SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)
(Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi)
UG Programmes CE,CSE,ECE,EEE,IT & ME are Accredited by NBA
CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204
Estd:1980

Regulation: R20

ELECTRICAL & ELECTRONICS ENGINEERING (Minors)

SCHEME OF INSTRUCTION & EXAMINATION
(With effect from 2020-21 admitted Batch onwards)

Course Code	Course Name	Year/ Sem	Cr	L	T	P	Int. Marks	Ext. Marks	Total Marks
B20EEM101	Electrical Power Generation	II-II	4	3	1	0	30	70	100
B20EEM201	Electrical & Electronics Measurements	III-I	4	3	1	0	30	70	100
B20EEM301	Power Transmission & Distribution	III-II	4	3	1	0	30	70	100
B20EEM401	Basic Power Electronics	IV-I	4	3	1	0	30	70	100
B20EEM501	MOOCS-1	II-II to IV-II	2	--	--	--	--	--	100
B20EEM601	MOOCS-2	II-II to IV-II	2	--	--	--	--	--	100
	TOTAL		**20**	**12**	**4**	**0**	**120**	**280**	**600**

*Two MOOCS courses of any ELECTRICAL & ELECTRONICS ENGINEERING related Program Core Courses from NPTEL/SWAYAM with a minimum duration of 8 weeks (2 Credits) courses other than the courses offered need to be taken by prior information to the concern. These courses should be completed between II Year II Semester to IV Year II Semester

Code	Category	L	T	P	C	I.M	E.M	Exam
B20EEM101	**Minors**	**3**	**--**	**--**	**3**	**30**	**70**	**3 Hrs**

ELECTRICAL POWER GENERATION

(Minor Degree course in EEE)

Course Objectives: Students will learn

1.	About the importance of electrical energy, working principle and types of generators.
2.	About layout and working of Thermal and Hydro power stations.
3.	About the general arrangement, principles and components & their functions present in nuclear and gas power plants.
4.	About the different nonconventional energy sources.
5.	About load demand and economic aspects of power systems.

Course Outcomes: Students will be able to

S.No	Outcomes	Knowledge Level
1.	**Apply**thescience and engineering fundamentals to understand the generation of electrical energy and working principle of an alternator	K3
2.	**Illustrate** the operation of Thermal and hydro power plants	K3
3.	**Illustrate**the power generation from nuclear and gas power plants	K3
4.	**Explore** the Solar, wind, tidal and Ocean thermal energy conversion systems	K3
5.	**Describe**economic aspects of power generation and tariff	K3

SYLLABUS

UNIT-I (10 Hrs)	**INTRODUCTION TO ELECTRICAL POWER SYSTEMS** Introduction, Importance of electrical energy, generation of electrical energy, sources of energy, Units of power & energy, Principle of operation and construction of alternators – types of alternators**,** emf equation of alternator.
UNIT-II (10 Hrs)	**THERMAL AND HYDRO ELECTRIC POWER PLANTS** Selection of site, general layout of a thermal power plant, Brief description of components, advantages and disadvantages. Hydroelectric power stations - Selection of site, general arrangement and operation of hydroelectric plants, advantages and disadvantages, classification of hydroelectric power plants.
UNIT-III	**NUCLEAR AND GAS POWER PLANTS**

(10 Hrs)	Selection of site, working principle, nuclear fission, nuclear fuels, nuclear chain reaction, general layout of a nuclear power plant, Brief description of components, advantages and disadvantages. Gas turbine power plant schematic arrangement, Brief description of components, Open cycle and closed cycle gas turbine power plants, advantages and disadvantages.
UNIT-IV (10 Hrs)	**NON-CONVENTIONAL POWER GENERATION** Non-Conventional Sources, Solar cell principle, photovoltaic system for power generation, Components of Wind energy conversion system, Tidal and Ocean thermal energy conversion- Layout and Principle, Advantages and disadvantages.
UNIT-V (10 Hrs)	**ECONOMIC ASPECTS OF POWER GENERATION & TARIFF** Economic Aspects –load curve, load duration curves, discussion on economic aspects: connected load, maximum demand, demand factor, load factor, diversity factor, power capacity factor and plant use factor. Tariff Methods–costs of generation and their division into fixed, semi-fixed and running costs, desirable characteristics of a tariff method, tariff methods: simple rate, flat rate, block-rate, two-part and three–part tariff methods – simple problems.

