[B19 EE 3101]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech I Semester (R19) Regular Examinations

ELECTRICALMACHINES-II

(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

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			CO	**KL**	M
		UNIT - I			
1.	a).	Derive the emf equation of an alternator.	CO1	K3	7M
	b).	A 3 phase, star connected synchronous generator driven at 750rpm is required to generate a line-to-line voltage of 440V at 50HZ on open circuit. The stator is wound with 2slots per pole per phase and each coil has 4 turns. Calculate the useful flux per pole.	CO1	K3	8M
		OR			
2.	a).	Explain how the rotating magnetic field is produced by three-phase currents.	CO2	K3	7M
	b).	A 3 phase, 6 pole, star-connected alternator revolves at 1000 r.p.m. The stator has 90 slots and 8 conductors per slot. The flux per pole is 0.05wb (sinusoidally distributed). Calculate the voltage generated by the machine if the winding factor is 0.96.	CO2	K3	8M
		UNIT - II			
3.	a).	Discuss the parallel operation of two alternators with identical speed/load Characteristics.	CO2	K3	7M
	b).	A 3300V, 3phase star connected alternator has a full load current of 100A. On short circuit a field current of 5A was necessary to produce full load current. The emf on open circuit for the same excitation was 900V. The armature resistance was 0.8Ω/ph. Determine the full load voltage regulation for (1)0.8pf lagging (2)0.8pf leading.	CO2	K4	8M
		OR			
4.	a).	Explain how voltage regulation is determined from E.M.F method	CO2	K3	7M
	b).	A 3-Φ generator rated at 25MVA, 0.8pf lag, 13.8KV is operated at normal voltage & rated load. X_d, X_q and R_a are 7.62 , 4.57 , 0.15 Ω/ph respectively. Determine direct axis & quadrature axis components of armature current and internal induced voltage. Also find regulation.	CO2	K4	8M
		UNIT – III			
5.	a).	Explain starting methods of synchronous motor	CO3	K3	7M

	b).	A 3300V, 3 phase synchronous motor running at 1500 rpm has its excitation kept constant corresponding to no-load terminal voltage of 3000V. Determine the power input, power factor and torque developed for an armature current of 250A if the synchronous reactance is 5 Ω per phase and armature resistance is neglected.	CO3	K4	8M
OR					
6.	a).	Explain V and inverted V curves of a synchronous motor?	CO3	K4	7M
	b).	A 2000V, 3 phase, 4 pole, star connected synchronous motor runs at 1500rpm. The excitation is constant and corresponding to an open circuit voltage of 2000V. The resistance is negligible in comparison with synchronous reactance of 3.5Ω /ph. For an armature current of 200A. Determine (i) power factor (ii) power input (iii) torque developed.	CO3	K4	8M
UNIT – IV					
7.	a).	Sketch and explain the torque slip characteristics of the 3 Φ cage and slip-ring induction motors.	CO4	K4	8M
	b).	A 50 HP, 6–Pole, 50 Hz, slip ring IM runs at 960 rpm on full load with a rotor current of 40A. Allow 300 W for copper loss in S.C. and 1200 W for mechanical losses, find R_2 per phase of the 3- phase rotor.	CO4	K4	7M
OR					
8.	a).	Explain in detail the construction of circle diagram of an induction motor.	CO4	K4	8M
	b).	The power input to the rotor of a 3 phase, 50 HZ, 6 pole induction motor is 80 KW. The rotor emf makes 100 complete alternations per minute. Find i. Slip ii. Motor Speed iii. Mechanical power developed iv. Rotor copper loss per phase vi. Torque developed.	CO4	K4	7M
UNIT – V					
9.	a).	Explain the cascade method of speed control for a 3-Φ induction motor with neat diagram	CO5	K3	7M
	b).	Give the classification of single-phase motors. Explain any two types of single-phase induction motors.	CO5	K3	8M
OR					
10.	a).	Explain double revolving field theory.	CO5	K3	8M
	b).	Develop equivalent circuit of a single-phase induction motor ignoring core losses.	CO5	K3	7M

[B19 EE 3102]
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)
III B. Tech I Semester (R19) Regular Examinations
CONTROL SYSTEMS
(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**
All questions carry equal marks
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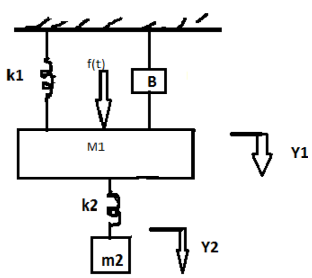
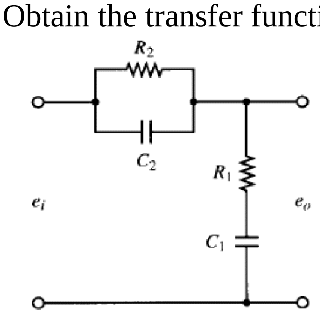
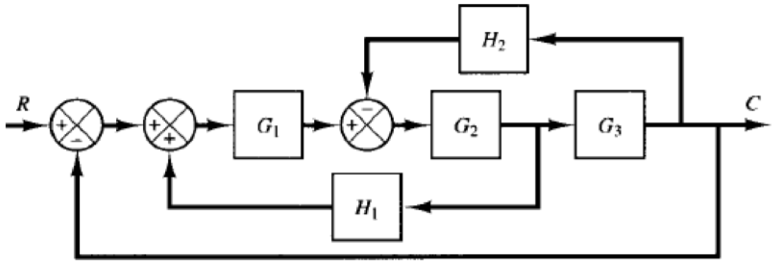
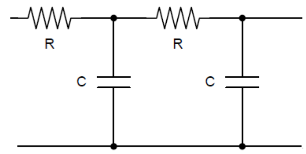
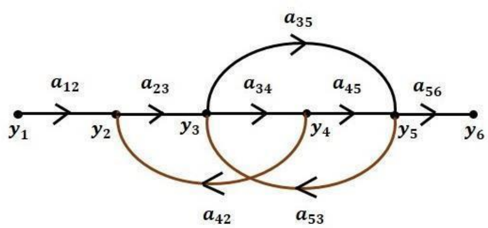
			CO	KL	M
UNIT - I					
1.	a).	Differentiate open-loop and closed loop control systems with examples.	CO1	K3	7
	b).	For the given mechanical system, obtain the transfer function and draw its electrical analog based on f-i analogy. 	CO1	K3	8
OR					
2.	a).	Discuss the significance of Impulse response of an LTI System?	CO1	K3	7
	b).	Obtain the transfer function $E_o(s)/E_i(s)$ for the following network 	CO1	K3	8
UNIT - II					
3.	a).	Illustrate the effects of feedback in control systems	CO2	K3	7
	b).	Find the transfer function C/R for the following system by using block diagram reduction technique	CO2	K3	8

