real is a capacitor of 20 μ	espectively are placed f a current of 10 A, ce of the second coil.  14 sin $\left(\omega t + \frac{\pi}{6}\right)$ has an C) 20 A epresents  C) Form factor  F is 1.382 A from a	close to each other such flowing in the first coil (06 Marks) (04 Marks) n rms value of  D) 0.707  D) Peak factor 220 V A.C. supply. The		
2		that prod	o coils having 1000 turn 60% of the flux production after a flux of 0.5 mwb cose the correct answers.  An alternating current amperes.  A) 10 A  In an a.c circuit, the ray Power factor  A current drawn by a supply frequency is  A) 25 Hz	ns and 1600 turns reuced by one coil. It is, Find the inductant is for the following:  t is given by i = 14  B) 14.14 atio of kW/KVA real B) Load factor is a capacitor of 20 μ  B) 60 Hz	espectively are placed f a current of 10 A, ce of the second coil.  14 $\sin\left(\omega t + \frac{\pi}{6}\right)$ has an C) 20 A epresents  C) Form factor F is 1.382 A from a C) 50 Hz	close to each other such flowing in the first coil (06 Marks) (04 Marks) n rms value of  D) 0.707 . D) Peak factor		
2		that prod	o coils having 1000 turn 60% of the flux production of the flux production and the correct answers.  An alternating current amperes.  A) 10 A  In an a.c circuit, the r  A) Power factor  A current drawn by a supply frequency is  A) 25 Hz	ns and 1600 turns reuced by one coil. It is, Find the inductant is for the following:  t is given by i = 14  B) 14.14 atio of kW/KVA real B) Load factor is a capacitor of 20 μ  B) 60 Hz	espectively are placed f a current of 10 A, ce of the second coil.  14 $\sin\left(\omega t + \frac{\pi}{6}\right)$ has an C) 20 A expresents  C) Form factor  F is 1.382 A from a C) 50 Hz	close to each other such flowing in the first coil (06 Marks) (04 Marks) n rms value of  D) 0.707  D) Peak factor 220 V A.C. supply. The		
2		that production in the content of th	o coils having 1000 turn 60% of the flux production of the flux production and the correct answers.  An alternating current amperes.  A) 10 A  In an a.c circuit, the ray Power factor  A current drawn by a supply frequency is  A) 25 Hz  The unit of apparent products.	as and 1600 turns reuced by one coil. It is for the following:  a for the following:  b 14.14  atio of kW/KVA re  B) Load factor  a capacitor of 20 µ  B) 60 Hz  power is  B) KVAR	espectively are placed f a current of 10 A, ce of the second coil.  14 sin $\left(\omega t + \frac{\pi}{6}\right)$ has an C) 20 A epresents  C) Form factor  F is 1.382 A from a C) 50 Hz  C) KVA	close to each other such flowing in the first coil (06 Marks) (04 Marks) n rms value of  D) 0.707  D) Peak factor 220 V A.C. supply. The		

- respect to sinusoidally varying quantities.
- Two impedances (150 j157)  $\Omega$  and (100 + j110)  $\Omega$  are connected in parallel across 200 V, 50 Hz supply. Find branch currents, total current and total power consumed in the circuit. Draw the phasor diagram.
- Show that the power consumed in an R-C series circuit is VIcos\( \phi\). Draw the waveform for voltage, current and power. (06 Marks)

3	a.	Choose the correct answers for the following: (04 Marks)						
		i)	The phase sequence	of a three phase s	ystem is RYB. The o	other possible phase		
			A) VDD	, , 	CVDDV	DVM C4		
		ii)	When the two wattr	D) DKI	c) KBY	D) None of these		
		sequence is, A) YRB B) BRY C) RBY D) No ii) When the two wattmeters used to measure three phase power gives equation the p.f of the circuit is given by, A) 0 B) 0.5 C) 1 D) 0.8						
			A) 0	R) 0.5	, ,	D) 0.866		
		iii)	The nower consumed	by a 3-d load is given	n by the evaression	D) 0.000		
		••••	A) 2V-I- assh	D) V Looph	by the expression C) $\sqrt{3} V_L I_L \cos \phi$	D) /2 V 1		
		iv)	A) 3 v Lileus w	officient them	c) V3 VLILCOSQ	D) V3 VLCOSØ		
		10)	A 3-ψ apparatus is	R) Less	a $I = \varphi$ apparatus,	D) None of these		
	b.	iv) A 3-φ apparatus is efficient than a 1 – φ apparatus, A) More B) Less C) Both (A) & (B) D) None of these What are the advantages of 3-φ systems over a single phase system? (06 Marks)						
	c.							
		the t	two single phase wattm	eters connected to me	asure the input	(05 Marks)		
	d.		the two single phase wattmeters connected to measure the input. (05 Marks)  Obtain the relationship between line current and phase current in a balanced 3-φ delta					
			nected system.			(05 Marks)		
						, ,		
4	a.	Cho	ose the correct answers			(04 Marks)		
		i)	The totating disc of the		de of			
		• • •	A) Copper			D) Platinum		
		ii)	One unit of electrical	energy is equivalent t	0	<b>5</b> ) 10		
		1115	A) 3.6 kWs			D) 10 WH		
		iii)	An intermediate switch		of lamps.			
			<ul><li>A) Three way control</li><li>C) One way control</li></ul>		B) Two way control D) Four way control			
		iv)	The value of "Fusing	Factor" is always	D) Four way control			
		1,	A) Less than 1	B) Equal to 1	C) Zero,	D) More than 1.		
	b.							
		single phase induction type energy meter. (08 Marks)						
	c.	Writ	te the circuit diagram a	and switching table for	or two-way and three-v	vay control of lamp.		
		Where is it used? (08 Marks)						
_		<b>C</b> 11		$\frac{\mathbf{PART} - \mathbf{B}}{\mathbf{B}}$				
5	a.	Choose the correct answers for the following:  i) The purpose of commutator in a d.c. generator is to  (04 Marks)						
		i)	A) Increase output vo			AC. DC		
			C) Reduce sparking a		B) Convert emf from			
		ii)			D) Increase the speed hs is equal to			
		•••			is is equal to	,		
			A) $\frac{P}{2}$	B) 2P	C) P	D) 4P		
		iii)	The speed of a d.c	motor is almo	st constant			
		111)	A) Shunt	B) Series	C) Compound	D) None of these		
		iv)	,		ly proportional to	D) None of these		
		,	A) Vla	B) $I_aR_a$	C) $\phi I_a$	$D$ ) $E_bI_a$		
	<ul> <li>b. Derive the expression for the e.m.f of a DC generator.</li> </ul>							
	c.		ch the various characte			(04 Marks)		
					_	(06 Marks)		
	d.	A D	C shunt motor takes ar	armature current of	110 A at 480 V. The a	rmature resistance is		
		0.2 9	$\Omega$ . The machine has 6	poles and armature i	is lap connected with 8	364 conductors. The		
		flux	per pole is 0.05 Wb. Ca	alculate i) speed ii) th	e torque developed by t	the armature.		
						(06 Marks)		

