ī	Firstranker's choice	1-	
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	USN USN		10ELE15/25
	First/Second Semester B.E. Degree	Examination,	June / July 2014
	Basic Electrical	Engineerin	g
	Time: 3 hrs.	_	Max. Marks:100
	Note: 1. Answer any FIVE full questions, choosing 2. Answer all objective type questions only on 3. Answer to objective type questions on sheet	at least two from e OMR sheet page 5 is other than OMR w	ach part. of the answer booklet. vill not be valued.
	PART	<u>`A</u>	
	1 a. Choose the correct answers for the following	5 .	(04 Marks)
	q' The resistance of a conductor is direct	tly proportional to if	and inversiv
	A) Length & Area	D) Area & I	anath
	C) Length & Current	D) Lenoth &	Voltage
	ii) When the conductor moves perpendicula	ar to the lines of flu	x, the emf induced is
	A) Minimum B) Maximum	C) Zero	D) None of these
	iii) The mutual inductance between two co	oils of self inductan	ce 0.8 H and 0.2 H, have a
	coefficient of coupling 0.9 is	,	
	A) 0.36 H 13) 0.4 H	C) 0.16 H	D) 0.144 H •
	iv) An electric heater is rated to 2 kW, 200) Y. The resistance of	of the heater coil is,
	A) 10 cl B) 0.1 0	C) 20 Q %	Г 7b* D) 200 Q
	b. Show that the equivalent resistance of two re product of these two resistances divided by t	esistors connected in the sum of those two	n parallel in the ratio of the resistance values.
			(04 Marks)
	c. Derive an expression for dynamically induce	ed emf.	(06 Marks)
	that 60% of the flux produced by one coll	It a current of 10	A flowing in the first coil
	produces a flux of 0.5 mwb. Find the induct	ance of the second of	nil (06 Marke)
	produces a nux or 0.5 mwb. I md the mutet		
	2 a. Choose the correct answers for the following	5:	(04 Marks)
		71	
	i) An alternating current is given by $i = 1$	4.14 sin o)t + $\frac{1}{2}$) ha	as an rms value of
	ampereS	0	
	A) 10 A B) 14.14	C) 20 A	D) 0.707
	ii) In an a.c circuit, the ratio of kW/KVA	represents	,
	• A) Power factor B) Load factor	C) Form fact	or D) Peak factor
	iii) A current drawn by a capacitor of 20	1.i.F is 1.382 A from	m a 220 V A.•. supply. The
	supply frequency is,		_
	A) 25 Hz B) 60 Hz	C) 50 Hz	D) 40 Hz
	iv) The unit of apparent power is		
	A) kW B) KVAR	C) KVA	D) Joules
	U. Define: (1) Instantaneous value (11) Al	inpitude (11	(iv) Period With
	Two impedances (150 - i157) 0 and (100 -	(110) 0 are connect	(04 Marks) ted in parallel across 200 V
	50 Hz supply Find branch currents total c	urrent and total now	ver consumed in the circuit
	Draw the phasor diagram	unoni and iotai pow	(A6 Marke)
	d. Show that the power consumed in an R-C	series circuit is Wo	os Draw the waveform for
	voltage, current and power.		(06 Marks)
			()

D,	F	irs	tRa	anker. <mark>co</mark>	M KLE SO	oclety's			
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	2 a Chasse the servest energy		www.institutiker.com						
	3 a. Choose the correct answer			The phase seque	ence or a three	tm''' e nhase syst	tem is RVR Th	() ne other possibl	e phase
			1)	sequence is		e phase syst		le other possion	e phase
				A) YRB	B) BRY		C) RBY	D) None o	f these
			ii)	When the two w	attmeters used	to measure	three phase powe	er gives equal re	adings,
			ŕ	then the p.f of the	circuit is giver	n by			-
				A) 0	B) 0.5		C) 1	D) 0.866	
			iii)	The power consumers of	med by a 3-4) l	oad is given	by the expression		
				A) 3VLILcos4)	B) VaLco	os4	C) V _L ILCOS4)	D) $\sqrt{3} V_{L}$	cosø
			iv)	A 3-4) apparatus i	s eff	ficient than a 1	1 - 4) apparatus,		
			,	A) More B)	Less (C) Both	(A) & (B	D) None o	f these
			What	t are the advantage	es of 3-4) system	ns over a sing	gle phase system:	? ((06 Marks)
	c. A 3. 4), 400 V, motor takes an input of 40 kW at 0.45 p.f. lag. Find t the two single phase wattmeters connected to measure the input.					nd the reading o	the reading of each of (05 Marks) `a balanced 3-4) delta		
						(
	d. Obtain the relationship between line current and phase current -in				in `a balanced 3				
	connected system.					((05 Marks)		
	4	a.	Choo	ose the correct ans	wers for the fol	lowing :		(04 Marks)
	-		i)	The totating disc	of the energy n	neter is made	e of	(
			-/	A) Copper	B) Silver		C),Aluminum	D) Platinu	m
			ii)	One unit of electr	rical energy is e	equivalent to		,	
			,	A) 3.6 kWs	B) 3600 V	Ŵ.S	C) 1 kWH	D) 10 WH	
			iii)	An intermediate	switch is used i	n	of lamps.		
				A) Three way co	ntrol		B) Two way con	trol	
				C) One way cont	rol		D) Four way con	ntrol	
			iv) T	he value of "Fusi	ing Factor" is a	always			
A) Less than 1 B) Equal			to I	C) Zero	D) More th	nan I.			
	 b. With the help of neat diagram, explain the construction and principl single phase induction type energy meter. c. Write the circuit diagram and switching table for' two-way and three-w Where is it used? 				nciple of operat	ple of operation of a			
					() Yaa wax control (of lown			
					ce-way control (08 Marks)			
where is it used?					(00 101 u 1 KS)			
PART — B									
	5	a. C	Choos	e the correct answ	vers for the foll	lowing :		(04 Marks)
			i)	The purpose of c	ommutator in a	d.c. generate	or is to		
				A) Increase outp	ut voltage		B) Convert emf	from AC to DC	
				C) Reduce spark	ing at brushes		D) Increase the s	speed	
	ii) In a lap winding, the number of parallel paths is equal to								
				Р	B) 2P		C) P	D) 4P'	
				A) —	D) 21		0)1	<i>D</i>) II	
			iii)	The speed of a d.	.c m	otor is almos	t constant.		
				A) Shunt	B) Series		C) Compound	D) None of	of these
			iv)	The torque produ	aced by DC mo	tor is directly	y proportional to		
				A) VI _a	B) IaRa		C) Id _a	D) EbI _a	
		b.	Deri	ve the expression	for the e.m.f of	a DC genera	tor.	(04 Marks)
		c.	Sket	ch the various cha	racteristics of I	DC shunt mo	tor and mention i	ts applications.	06 Mart 1
		А		C shunt motor tab	es an armatura	current of 1	10 Δ at /80 V T) The armature regi	stance is
	a. A DC shuft motor takes an armature current of 110 A at 480 V. The armature resists						ore The		
			0.∠ 3 fluv	ner nole is 0.05 W	(h Calculate i)	speed ii) the	torque develope	d by the armature	ors. The
			пил	Per pore is 0.03 W	. J. Calculate I)	speed if) the	inque de reioper	a by the armature	·•