					
OR					
4.	a).	Obtain the block diagram for the system shown in figure below 	CO2	K3	7
	b).	Obtain the transfer function y_6/y_1 for the given SFG using Mason's gain rule. 	CO2	K3	8
UNIT - III					
5.	a).	Distinguish between type and order of a system. What are the various error constants and how they are related to the type of the system?	CO3	K4	7
	b).	Derive the expression for unit-step response of a standard second-order system which is under-damped. Also, describe the transient response specifications.	CO3	K3	8
OR					
6.	a).	Discuss the standard input signals used to test control systems. Which one is used mostly and why?	CO3	K3	7
	b).	A unity feedback system is characterized by an open-loop transfer function G(s) = K/S(S+10). Determine the value of gain K such that the system has a damping ratio of 0.5. With this value of K, find the settling time, percent overshoot and steady state error for a unit-ramp input.	CO3	K3	8
UNIT - IV					
7.	a).	Explain why all the poles of a closed loop system must lie in the left-half of the s-plane for the system to be stable.	CO4	K3	7
	b).	Using R-H criterion, find the range of K for the closed loop system to be stable. The open loop transfer function of the system is	CO4	K3	8

		$$G(S)H(S)=\frac{K}{S(S+1)(S+2)}$$			
		OR			
8.	a).	Explain how ‘Relative stability’ of a system can be assessed using RH criterion?	CO4	K3	7
	b).	Obtain the Root-locus for the system with $G(S)H(S)=\frac{K}{S(S+4)(S^2+4S+8)}$ What value of K makes the closed loop system marginally stable?	CO4	K3	8
		UNIT - V			
9.	a).	What are the frequency domain specifications? A second order system step response shows 25% overshoot. What is its resonant peak in frequency response?	CO5	K3	7
	b).	Obtain the Bode plots for the system having OL transfer function $G(S)H(S)=\frac{2500}{S(S+5)(S+50)}$ Determine the Gain Margin and Phase Margin.	CO5	K4	8
		OR			
10.	a).	What is the purpose of Constant M and N Circles.? Explain	CO5	K3	7
	b).	Draw Nyquist diagram and determine the stability of a control system with open-loop transfer function $G(S)H(S)=\frac{3}{S(S+1)^2}$.	CO5	K4	8

[B19 EE 3103]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech I Semester (R19) Regular Examinations

POWER ELECTRONICS

(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

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			CO	KL	M
UNIT-I					
1.	**a).**	**Explain** the static VI characteristics of an SCR.	**CO1**	**K3**	**7**
	b).	**Applying** two transistor analogy, explain how thyristor can be turned on.	**CO1**	**K4**	**8**
OR					
2.	**a).**	SCRs with a rating of 100 V and 200 A are available to be used in a string to handle 6 KV and 1 KA. **Determine** the number of series and parallel units required in case derating factor is 0.1.	**CO1**	**K4**	**7**
	b).	**Explain** resonant pulse commutation technique to turn off a thyristor.	**CO1**	**K3**	**8**
Unit-II					
3.	**a).**	**Analyze** the operation of single phase semi converter with RL load. Determine the expression for output voltage.	**CO2**	**K4**	**7**
	b).	**Explain** the effect of source impedance in a single phase full converter.	**CO2**	**K4**	**8**
OR					
4.	**a).**	**Analyze** the operation of single phase full converter with RL load. Draw the output voltage waveforms for $\alpha=60^0$.	**CO2**	**K4**	**7**
	b).	For a 3-Ø fully controlled SCR bridge converter operating from 3-Ø ,400 volts,50 hz supply. **Determine** the average D.C output voltage for a firing angle of 45°.	**CO2**	**K4**	**8**
Unit-III					
5.	**a).**	Explain the operation of step up chopper and **Derive** the expression for output voltage.	**CO3**	**K3**	**7**
	b).	**Explain** control strategies for varying duty cycle in the chopper.	**CO3**	**K3**	**8**
OR					

6.	a).	A step-up chopper has input voltage of 220 V and the output voltage of 660 V. If the conducting time of thyristor chopper is 100µ sec, **Compute** the pulse width of output voltage.	**CO3**	**K3**	**7**
	b).	**Draw** therelated waveforms of Cuk converter in continuous mode and explain its operation.	**CO3**	**K3**	**8**
Unit-IV					
7.	**a).**	**Illustrate the** step down Cycloconverter with a circuit diagram and neat output voltage waveforms.	**CO4**	**K3**	**7**
	b).	Draw the circuit diagram and output voltage waveform of 1-Ø A.C voltage controller with R load. **Derive** the expression for output voltage.	**CO4**	**K3**	**8**
OR					
8.	**a).**	Draw the circuit diagram and output voltage waveform of 1-Ø A.C voltage controller with RL load. **Derive** the expression for output voltage.	**CO4**	**K3**	**7**
	b).	**Illustrate** the step up Cycloconverter with a circuit diagram and neat output voltage waveforms.	**CO4**	**K3**	**8**
UNIT-V					
9.	**a).**	**Explain** a full bridge inverter with neat wave forms and derive the expression for output voltage.	**CO5**	**K4**	**7**
	b).	**Explain** methods to reduce harmonic in the inverter output voltage.	**CO5**	**K4**	**8**
10.	**a).**	**Explain** the three phase VSI with 180° operation with neat output voltage waveforms.	**CO5**	**K4**	**8**
	b).	**Compare** voltage source inverter and current source inverter.	**CO5**	**K4**	**7**

[B19 EE 3104]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech I Semester (R19) Regular Examinations

ELECTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION

(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

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			CO	KL	M
		UNIT – I			
1.	a).	**Explain** the working of thermal power plant with a neat layout.	CO1	K3	8M
	b).	A factory has a maximum load of 240 kW at 0.8 p.f. lagging with an annual consumption of 50,000 units. The tariff is Rs 50 per KVA ofmaximum demand plus 10 paise per unit. **Calculate** the flat rate ofenergy consumption. What will be annual saving if p.f. is raised tounity?	CO1	K3	7M
		OR			
2.	a).	**Explain** the importance of the following terms in generation: i) Load curve ii) Load duration curve	CO1	K3	7M
	b).	A power station has a maximum demand of 20000 kW. The annual load factor is 50% and plant capacity factor is 40%. **Determine** the reserve capacity of the plant.	CO1	K3	8M
		UNIT – II			
3.	a).	**Compare** the volume of conductor material required for a d.c. 3-wire system and 3-phase, 3-wire system on the basis of equal maximum potential difference between one conductor and earth. Make suitable assumptions.	CO2	K4	7M
	b).	State and prove Kelvin's law for size of conductor for transmission. Discuss its Limitations.	CO2	K3	8M
		OR			
4.	a).	**Compare** AC transmission and DC transmission.	CO2	K4	7M
	b).	A 2 wire DC distributor ABCDEA in the form of a ring main is fed at point 'A' at 230V and is loaded as follows: 20A at B, 40A at C, 60A at D and 20A at E. The resistances of various sections (ground and return) are AB = 0.1Ω, BC = 0.05Ω, CD = 0.01Ω, DE = 0.025Ω and EA =0.075Ω. **Determine** the point of minimum potential and current in each section of distributor.	CO2	K3	8M
		UNIT – III			
5.	a).	**Derive** an expression for the Inductance of a three-phase line having unsymmetrical spacing.	CO3	K3	7M
	b).	The three conductors of a 3-phase line are arranged at the corners of a	CO3	K3	8M