Text Books:	
1.	Principles of Power systems by V.K.Mehta, S.Chand Publications,2006
2.	A Textbook of Electrical technology – vol 2 by B. L Theraja, A.K Theraja, S. Chand publications, 23rd edition
3.	Non-conventional Energy Sources, G.D.Rai, Khanna Publishers, Fifth edition 2016
Reference Books:	
1.	A Textbook on Power System Engineering. Gupta, M.L. Soni, U.S. Bhatnagar, A. Chakrabarti.
2.	A Course in power systems. J.B Gupta, S.K Kataria and Sons, 2013

		Course Code: B20EEM101			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		II B.Tech. II Semester MODEL QUESTION PAPER			
		ELECTRICAL POWER GENERATION			
		ELECTRICAL AND ELECTRONICS ENGINEERING			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer **ONE Question** from **EACH UNIT**			
		All questions carry equal marks			
		Assume suitable data if necessary			
			CO	**KL**	**M**
		UNIT-I			
1.	**a).**	**Describe** the importance of electrical energy.	**1**	**3**	**7**
	b).	**Explain** the different types of sources of energy.	**1**	**3**	**7**
		OR			
2.	**a).**	**Explain** the construction and working principle of an Alternator.	**1**	**3**	**7**
	b).	**Derive** the emf equation of Alternator.	**1**	**3**	**7**
		UNIT-II			
3.	**a).**	**Describe** the important components of a Thermal powerstation.	**2**	**3**	**7**
	b).	**Explain** briefly about Selection of site for thermal power plant	**2**	**3**	**7**
		OR			
4.	**a).**	**Describe** the general arrangement and operation of hydroelectric plants.	**2**	**3**	**7**
	b).	**Explain** the classification of hydroelectric power plants	**2**	**3**	**7**
		UNIT-III			
5.	**a).**	**Explain** the working of Nuclear power plant with a neat layout.	**3**	**3**	**7**
	b).	**Describe** the working of nuclear reactor and explain it's components.	**3**	**3**	**7**
		OR			
6.	**a).**	**Explain** the working of Open cycle gas power plant with a neat layout.	**3**	**3**	**7**
	b).	**Explain** briefly about the advantages and disadvantages of gas power plants	**3**	**3**	**7**
		UNIT-IV			
7.	**a).**	**Explain** the working of solar power generation.	**4**	**3**	**7**
	b).	**Explain** briefly about the advantages and disadvantages of solar photovoltaic power generation.	**4**	**3**	**7**
		OR			

8.	**a).**	**Explain** the working of open cycle ocean thermal energy conversion with a neat diagram.	**4**	**3**	**7**
	b).	**Explain** the advantages and disadvantages of Tidal power generation.	**4**	**3**	**7**
		UNIT-V			
9.	**a).**	Define and **explain** the importance of the following terms in generation: (i) Connected load (*ii*) maximum demand (*iii*) demand factor (*iv*) average load.	**5**	**3**	**7**
	b).	A consumer has the following connected loads: 15 lamps of 40 W each and two heaters of 1,000 W each. His maximum demand is 15000 W. On the average he uses 10 lamps for 5 hours a day and each heater for 3 hours a day. **Calculate** his average load, monthly energy consumption and load factor.	**5**	**3**	**7**
		OR			
10.	**a).**	**Explain** two part tariff and three part tariff.	**5**	**3**	**7**
	b).	**Evaluate** annual bill of a consumer whose maximum demand is 100kW, power factor = 0.8 lagging and load factor = 50%. The tariff used is Rs 75 per of maximum demand plus 20 paise per kWh consumed.	**5**	**3**	**7**

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

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

Code	Category	L	T	P	C	I.M	E.M	Exam
B20EEM201	**Minors**	**3**	**--**	**--**	**3**	**30**	**70**	**3 Hrs**