	a.	Cho	ose the correct	answers for the followin	g:	(04 Marks)
		i)	The transform	nation ratio in a transforr	ner is equal to .	
		-/				I.
			A) $\frac{D_1}{D_1}$	B) - 111	C) $\frac{N_2}{N_1}$	D) $\frac{-2}{r}$
			$\mathrm{E}_2$	$N_2$	$N_1$	$\mathbf{I}_{1}$
		ii)	The efficienc	y of a transformer is max	imum when	
			A) Iron loss	B) Iron loss is equa	l to copper loss	
			C) Iron loss	is less than copper loss	D) None of these	11
		iii)			handle and v	oltages
		1117				
				_	ium C) High and Medium	D) None of these
		1V)	Copper loss 1	n a transformer is a	loss.	
					s C) Friction loss	D) None of these
	b.	Expl	lain the constru	iction and working of a t	ransformer.	(06 Marks)
	c. Find the number of turns on the primary and secondary side of a 440/230 V, 50					
					section of the core is 30 c	
			density is 1Wl			(04 Marks)
	d.				pf has an efficiency 94% a	
	ч.					
		ioau	and full load (	of 600 kw. Determine in	e efficiency at half full -lo	
_		<b>C</b> 1		0 1 01		(06 Marks)
7	a.			answers for the following		(04 Marks)
		i)		pole rotor is used in		
			A) Low speed	B) High speed	<ul><li>C) Medium speed</li></ul>	D) A and B
		ii)	The speed at	which a 4-pole alternate	or has to be driven to gener	rate a voltage at 50 Hz
			is		_	•
			A) 1000 rpm	B) 1500 rpm	C) 2000 rpm	D) 1440 rpm
		iii)	The E. M. F.	induced in an alternator	is given by the equation	- ) - · · · · - <b>p</b> - · ·
		,	Δ) 1 11 f h 7	b b. B) 2.22 b f. z	is given by the equation C) 2.22 f $\phi$ z $k_p$ $k_d$ excited.	 D) 4 44 f Å 7
		i+.)	The field win	$\frac{Kp\;Kd}{ding\;of\;on\;oltomaton\;is}$	C) 2.22 I $\psi$ Z $K_p$ $K_d$	D) 4.44 I \ Z
		iv)	The field will	ding of an alternator is	excited.	C D) N C (1
	1				C) Both DC and A	
	b.	How	are alternator	s classified? With a neat	diagram, show the differen	
		4.0	1 2 1	4.	2000	(08 Marks)
	c. A 2 – pole, 3 – phase alternator running at 3000 rpm has armature slots with 2 co					
					equired to generate a line	
		Dist	ribution factor	is 0.952 and pitch factor	is 0.956.	(06 Marks)
	d.	Defi	ne regulation o		(02 Marks)	
8	a.	Cho	ose the correct	answers for the following	ıg:	(04 Marks)
		i)		y of the rotor current is _		,
		-/	,		$C) sf^2$	D) N C.1
			A) $\frac{s}{f}$	B) sf	,	D) None of these
		ii)	In a 3 – phase	e induction motor, the sli	p speed is given by C) N <sub>S</sub> – N	
		,	A) No	B) N	C) No = N	D) N – No
		iii)	The synchror	ous speed of three phase	induction motor is given l	by the trig
		****	120	r	1200	. De
			A) $N_s = \frac{120}{1}$	$\frac{n}{2}$ B) N <sub>S</sub> = 120 fP	e induction motor is given by $C) \frac{120P}{f} = N_S$	D) $N_s = \frac{PT}{r}$
					-	
		iv)	A $3-\phi$ indu	ction motor having $4-p$	oles, 50 Hz runs at 1440 r	om, the slip is
			A) 3%	B) 5%	C) 4%	D) 1%
	b.	With	,	,	rinciple of 3 - φ induction	,
	c.					
	٠.				6 – pole alternator which	-
	ر .			ith a slip of 3%, what is	•	(06 Marks)
	d.	wny	does an induc	tion motor need a starter	?	(04 Marks)