		triangle of sides 4, 5 and 6 meters. **Calculate** inductance per km of each conductor when conductors are regularly transposed. The diameter of each line conductor is 2cm.			
OR					
6.	a).	**Derive** an expression for the Capacitance of a single phase two wire line.	CO3	K3	7M
	b).	A 3-phase overhead transmission line has its conductors arranged at the corners of an equilateral triangle of 2 m side. **Calculate** the capacitance of each line conductor per km. Given that diameter of each conductor is 1·25 cm.	CO3	K3	8M
UNIT – IV					
7.	a).	**Derive** the generalized circuit constants for short transmission line	CO4	K3	7M
	b).	A 3phase, 50Hz, 150 km line has a resistance, inductive reactance a capacitive shunt admittance of 0·1 Ω, 0·5 Ω and 3 $\times 10^{-6}$S per km per phase. If the line delivers 50 MW at 110 kV and 0·8 p.f .lagging. **Calculate** the sending end voltage and current. Assume a nominal π circuit for the line.	CO4	K3	8M
OR					
8.	a).	Using rigorous method, **derive** expressions for sending end voltage and current for a long transmission line.	CO4	K3	7M
	b).	A 3-φ transmission line 200 km long has the following constants: Resistance/phase/km = 0·16 Ω Reactance/phase/km = 0·25 Ω Shunt admittance/phase/km = 1·5 × 10^{-6} S. **Calculate** by rigorous method the sending end voltage and current when the line is delivering a load of 20 MW at 0·8 p.f. lagging. The receiving end voltage is kept constant at 110 kV.	CO4	K3	8M
UNIT – V					
9.	a).	**Derive** an Expression for the sag of transmission line conductor, suspended between two supports of the same height.	CO5	K3	7M
	b).	An overhead line has a span of 260 m, the weight of the line conductor is 0·68 kg per meter run. **Calculate** the maximum sag in the line. The maximum allowable tension in the line is 1550 kg.	CO5	K3	8M
OR					
10.	a).	The self-capacitance of each unit in a string of three suspension insulators is C. The shunting capacitance of the connecting metal work of each insulator to earth is 0·15 C while for line it is 0·1 C. **Calculate** (i) the voltage across each insulator as a percentage of the line voltage to earth and (ii) string efficiency.	CO5	K3	7M
	b).	**Explain** the following terms with reference to corona: (i) Critical Disruptive voltage (ii) Visual critical voltage, (iii) Power loss due to corona.	CO5	K3	8M

B19 EE 3105]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech I Semester (R19) Regular Examinations

MICRO PROCESSORS AND MICRO CONTROLLERS

(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

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			CO	KL	M
		UNIT – I			
1.	a)	With the help of neat diagram explain the architecture of 8085 microprocessor in detail. Discuss its flag register.	CO1	K3	7M
	b)	Describe with suitable examples the data transfer, loading & storing instructions of 8085 microprocessor?	CO1	K3	8M
		OR			
2.	a)	Interface a 8K RAM consecutively with microprocessor 8085, starting with ROM interfacing at address 8000H.	CO1	K3	7M
	b)	Write a program with a flowchart to multiply two 8-bit binary numbers using 8085MP	CO1	K3	8M
		UNIT – II			
3.	a)	Explain different addressing modes of 8086 microprocessor	CO2	K3	7M
	b)	Give the two examples for data transfer instructions, arithmetic instructions, logic instructions and branch instructions of 8086 MP?	CO2	K3	8M
		OR			
4.	a)	Distinguish between 8085 and 8086 microprocessors	CO2	K3	7M
	b)	Draw the flag register of 8086 MP and explain the function of each flag	CO2	K3	8M
		UNIT – III			
5.	a)	Explain the block diagram and the functions of each block of the 8251 USART.	CO3	K3	7M
	b)	Explain the block diagram and the functions of each block of the 8255 PPI	CO3	K3	8M
		OR			

6.	a)	Interface a 10- or 12-bit D/A converter with an 8-bit processor	CO3	K3	7M
	b)	Explain the DMA operation using 8085 for bulk data transfer.	CO3	K3	8M
		UNIT – IV			
7.	a)	Draw and explain the formats of TMOD, TCON, SCON, IE and IP registers of 8051microcontroller	CO4	K3	8M
	b)	Draw the memory map for the 128-byte internal RAM 8051 microcontroller	CO4	K3	7M
		OR			
8.	a)	Explain the architecture of 8051 microcontroller	CO5	K3	8M
	b)	Discuss different interrupts in 8051 microcontrollers	CO5	K3	7M
		UNIT – V			
9.	a).	Explain the addressing modes of 8051 with examples	CO5	K4	7M
	b).	List and explain the logical group of instructions of 8051 microcontroller with examples.	CO5	K4	8M
		OR			
10.	a)	Explain the procedure for stepper motor controller using 8051 microcontrollers	CO5	K4	15M

[B19 EE 3106]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech I Semester (R19) Regular Examinations

ANALOG ELECTRONICS

(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

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			CO	KL	M
		UNIT - I			
1.	a).	Determine expressions for input impedance and output impedance in case of a voltage series feedback topology.	1	2	7
	b).	An amplifier gain change by ±10% using negative feedback amplifier is to be modified to yield gain of 100 with 0.1% variation.Calculate the required loop gain and amount of negative feedback	1	4	8
		OR			
2.	a).	Determine expressions for input impedance and output impedance of voltage –shunt and current-shunt topologies and identify the types of amplifiers.	1	2	8
	b).	A negative feedback of β=0.002 is applied to an amplifier of gain 1000.Calculate the change in overall gain of the feedback amplifier ,if the internal amplifier is subject to a gain reduction of 15%.	1	4	7
		UNIT - II			
3.	a).	Explain the working of RC phase shift oscillator using BJT and derive frequency of oscillations.	2	4	8
	b).	In a colpitt’s oscillator C1= 0.02 µF and C2=0.2 µF. if the frequency of oscillator is 10KHz, Find the value of inductor and also find the required gain for oscillator.	2	4	7
		OR			
4.	a).	Obtain the frequency and condition for sustained oscillations of colpitt’s oscillator	2	3	8
	b).	In Hartley oscillator, calculate L2 if L1=15 mH, C = 50 pF, mutual inductance of 5 µH and the frequency of oscillations is 168 KHz.	2	4	7
		UNIT - III			
5.	a).	Explain the operation of the square wave generator with a neat circuit diagram and derive an expression for its time period.	3	2	7
	b).	With a neat sketch, explain the operation of the Instrumentation amplifier in detail.	3	2	8
		OR			
6.	a).	Design a schmitt circuit with +Vsat=+12V, -Vsat=-12V, R1=50 ohm, R2=100k ohm, Vref=0.2V, Vin=1V(p-p).Find values of V_{utp} and V_{ltp}	3	4	7
	b).	Explain in detail about the operation of Absolute value output circuit	3	2	8