ELECTRICAL AND ELECTRONIC MEASUREMENTS

(Minor Degree course in EEE)

Course Objectives: Students will learn

1.	About the basics of measurements, instruments characteristics and errors
2.	About analog measuring instruments for current, voltage and resistance
3.	About the instruments for measuring power & energy
4.	About various electronic measuring instruments
5.	About the Cathode Ray Oscilloscope (CRO), display devices and recorders

Course Outcomes: Students will be able to

S.No	Outcomes	Knowledge Level
1.	**Explore** the significance of measurement and instrument characteristics	**K3**
2.	**Illustrate** the working of different analog electrical measuring instruments	**K3**
3.	**Illustrate** the working of wattmeter and energy meter	**K3**
4.	**Acquire** the knowledge of electronic instruments and their working	**K3**
5.	**Illustrate** the working of CRO, Display devices and recorders	**K3**

SYLLABUS

UNIT-I (10 Hrs)	**INTRODUCTION TO MEASUREMENTS AND INSTRUMENTATION** Introduction-Significance of Measurement, Methods of Measurement, Modes of Measurement, Generalized Measurement system and its functional elements, Applications of Measurement Systems, Static Characteristics of Instruments, Errors in Measurements-Gross, Systematic & Random Errors.
UNIT-II (10 Hrs)	**MEASUREMENT OF CURRENT, VOLTAGE & RESISTANCE** Introduction, Classification, Essential features of Indicating Instruments, Permanent Magnet Moving Coil -Principle, Construction & Working, Extension of range, Simple Problems, Moving Iron Instruments- Principle, Construction & Working, Electrodynamometer type Instruments- Principle, Construction & Working. Ohmmeters-Series-Type, Shunt Type and Megger.
UNIT-III (10 Hrs)	**MEASUREMENT OF POWER & ENERGY** Introduction to Wattmeter, Types of Wattmeters, Dynamometer Wattmeter- Principle,

	Construction & Working, Advantages & Disadvantages, Errors. Measurement of single phase Power using Wattmeter & without Wattmeter. Introduction to Energy meter, Essential characteristics of Energy Meter, Induction Type Single Phase Energy Meter- Construction, Operation, Errors, Compensations.
UNIT-IV (10 Hrs)	**ELECTRONIC INSTRUMENTS** Introduction, Essentials of Electronic Instruments, Advantages of Electronic Instruments. Electronic Voltmeters- Introduction, Advantages, Types, Rectifier Type AC Voltmeter, Average Responding Voltmeter, Peak Responding Voltmeter, True RMS reading Voltmeter, Electronic Multimeter.
UNIT-V (10 Hrs)	**CRO, DISPLAY DEVICES & RECORDERS** Introduction to CRO, Applications of CRO, Block Diagram of CRO, Cathode ray Tube (CRT), CRO Measurements-Voltage, Current, Phase angle & Frequency. Introduction to Digital Display Units- CRTs, LEDs, LCDs, NIXIEs, ELs Comparison of Various Display Devices, Introduction to Recorders, Types, Strip chart recorders, Circular Chart Recorders, X-Y Recorders.

Text Books:

1.	R K Rajput., "Electrical & Electronic Measurement and Instrumentation," S Chand, New Delhi, First Edition, 2020. ISBN: 978-93-856.
2.	Sawhney A.K., "A Course in Electrical & Electronic Measurement and Instrumentation," Dhanpat Rai & Company Private Limited, New Delhi, 18th Edition, 2007.

Reference Books:

1.	A Course in Electronics and Electrical Measurements and Instrumentation J. B. Gupta Katson Books 2013 Edition.
2.	Rangan, C.S., Sharma, G.R., Mani, V.S., "Instrumentation Devices and Systems," Tata McGraw- Hill Publishing Company, New Delhi, 2nd Edition, 2002.