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(06 Marks)

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6 a. C	Choos	e the correct and	Swers _			(04 Marks)
	i)	The transformation	on ratio in a transform	ner is equal to		10
		A) $-$	B) Ni	C) N2 N]	D) $\frac{12}{}$
	ii)	L_2	$1N_2$	vinum whon		
	11)	A) Iron loss is m	ore than copper loss	B) Iron lo	$\frac{1}{1}$	copper loss
		C) Iron loss is le	ss than copper loss	D) None	of these	copper loss
	iii)	Core type of tran	sformers are used to	handle an	d volta	ges.
		A) Low and Hig	gh B) Low and Med	ium C) High and	l Medium D)	None of these
	iv)	Copper loss in a t	transformer is a	loss.		
h	Evol	A) Constant loss	B) variable los	s C) Fricul ransformer	on loss	D) None of these (06 Marks)
С.	Find	.the number of tu	rns on the primary a	and secondary si	de of a 440/2.	30 V. 50 Hz single
	phas	e transformer, if	the net area of cross	section of the co	ore is 30 cm^2	and the maximum
	flux	density is 1Whin1	2.			(04 Marks)
d.	A si	ngle phase transfo	rmer working at 0.8	pf has an efficier	1cy 94% at bo	th three fourth full
	load	and full load-of 60	00 kW. Determine the	e efficiency at hal	if full —load,	unity power factor. (06 Marks)
7 a. Cł	noose	the correct answ	ers for the followin	19:		(04 Marks)
, u. e.	i)	A non salient pol	le rotor is used in	alternator.		(011/11/11/
	,	A) Low speed	B) High speed	l C) Mediu	um speed	D) A and B
	ii)	The speed at whi	ch a 4—pole alterna	tor has to be drive	en to generate	a voltage at 50 Hz
		is	D) 1500 mm	Armik	^N	D) 1440 mmm
	iii)	A) 1000 rpm The F M F ind	B) 1500 rpm	C) 2000	rpin	D) 1440 rpm
	111)	A) 4.44 ftli z $k_{\rm p}$	$k_d = B (2.22 k_p)$	z C) 2.22	$f z k_{n} kd$	D) 4.44 f z
	iv)	The field windin	g of an alternator is	excited.	P	,
		A) DC	B) AC	C) Both	DC and AC I	D) None of these
b.	How	are alternators cl	assified? With a near	diagram, show t	he difference	between them. (08 Marks)
с.	A 2	— pole, 3 — phas	e alternator running a	at 3000 rpm has an	rmature slots v	with 2 conductors in
	eac	h slot. Calculate	the flux per pole r	equired to gene	rate a line vo	oltage of 2300 V.
b	D1st	ribution factor is (0.952 and pitch facto	r 1s 0.956.		(06 Marks) (02 Marks)
u.	Den	ine regulation of a				(02 IVIAI KS)
8 a. Cl	100se	the correct answ	ers for the followir	ıg :		(04 Marks)
	i)	The frequency o	f the rotor current is			
		A) X.	B) sf	C) sf ²		D) None of these
	ii)	In a 3 — phase in	nduction motor, the s	lip speed is given	by	
		A) N _s	B) N	C) Ns —	Ν	D) N — Ns
	iii)	The synchronou	s speed of three phas	e induction moto	r is given by	
		A) $Ns = \frac{120f}{r}$	B) Ns = 120 f	P C)	-N _s	D) Ns Pf
	iv)	P A 3 — (I) induct	ion motor having 4 —	– poles, 50 Hz run	s at 1440 rpm.	the slip is
		A) 3%	B) 5%	C) 4%	1 10 ipili,	D) 1%
b. '	With	a neat diagram, e	xplain the working	principle of 3 - i	nduction mot	tor. (06 Marks)
C.	A 1	0 pole induction m	notor is supplied by a	16 — pole alterna	ator which is d	driven at 1200 rpm.
1 -	If th	e motor runs with	a slip of 3%, what is	s its speed?		(06 Marks)
d. '	Why d	toes an induction	motor need a starte	r?		(04 Marks)

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