		with necessary derivations.			
UNIT - IV					
7.	a).	Design a wide BPF with f_L=200Hz , f_H=1KHz and pass band gain=4. Draw the frequency response plot of this filter.Calculate the value Q for the filter.	4	4	7
	b).	Design an RC phase oscillator for frequency of 5KHz	4	4	8
OR					
8.	a).	Derive the transfer function of a second order LPF. Comment on its frequency response	4	2	7
	b).	Explain the operation of the Quadrature Oscillator with a neat diagram and design the Quadrature Oscillator to operate at a frequency of 159 Hz.	4	4	8
UNIT - V					
9.	a).	Explain the operation of 555 Timer as Monoatable Multivibrator with a neat circuit diagram and derive an expression for its time period. Design a Monostable Multivibrator using 555timer to produce a pulse width of 100ms	5	4	9
	b).	Explain in detail about the block diagram of PLL	5	2	6
OR					
10.	a).	Design an Astable Multivibrator using 555timer to generate duty cycle of a) 45% and b) 65%.	5	4	8
	b).	Explain in detail about two applications of PLL	5	2	7

[B19 EE 3107]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech I Semester (R19) Regular Examinations

LINEAR & DIGITAL IC APPLICATIONS

(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

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			M	CO	KL
		UNIT-I			
1	a.	Draw a block diagram of typical OP-AMP and explain the function of each block.	**7**	**1**	**3**
	b.	Explain the working of Instrumentation amplifier using 3 Op-Amps.	**8**	**1**	**3**
		OR			
2	a.	Explain the operation of Square wave generator circuit with neat circuit diagram and derive expression for time period.	**7**	**1**	**3**
	b.	Explain the operation of an Regenerative comparator with circuit diagram and Waveforms.	**8**	**1**	**3**
		UNIT-II			
3	a.	Derive the transfer function of a second order LPF. Comment on its frequency response.	**7**	**2**	**3**
	b.	Why active filters are preferred to passive filters. Explain the operation of All-pass filters with neat circuit diagrams and waveforms.	**78**	**2**	**2**
		OR			
4	a.	Design a Wide Band Pass Filter with f L =200Hz ,f H =1kHz and pass band gain of 4 Calculate the value of Q for the filter.	**7**	**2**	**3**
	b.	Draw a block diagram of typical voltage controlled oscillator and explain its working.	**8**	**2**	**3**
		UNIT-III			
5	a.	Draw the circuit of Schmitt trigger using IC555 timer and explain its operation?	**7**	**3**	**3**
	b.	Design a monostable multivibrator using 555 timer to produce a pulse width of 100 ms and explain its working with the help of a functional diagram of a 555 timer.	**8**	**3**	**3**
		OR			
6	a.	With the help of schematic diagram of 555 timer, explain how it can be used as mono stablemultivibrator	**7**	**3**	**3**
	b.	Draw and explain the working of 555-timer circuit in astable mode to get	**8**	**3**	**3**

		output waveform with 50% duty cycle			
UNIT-IV					
7	a.	With a neat diagram explain the working principle of R-2R ladder type DAC.	**7**	**4**	**3**
	b.	With neat block diagram, explain successive approximation type A/D converter in detail	**8**	**4**	**3**
OR					
8	a.	Which is the fastest ADC? Explain the operation and discuss its merits and de-merits	**7**	**4**	**3**
	b.	Draw and explain the circuit diagram of parallel comparator type ADC.	**8**	**4**	**3**
UNIT-V					
9	a.	Draw the circuit of a TTL NAND gate and explain the operation.	**7**	**5**	**3**
	b.	Draw the circuit of a DTL NAND gate and explain the operation.			
OR					
10	a.	Describe a basic ECL Nor gate and explain its working with the suitable truth table and diagram?	**7**	**5**	**3**
	b.	Write a VHDL Code for Binary Comparator	**8**	**5**	**3**

[B19EE3108]
III/IV B.Tech I Semester (R19) Regular Examinations
[PULSE AND DIGITAL CIRCUITS]
(EEE)

MODEL QUESTION PAPER

TIME: 3Hrs. **Max. Marks: 75M**

Answer **ONE Question** from **EACH UNIT.**
All questions carry equal marks.
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			CO	KL	M
		UNIT-I			
1.	**a).**	Explain the response of RC Low Pass circuit for the following input waveforms (i) Step (ii) Pulse	**1**	3	**8**
	b).	Deduce the expression for %tilt of a square wave after passing through a high pass RC Circuit.	**1**	**4**	**7**
		OR			
2.	**a).**	Show that a high pass circuit acts as differentiator and low pass circuit acts as an Integrator	**1**	2	**7**
	b).	Explain the circuit diagram of a compensated attenuator and derive the condition necessary for perfect attenuation.	**1**	3	**8**
		UNIT-II			
3.	**a).**	State and prove clamping circuit theorem.	**2**	2	**7**
	b).	Explain the working of the Transistor Clipper with the help of a neat Circuit diagram and waveforms.	**2**	3	**8**
		OR			
4.	**a).**	Design a clipping circuit to clip the given input voltage 10 sin wt at +5V level and below 5V.	**2**	4	**7**
	b).	Explain the response of the clamping circuit when a square wave input is applied under steady state conditions.	**2**	3	**8**
		UNIT-III			
5.	**a).**	Explain the operation of Schmitt trigger circuit with a neat diagram and also derive UTP, LTP equations.	**3**	3	**7**

	b).	Explain the operation of Collector Coupled monostable multivibrator with a circuit diagram and relevant waveforms.	**3**	3	**8**
		OR			
6.	**a).**	Explain the operation of Collector Coupled Astable multivibrator with a circuit diagram and relevant waveforms.	**3**	3	**7**
	b).	Define different switching times of a transistor with suitable circuit diagrams and waveforms.	**3**	3	**8**
		UNIT-IV			
7.	**a).**	Sketch a neat circuit diagram of UJT relaxation oscillator and explain its operation.	**4**	**3**	**7**
	b).	Deduce expressions for sweep speed error in Miller and Bootstrap sweep generators.	**4**	3	**8**
		OR			
8.	**a).**	Explain the working of a current sweep generator with the help of a neat circuit diagram and waveforms.	**4**	3	**8**
	b).	Define and derive the expressions for the slope error, transmission error and displacement error for the exponential sweep circuit.	**4**	3	**7**
		UNIT-V			
9.	**a).**	Explain the principle of synchronization and frequency division.	**5**	2	**8**
	b).	Sketch the circuit of a TTL NAND gate and explain the operation.	**5**	2	**7**
		OR			
10.	**a).**	Explain the operation of ECL NOR logic gate with a neat circuit diagram.	**5**	2	**8**
	b).	Sketch the circuit of a CMOS inverter and explain the operation.	**5**	2	**7**