		Course Code: B20EEM201			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		ELECTRICAL AND ELECTRONICS MEASUREMENTS			
		ELECTRICAL AND ELECTRONICS ENGINEERING			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer **ONE Question** from **EACH UNIT**			
		All questions carry equal marks			
		Assume suitable data if necessary			
			CO	**KL**	**M**
		UNIT-I			
1.	**a).**	**Illustrate** different types of Errors in measurements	1	3	7
	b).	**Summarize** different methods and modes of measurements	1	3	7
		OR			
2.	**a).**	**Illustrate** static characteristics of Instruments	1	3	7
	b).	**Summarize** generalized measurement system and its functional elements.	1	3	7
		UNIT-II			
3.	**a).**	**Explain** the principle of working of a PMMC instrument with neat diagram	2	3	7
	b).	**Explain** different types of damping torques in measuring instruments.	2	3	7
		OR			
4.	**a).**	**Illustrate** construction and working electro dynamo meter type instrument.	3	3	7
	b).	**Explain** the operation of megger with neat diagram.	3	3	7
		UNIT-III			
5.	**a).**	**Explain** construction and working electro dynamo meter type wattmeter.	3	3	7
	b).	**Illustrate** induction type single phase energy meter.	3	3	7
		OR			
6.	**a).**	**Discuss** measurement of power with and without wattmeter.	3	3	7
	b).	**Explain** errors and compensations for energy meter.	3	3	7
		UNIT-IV			
7.	**a).**	**Explain** the operation of rectifier type AC voltmeter	4	3	7
	b).	**Explain** the operation of average responding type AC voltmeter	4	3	7

		OR			
8.	**a).**	**Explain** Peak responding type voltmeter.	4	3	7
	b).	**Explain** briefly true value, RMS value with examples	4	3	7
		UNIT-V			
9.	**a).**	With neat diagram **explain** the working of CRO	5	3	7
	b).	**Explain** the terms CRTs, LEDs, LCDs, NIXIEs	5	3	7
		OR			
10.	**a).**	**Describe** how the following measurements can be made with the use of a CRO. (i) Frequency (ii) Phase angle.	5	3	7
	b).	**Differentiate** Strip chart recorders and circular chart Recorders	5	3	7

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

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

Code	Category	L	T	P	C	I.M	E.M	Exam
B20EEM301	**Minors**	**3**	**--**	**--**	**3**	**30**	**70**	**3 Hrs**

POWER TRANSMISSION AND DISTRIBUTION

(Minor Degree course in EEE)

Course Objectives: Students will learn

1.	About different Power supply systems and conductor material requirements for Overhead system.
2.	About mechanical design of transmission lines and insulator requirements.
3.	About the performance analysis of different types of transmission lines.
4.	About the different types of distribution systems
5.	About the underground cables and different substations.

Course Outcomes: Students will be able to

S. No	Outcomes	Knowledge Level
1.	**Compare** D.C and A.C transmission networks andcorresponding conductor material requirement	K3, K4
2.	**Examine** the mechanical and electrical design aspects of transmission system.	K3
3.	**Determine** the performance of short, medium and long transmission lines	K3
4.	**Analyze** theworking ofD.C and A.C Distribution systems	K3, K4
5.	**Explore** the underground cables and **illustrate**different substations	K3

SYLLABUS

UNIT-I (10 Hrs)	**ELECTRICAL SUPPLY SYSTEMS** Introduction, Typical A.C. Power Supply Scheme, Comparison of D.C. and A.C. Transmission, Advantages of High Transmission Voltage, Various Systems of Power Transmission, Comparison of Conductor Material in Overhead System, Kelvin's Law.
UNIT-II (10 Hrs)	**MECHANICAL DESIGN OF OVERHEAD LINES** Main components of Overhead Lines, Insulators - Types of Insulators, Potential Distribution over Suspension Insulator String, String Efficiency, Methods of Improving String Efficiency, Sag in Overhead Lines, Calculation of Sag, Corona effect, Skin effect, Ferranti effect.
UNIT-III (10 Hrs)	**PERFORMANCE OF TRANSMISSION LINES** Constants of a Transmission Line, Classification of overhead Transmission Lines, Performance of Short Transmission Lines, Medium Transmission Lines, End Condenser