CO-COURSE OUTCOME **KL-KNOWLEDGE LEVEL** **M-MARKS**

[B19 EE 3201]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech II Semester (R19) Regular Examinations

POWER SYSTEM ANALYSIS AND STABILITY

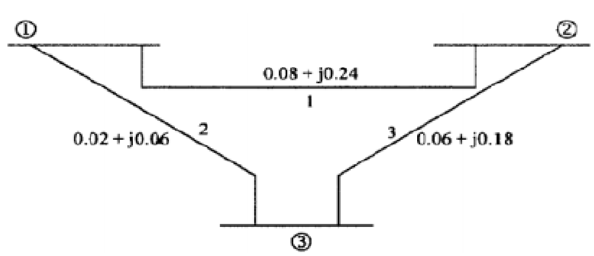
(EEE)

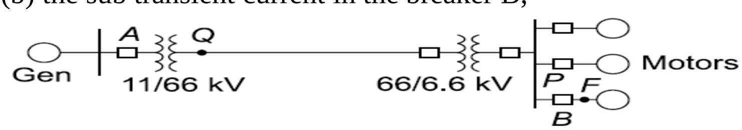
TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

*****

			CO	**KL**	**M**
		UNIT – I			
1.	a).	Describe the step-by-step procedure for developing single line diagram of a given power system.	CO1	K3	8M
	b).	A 50kW, three phase, Y connected load is fed by a 210kVA transformer with voltage rating 11kV/415V through a feeder. The length of feeder is 1km and the impedance of the feeder is (0.25+j 4) ohm/km. If the load power factor is 0.8. Determine the p.u impedance of the feeder and load.	CO1	K3	7M
		OR			
2.	a).	Show that the per unit equivalent impedance of a two winding transformer is the same whether the calculations are made from H.V. side or the L.V. side	CO1	K3	8M
	b).	The three phase ratings of a 3- winding transformer are Primary star Y – connected, 66kV, 15MVA Secondary Y – connected, 13.2kV, 10.0 MVA Tertiary Δ – connected, 2.3kV, 5MVA Neglecting resistance, the leakage reactances are Z_{ps} = 7% on 15MVA, 66kV base, Z_{pt} = 9% on 15MVA, 66kV base Z_{st} = 8% on 10 MVA, 13.2kV base Find the pu impedances of the star connected equivalent circuit for a base of 15 MVA, 66kV in the primary circuit.	CO1	K3	7M
		UNIT – II			
3.	a).	For the 3-bus system shown in the figure, Calculate Y-bus?  	CO2	K3	8M
	b).	Compare Gauss-Seidel, Newton Raphson and Fast decoupled load flow methods.	CO2	K4	7M

OR					
4.		With the help of a neat flow chart, explain the Newton-Raphson method of load flow solution when the system contains voltage-controlled busses in addition to swing bus and load bus.	CO2	K4	15M
UNIT – III					
5.	a).	Explain how a synchronous generator is represented in short circuit analysis.	CO3	K3	8M
	b).	A synchronous generator and a synchronous motor each rated 25 MVA, 11 kV having 15% subtransient reactance are connected through transformers and a line as shown in figure. The transformers are rated 25 MVA, 11/66 kV and 66/11 kV with leakage reactance of 10% each. The line has a reactance of 10% on a base of 25 MVA, 66 kV. The motor is drawing 15 MW at 0.8 power factor leading and a terminal voltage of 10.6 kV when a symmetrical three-phase fault occurs at the motor terminals. Find the subtransient current in the generator, motor and fault  (a) One-line diagram for the system	CO3	K4	7M
OR					
6.	a).	Describe the various types of current limiting reactors used in power system.	CO3	K3	8M
	b).	A 25 MVA, 11 kV generator with X_d''= 20% is connected through a transformer, line and a transformer to a bus that supplies three identical motors as shown in Fig. Each motor has X_d'' = 25% and X_d' = 30% on a base of 5 MVA, 6.6 kV. The three-phase rating of the step-up transformer is 25 MVA, 11/66 kV with a leakage reactance of 10% and that of the step-down transformer is 25 MVA, 66/6.6 kV with a leakage reactance of 10%. The bus voltage at the motors is 6.6 kV when a three-phase fault occurs at the point F. For the specified fault, calculate (a) the sub transient current in the fault, (b) the sub transient current in the breaker B, 	CO3	K4	7M
UNIT – IV					
7.	a).	Derive an expression for the positive sequence current I_{a1} of an unloaded generator when it is subjected to a double line to ground fault.	CO4	K3	8M
	b).	A 25 MVA, 13.2 kV alternator with solidly grounded neutral has a sub transient reactance of 0.25 p.u. The negative and zero sequence reactance's are 0.35 and 0.1 p.u. respectively. A single line to ground fault occurs at the terminals of an unloaded alternator; determine the fault current and the line-to-line voltages. Neglect resistance.	CO4	K3	7M

OR					
8.	a).	What are the different types of unsymmetrical faults? **Derive** the expression and sequence network for line to ground (L-G) fault for an unloaded synchronous generator.	CO4	K3	8M
	b).	Two 5 MVA, 50 Hz, 11 kV alternators with sub transient reactance X" = 0.1 p.u and a transformer of 40 MVA, 11/66 kV and reactance of 0.08 p.u are connected to a bus A. another generator rated 60 MVA, 11 kV with a reactance of 0.12 p.u is connected to a bus B. both A and B are interconnected through a reactor of 80 MVA, 20% reactance. If a 3-phase fault occurs on the H.V side of the transformer, calculate the current fed into the fault and fault MVA.	CO4	K3	7M
UNIT – V					
9.	a).	Explain critical clearing time and critical clearing angle, deriving the expressions.	CO5	K4	8M
	b).	Explain the methods of improving transient stability.	CO5	K3	7M
OR					
10.	a).	Explain equal area criterion.	CO5	K3	8M
	b).	A synchronous generator of reactance 1.20 pu is connected to an infinite bus (|V| = 1.0 pu) through transformers and a line of total reactance of 0.60 pu. T generator no load voltage is 1.20 pu and its inertia constant is H = 4 MW-s/M The resistance and machine damping may be assumed negligible. The syster frequency is 50 Hz. Calculate the frequency of natural oscillations if the gen is loaded to (i) 50% and (ii) 80% of its maximum power limit.	CO5	K4	7M

[B19 EE 3202]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech II Semester (R19) Regular Examinations

INTERNET OF THINGS AND ITS APPLICATIONS IN ELECTRICAL ENGINEERINGMODEL QUESTION PAPER

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

*****

			CO	KL	M
		UNIT – I			
1.	a).	Explain various components in IoT ecosystem	CO1	K3	7
	b).	Explain the Cyber physical systems and write their features and applications	CO1	K3	8
		OR			
2.	a).	Describe in detail how data is transmitted or received by using OSI layer model.	CO1	K3	8
	b).	List out the applications of IoT in various fields	CO1	K3	7
		UNIT – II			
3.	a).	Explain Raspberry Pi basic architecture in detail	CO2	K3	8
	b).	Explain Raspberry Pi board GPIO Pins and interfacing devices	CO2	K3	7
		OR			
4.	a).	Describe the Arduino board in detail and give interfacing process of servo actuator to the Arduino board	CO2	K3	8
	b).	Classify and explain different types of sensors	CO2	K3	7
		UNIT – III			
5.	a).	Illustrate the operation of Low dropout Regulator for power supply at different voltage levels	CO3	K3	7
	b).	Explain about the Energy harvesting Circuit and give any one example of energy harvesting circuit	CO3	K3	8
		OR			

6.	a).	Compare the operations of Switching regulator and linear regulator	CO3	K3	7
	b).	Explain how to get energy from Thermo electric generator and RFID harvester circuits	CO3	K3	8
UNIT – IV					
7.	a).	Distinguish the various types of Low power wide area networks	CO4	K3	7
	b).	Explain how to use MQTT protocol in IoT networking	CO4	K3	8
OR					
8.	a).	Write how to communicate data using BLE in IoT networks	CO4	K3	8
	b).	Explain in detail the extended CAN frame format?	CO4	K3	7
UNIT – V					
9.		Illustrate the role of IoT networks for the reliable operation of Grid.	CO5	K3	15
OR					
10.	a).	Explain about the application of IoT in Power plant operation and maintenance	CO5	K3	7
	b).	Explain various aspects of intelligent control of vehicles.	CO5	K3	8

[B19EE3203]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech II Semester (R19) Regular Examinations

ADVANCED CONTROL SYSTEMS

(EEE)

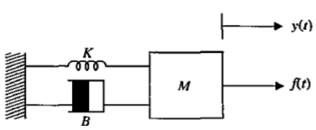
MODEL QUESTION PAPER

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

*****

			CO	KL	M
		UNIT-I			
1.	(a).	What is an LVDT? Discuss its application.	CO1	K3	7M
	(b).	Explain about the armature-controlled D.C. Servomotor and derive its transfer function.	CO1	K3	8M
		(OR)			
2.	(a).	What is a Synchro? Explain how it can be used as an error detector.	CO1	K3	7M
	(b).	Explain about various types of stepper motors.	CO1	K3	8M
		UNIT-II			
3.	(a).	Discuss PI, PD and PID controllers.	CO2	K3	7M
	(b).	A UFB system has an open-loop transfer function G(s)=K/S(S+7) and is operating with 15% POS in its step response. Using Root-locus technique, design a Lag compensator to reduce the SS error for a ramp input by a factor of 20.	CO2	K4	8M
		(OR)			
4.		A UFB system has an OL transfer function with adjustable gain as shown. $$G(s)=\frac{K}{S(S+1)}$$ Design a Lead compensator using bode approach to meet the specifications of K_v=10 and PM $\geq 45^0$.	CO2	K4	15M
		UNIT-III			
5.	(a).	Obtain the state variable model for the mechanical system given  below.	CO3	K3	7M
	(b).	Construct the SS model for the following transfer function. $$G(s)=\frac{2S+1}{S^2+7S+9}$$	CO3	K3	8M

		(OR)				
6.	(a).	Obtain the transfer function model for the following system. $$\dot{x} = \begin{bmatrix} -4 & -1.5 \\ 4 & 0 \end{bmatrix} x + \begin{bmatrix} 2 \\ 0 \end{bmatrix} u$$ $$y = [1.5 \quad 0.625] x$$	CO3	K3	7M
	(b).	Find the state transition matrix for the given system. $$\begin{bmatrix} \dot{x}_1(t) \\ \dot{x}_2(t) \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} + \begin{bmatrix} 0 \\ 2 \end{bmatrix} u$$	CO3	K3	8M
		UNIT-IV				
7.	(a)	Explain about pole placement technique with state feedback control.	CO4	K3	7M
	(b)	Determine the state feedback gain matrix for locating the CL poles of the given system at -2+j4, -2-j4 and -10. $$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$	CO4	K4	8M
		(OR)				
8.	(a)	Explain how steady-state error can be controlled with state feedback.	CO4	K3	7M
	(b)	Test the controllability and observability for the following SS model. $$\begin{bmatrix} \dot{x}_1(t) \\ \dot{x}_2(t) \\ \dot{x}_3(t) \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \\ x_3(t) \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} u(t) \qquad y = \begin{bmatrix} 3 & 4 & 1 \end{bmatrix} x$$	CO4	K3	8M
		UNIT-V				
9.	(a).	What is a Sampled data system? Explain with a block diagram.	CO5	K3	7M
	(b).	The closed-loop transfer function of a digital control system is $$G(z) = \frac{0.3678Z + 0.2644}{Z^2 - Z + 0.6322}$$ Find its unit-step response.	CO5	K3	8M
		(OR)				
10.	(a).	Explain how Bilinear transformation is used for stability study of digital control systems.	CO5	K3	7M
	(b).	The characteristic equation of discrete data system is given below. Verify its stability by Jury's test. $$q(z) = Z^3 + 3.3Z^2 + 4Z + 0.8 = 0$$	CO5	K3	8M

[B19 EE 3204]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech II Semester (R19) Regular Examinations

DIGITAL CONTROL SYSTEMS

(EEE)