	Method, Nominal T Method, Nominal π Method, Long Transmission Lines, Generalized circuit constants of a Transmission Line.
UNIT-IV (10 Hrs)	**DISTRIBUTION SYSTEMS** Classification of Distribution Systems, Types of D.C. Distributors, D.C. Distribution Calculations, D.C. distributor fed at one end (concentrated loading), Distributor fed at both ends (concentrated loading). Single phase A.CDistribution Calculations, Methods of solving A.C. Distribution Problems.
UNIT-V (10 Hrs)	**UNDERGROUND CABLES AND SUBSTATIONS** Underground cables, Construction of Cables, comparison of overhead and underground transmission system, Substation, Classification of substations, Comparison between outdoor and indoor substation, Symbols for equipment in substation, Single bus bar arrangement in substations, Earthing.
Text Books:	
1.	Principles of Power systems by V.K. Mehta S. Chand Publications
2.	Electrical power Systems byC.L.Wadhwa, New Age International,2011
Reference Books:	
1.	A Textbook on Power System Engineering. Gupta, M.L. Soni, U.S. Bhatnagar, A. Chakrabarti.
2.	Generation, Distribution, utilization of Electrical Energy by C.L.Wadhwa, New Academic Science,2011

		Course Code: B20EEM301			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		POWER TRANSMISSION AND DISTRIBUTION			
		ELECTRICAL AND ELECTRONICS ENGINEERING			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer **ONE Question** from **EACH UNIT**			
		All questions carry equal marks			
		Assume suitable data if necessary			
			CO	**KL**	**M**
		UNIT-I			
1.	**a).**	Explain the advantages of High Transmission Voltage.	**1**	**3**	**7**
	b).	**Compare** the volume of conductor material required for a d.c. 2-wire system and 3-phase, 3-wire system on the basis of equal maximum potential difference between one conductor and earth. Make suitable assumptions.	**1**	**4**	**7**
		OR			
2.	**a).**	Compare D.C. and A.C. Transmission lines	**1**	**3**	**7**
	b).	State and prove Kelvin's law for size of conductor for transmission. Discuss it's Limitations.	**1**	**4**	**7**
		UNIT-II			
3.	**a).**	**Derive** an Expression for the sag of transmission line conductor suspended between two supports of the same height.	**2**	**3**	**7**
	b).	A 132 kV transmission line has the following data : Wt. of conductor = 680 kg/km Length of span = 260 m Ultimate strength = 3100 kg Safety factor = 2 **Calculate** the height above ground at which the conductor should be supported. Ground clearance required is 10 metres.	**2**	**3**	**7**
		OR			
4.	**a).**	Explain the methods to improve string efficiency.	**2**	**3**	**7**
	b).	In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, **Calculate** (i) the distribution of voltage over 3 insulators and (ii) string efficiency.	**2**	**3**	**7**
		UNIT-III			
5.	**a).**	**Explain** the short transmission lines with phasor diagram.	**3**	**3**	**7**
	b).	A 3-phase line delivers 3600 kW at a p.f. 0·8 lagging to a load. If the	**3**	**3**	**7**