MODEL QUESTION PAPER

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

*****

			CO	KL	M
UNIT – I					
1.	a).	Explain the mathematical model of sample and hold operation.	CO1	K3	8
	b).	Obtain the transfer function of Zero-Order-Hold.	CO1	K3	7
OR					
2.	a).	Explain the operation of Sample and Hold device with block diagram and waveforms.	CO1	K3	8
	b).	State and Explain Sampling theorem.	CO1	K3	7
UNIT – II					
3.	a).	Determine the Z-transform of the following: (i) $e^{-aT} Sinbt$ (ii) $\frac{w}{s^2 - w^2}$	CO2	K3	8
	b).	Explain the relationship between S-Plane and Z-plane.	CO2	K3	7
OR					
4.	a).	Determine the Inverse Z-transform of the following: (i) $\frac{z-4}{(z-1)(z-2)^2}$ (ii) $\frac{2}{(2z-1)^2}$	CO2	K3	8
	b).	Explain the theorems of Z-transform.	CO2	K3	7
UNIT – III					
5.	a).	Explain the discrete data systems with cascaded elements separated by a sampler.	CO3	K3	6

	b).	Obtain pulse transfer function of the difference equation. $c(k+2)+2c(k+1)+3c(k)=r(k)$.	CO3	K3	9
		OR			
6.	a).	Explain the discrete data systems with cascaded elements not separated by a sampler.	CO3	K3	6
	b).	Solve the following difference equation. xk+2+4xk+1+2xk=uk. x(0)=0; x(1)=0 and u(k)=K (K=0,1,2….)	CO3	K3	9
		UNIT – IV			
7.	a).	Derive the solution of non-homogeneous state equation.	CO4	K3	6
	b).	Find eigen value and eigen vectors for the matrix. $A=\begin{bmatrix}4 & 1 & -2\\ 1 & 0 & 2\\ 1 & -1 & 3\end{bmatrix}$	CO4	K4	9
		OR			
8.	a).	Explain the diagonalization of 'A 'matrix.	CO4	K3	6
	b).	Obtain a transformation matrix which transforms the following state space equation into Jordan canonical form. $\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\\ \dot{X}_3\end{bmatrix}=\begin{bmatrix}6 & 1 & 0\\ -12 & 0 & 1\\ 8 & 0 & 0\end{bmatrix}\begin{bmatrix}X_1\\ X_2\\ X_3\end{bmatrix}$	CO4	K3	9
		UNIT – V			
9.	a).	State and explain the conditions to be satisfied for state controllability and observability.	CO5	K3	8
	b).	Explain Bilinear transformation method used in the stability of digital control system.	CO5	K3	7
		OR			
10.	a).	Explain Jury's stability test.	CO5	K3	7
	b).	Determine the stability of following characteristic equations by Jury's test: (i) $4z^3-4z^2-7z-2=0$ (ii) $z^3+0.2z^2+0.25z+0.05=0$	CO5	K4	8

[B19 EE 3205]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech II Semester (R19) Regular Examinations

SPECIAL ELETRICAL MACHINES

(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

*****

			CO	KL	M
		UNIT - I			
1.	a).	Explain in detail the construction and working of variable reluctance stepper motor.	CO1	K3	8
	b).	Explain briefly closed loop control of stepper motor.	CO1	K3	7
		OR			
2.	a).	Explain the principle of operation of permanent magnet stepper motor with torque Vs angle characteristics.	CO1	K3	8
	b).	Enumerate the various applications of stepper motor.	CO1	K3	8
		UNIT - II			
3.	a).	Explain the construction PMBLDC also compare conventional DC motor and PMBLDC motor	CO2	K3	8
	b).	Explain the speed-torque characteristics of PMBLDC motor.	CO2	K3	7
		OR			
4.	a).	Write in brief about power controllers used for PMBLDC motor and explain each block associated in it	CO2	K3	7
	b).	Explain the closed loop control scheme of a PMBLDC motor drive with a suitable schematic diagram.	CO2	K3	8
		UNIT - III			
5.	a).	Explain the construction and working principle of operation of PMSM.	CO3	K3	7
	b).	Derive the expression for power input and torque of a PMSM. Explain how its torque speed characteristics are obtained.	CO3	K3	8
		OR			
6.	a).	Enumerate the applications of PMSM.	CO3	K3	5
	b).	With necessary diagrams, discuss about various power controllers used for PMSM.	CO3	K3	10
		UNIT - IV			
7.	a).	Explain the principle of operation. State the advantages of switched reluctance motor.	CO4	K3	8

	b).	Describe with a neat circuit any two configuration of power converters used for the control of switched reluctance motor.	CO4	K3	7
OR					
8.	a).	Explain the torque-speed characteristics of switched reluctance motors.	CO4	K3	7
	b).	Derive the expressions for voltage and torque of SR machines	CO4	K3	8
UNIT - V					
9.	a).	Illustrate with neat diagram, the construction, working principle of radial type synchronous reluctance motor	CO5	K3	8
	b).	Discuss the main advantages and disadvantages of synchronous reluctance motor.	CO5	K3	7
OR					
10.	a).	Illustrate the performance of the synchronous reluctance motor with neat phasor diagram.	CO5	K3	8
	b).	Discuss the various applications of synchronous reluctance motor.	CO5	K3	7

[B19 EE 3207]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech II Semester (R19) Regular Examinations

POWER ELECTRONICS & DRIVES

(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

*****

			CO	KL	M
		UNIT – I			
1.	a).	Define Electric drive and **explain** the components of electric drive system	CO1	K3	7
	b).	State the advantages of drive system. **Illustrate** some applications with suitable drive system.	CO1	K3	8
		OR			
2.	a).	**Selection** of suitable drive for various applications.	CO1	K3	7
	b).	**Demonstrate** the four-quadrant operation of drive with neat sketches.	CO1	K3	8
		UNIT – II			
3.	a).	**Explain** transient stability of a drive.	CO2	K4	8
	b).	A variable speed dc drive has rated power of 10 kW, rated speed of 1500 rpm drives a load that comprises a constant load of T_L = 30 N-m. The inertia of the drive system is 0.10 kg.m^2. **Calculate** the time taken to accelerate the load from zero to 800 rpm, assuming the drive develops rated torque during the acceleration phase.	CO2	K3	7
		OR			
4.	a).	**Classify** different types of Electric braking methods.	CO2	K4	7
	b).	**Apply** dynamics of Motor-Load combination for; i.Determination of referred load torque i.Determination of referred Moment of Inertia i.Referring forces & masses having translational motion to rotating shaft	CO2	K3	8
		UNIT – III			
5.	a).	**Sketch** the speed-torque characteristics of a single phase fully controlled rectifier fed DC separately excited motor in both continuous and discontinuous current modes with waveforms.	CO3	K3	8
	b).	A 200V, 875 rpm, 150 A separately excited DC motor has an armature resistance of 0.06Ω. It is fed from single phase fully controlled rectifier with a source voltage of 220V, 50 Hz. Assuming continuous conduction. **Calculate**,	CO3	K3	7

		i.Firing angle for rated motor torque & 750 rpm i.Firing angle for rated motor torque & (-500) rpm i.Motor speed for α = 160 degrees and rated torque.			
OR					
6.	a).	**Obtain** the speed-torque characteristics of a single phase fully controlled rectifier fed DC series motor in both continuous and discontinuous current modes with waveforms.	**CO3**	**K4**	**8**
	b).	A 230V, DC series motor has a resistance of 0.2 Ω. At speed of 1800 rpm it takes 50 A. Determine the resistance to be added in series with the motor to limit the speed to 3600 rpm when the current is 12.5 A. Assume magnetizing curve to be a straight line between 0 to 50 A.	**CO3**	**K3**	**7**
UNIT – IV					
7.	a).	**Obtain** the speed-torque characteristics of a chopper fed DC series motor for continuous current mode operation.	**CO4**	**K4**	**8**
	b).	A 230 V, 960 rpm and 200 A separately excited dc motor as an armature resistance of 0.02 ohms the motor is fed from a chopper which provides both motoring and braking operation, the source has a voltage of 230V assume continuous conduction. Figure out i.Duty ratio of chopper for motoring operation at rated torque & 350 rpm i.Duty ratio of chopper for braking operation at rated torque & 350 rpm	**CO4**	**K3**	**7**
OR					
8.	a).	**Illustrate** the Chopper controlled DC separately excited motor and DC series motor.	**CO4**	**K3**	**8**
	b).	**Explain** Closed Loop Control of DC drive with block diagram.	**CO4**	**K4**	**7**
UNIT – V					
9.	a).	**Sketch** the speed-torque characteristics for an induction motor with Variable Voltage Control.	**CO5**	**K4**	**7**
	b).	Explain about slip power recovery? **Discriminate** Static Kramer's Drive with circuit diagram.	**CO5**	**K3**	**8**
OR					
10.	a).	**Sketch** the speed-torque characteristics for an induction motor with Variable Frequency Control using cycloconverter.	**CO5**	**K4**	**8**
	b).	**Discriminate** Static Scherbius Drive with circuit diagram.	**CO5**	**K3**	**7**

[B19 EE 3208]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech II Semester (R19) Regular Examinations

ADVANCED POWER ELECTRONIC CIRCUITS

(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

*****

S.No.			**CO**	**KL**	**M**
		UNIT – I			
1.	a).	Explain the operation of Three-phase AC Voltage controllers with Resistive Loads.	CO1	K3	8
	b).	Explain the operation of single-phase transformer tap changers.	CO1	K3	7
		OR			
2.	a).	Explain the Effects of source and load inductances on AC Voltage controller.	CO1	K4	7
	b).	Explain the operation of Three-phase AC Voltage controllers with RL Loads.	CO1	K3	8
		UNIT – II			
3.	a).	Explain the power factor improvement techniques in rectifiers.	CO2	K3	8
	b).	Explain the operation of single-phase series controller.	CO2	K3	7
		OR			
4.	a).	Briefly explain the Extinction angle control and symmetrical angle control.	CO2	K3	8
	b).	Explain the operation of three phase dual converter.	CO2	K3	7
		UNIT – III			
5.	a).	Explain different modes of operation of PUSH PULL converter	CO3	K4	8
	b).	Explain different modes of operation of forward converter	CO3	K4	7
		OR			
6.	a).	Explain the different mode of operation of single-switch flyback converter	CO3	K4	8

	b).	Compare different SMPS topologies in detail.	CO3	K4	7
UNIT – IV					
7.	a).	Explain the Space Vector PWM technique	CO4	K4	8
	b).	Explain advanced modulation techniques.	CO4	K4	7
OR					
8.	a).	Explain the Selective Harmonic Elimination (SHE) PWM	CO4	K4	8
	b).	Explain various PWM techniques used in inverters.	CO4	K4	7
UNIT – V					
9.	a).	Explain the operation of cascaded H Bridge multilevel inverter	CO5	K4	8
	b).	Explain the operation of Diode clamped multilevel inverter	CO5	K4	7
OR					
10.	a).	Explain the operation of Flying Capacitor multilevel inverter.	CO5	K4	8
	b).	Compare different multilevel inverter in detail.	CO5	K4	7

[B19 EE 3209]

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)

III B. Tech II Semester (R19) Regular Examinations

SWITCHED MODE POWER SUPPLIES

(EEE)

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

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			CO	KL	M
		UNIT – I			
1.	a).	**Draw** and **explain** characteristics of IGCT?	CO1	K3	7
	b).	**Illustrate** the basic operation of MOS Controlled Thyristor and explain its turn-on and turn-off processes.	CO1	K3	8
		OR			
2.	a).	**Compare** the power capability and switching speed of controllable switches.	CO1	K3	6
	b).	**Illustrate** the construction and operation of Static Induction Thyristor and mention its applications.	CO1	K3	9
		UNIT – II			
3.	a).	**Determine** the output voltage for Buck-Boost regulator and explain its operation.	CO2	K3	7
	b).	The Buck regulator has an input voltage of V_s=12 V, The required average output voltage is V_o=5V at R=500 Ω &ΔV_c=20 mV. The switching frequency is 25 KHz. If ΔI_L of inductor is limited to 0.8 A. **Determine** (a) Duty cycle (b) filter Inductance L, (c) filter capacitance C, and (d) Critical values of L & C.	CO2	K3	8
		OR			
4.	a).	**Illustrate** the operation of Cuk regulator with neat waveforms.	CO2	K3	8
	b).	A Boost regulator has input voltage of 220 V and output voltage of 660 V. If the non-conducting time of thyristor regulator is 100 us, **Compute** (a) the pulse width of output voltage. (b) In case pulse width is halved for constant frequency operation, find the new output voltage.	CO2	K3	7
		UNIT – III			
5.	a).	**Explain** the operation of Flyback Converter.	CO3	K4	7

	b).	**Explain** the operation of Half bridge converter.	CO3	K4	8
		OR			
6.	a).	**Examine** the operation Forward converter	CO3	K4	8
	b).	**Explain** the operation of Push-pull converter.	CO3	K4	7
		UNIT – IV			
7.	a).	**Illustrate** the necessity of series resonant circuit.	CO4	K3	7
	b).	**Examine** the operation of Series loaded resonant (SRL) converter.	CO4	K3	8
		OR			
8.	a).	**Explore** the differences between ZCS and ZVS resonant converter.	CO4	K3	7
	b).	**Explain** about ZCS converter.	CO4	K3	8
		UNIT – V			
9.	a).	**Compare** Unipolar and Bipolar PWM techniques	CO5	K4	8
	b).	**Explain** the operation of three phase sine PWM inverter	CO5	K4	7
		OR			
10.	a).	**Identify** the necessity of sine PWM compared to Square wave switching on output voltage waveform.	CO5	K4	8
	b).	**Examine** the harmonic analysis of a single phase square wave inverter.	CO5	K4	7