		sending end voltage is 33 kV, **determine** (i) the receiving end voltage (ii) line current (iii) transmission efficiency. The resistance and reactance of each conductor are 5·31 Ω and 5·54 Ω respectively.			
		OR			
6.	**a).**	**Derive** the expressions for sending end voltage, current, power and p.f., transmission efficiency in a medium transmission line using nominal – T method and also draw the phasor diagram.	**3**	**3**	**7**
	b).	A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants : Resistance/km/phase = 0.1 Ω Inductive reactance/km/phase = 0·2 Ω Capacitive susceptance/km/phase = 0·04 × 10− 4 siemen **Determine** (i) the sending end current (ii) sending end voltage (iii) sending end power factor and (iv) transmission efficiency when supplying a balanced load of 10,000 kW at 66 kV, p.f. 0·8lagging. Use nominal T method.	**3**	**3**	**7**
		UNIT-IV			
7.	**a).**	Draw and **explain** schematic diagram of radial and ring main distribution system.	**4**	**3**	**7**
	b).	A 2-wire d.c. distributor cable AB is 2 km long and supplies loads of 100A,150A,200A and 50A situated 500 m, 1000 m, 1600 m and 2000 m from the feeding point A.Each conductor has a resistance of 0·01 Ω per 1000 m. **Calculate** the p.d. at each load point if a p.d. of 300 V is maintained at point A.	**4**	**3**	**7**
		OR			
8.	**a).**	**Derive** the expression for sending end voltage of A.C. distributor, Power factors referred to receiving end voltage and draw the phasor diagram.	**4**	**4**	**7**
	b).	A single phase a.c. distributor AB 300 metres long is fed from end A and is loaded as under: (i) 100 A at 0·707 p.f. lagging 200 m from point A (ii) 200 A at 0·8 p.f. lagging 300 m from point A The load resistance and reactance of the distributor is 0·2 Ω and 0·1 Ω per kilometer. **Calculate** the total voltage drop in the distributor. The load power factors refer to the voltage at the far end.	**4**	**3**	**7**
		UNIT-V			
9.	**a).**	**Explain** the construction of underground cable with a neat sketch.	**5**	**3**	**7**
	b).	**Compare** overhead and underground transmission system.	**5**	**3**	**7**

		OR			
10.	**a).**	**Explain** the Single bus bar arrangement in substations with a neat diagram	**5**	**3**	**7**
	b).	**Explain** different types of earthing methods.	**5**	**3**	**7**

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

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

Code	Category	L	T	P	C	I.M	E.M	Exam
B20EEM401	Minors	**3**	**--**	**--**	**3**	**30**	**70**	**3 Hrs**

BASIC POWER ELECTRONICS

(Minor Degree course in EEE)

Course Objectives: Students will learn

1.	About the history and applications of power electronics
2.	About power electronic switching devices and their characteristics
3.	About the principle of operation & performance of uncontrolled AC-DC converters
4.	About the principle of operation & performance of DC-DC converters
5.	About the operation of DC-AC converters and the necessity of Pulse Width Modulation (PWM)

Course Outcomes: Students will be able to

S.No	Outcome	Knowledge Level
1.	**Explore** the importance and applications of Power electronics	K3
2.	**Analyse**the characteristics of Power Semi-conductor Devices	K4
3.	**Illustrate** the performances of uncontrolled AC-DC converters	K3
4.	**Acquire** the knowledge of DC-DC converters configurations & operation	K3
5.	**Acquire** the knowledge of DC-AC converter configurations & operation	K3

SYLLABUS

UNIT-I (10 Hrs)	**FUNDAMENTALS OF POWER ELECTRONICS** Introduction-Application of Power Electronics-History of Power Electronics-Types of Power Electronic circuits -Design of Power Electronic Equipment-Characteristics and Specifications of Switches
UNIT-II (10 Hrs)	**POWER SEMICONDUCTOR DEVICES** Diode characteristics-Power diode types-Reverse recovery characteristics, Power MOSFET and its V-I characteristics, IGBT and its V-I characteristics
UNIT-III (10 Hrs)	**DIODE RECTIFIERS** Introduction - single phase half wave and full wave rectifiers with R & RL-load - Three phase full wave rectifier with R & RL - load - Average output voltage expressions – output performance parameters - Numerical Problems

UNIT-IV (10 Hrs)	**DC-DC CONVERTERS (CHOPPERS)** Introduction - Step up and Step-down chopper - input and output voltage relationship – types of choppers and their operation - Numerical Problems
UNIT-V (10 Hrs)	**DC-AC CONVERTERS (INVERTERS)** Introduction- Principle of operation of Single-phase half bridge and full bridge Inverters with R-load - Performance Parameters-Three phase Inverter with 180^0 mode, Introduction to Pulse Width Modulation (PWM)
Text Books:	
1.	Power electronics - P.S. Bimbhra- Khanna Publishers, 5^{th}Edition, 2014
2.	Power Electronics: Devices, Circuits and Applications – M.H. Rashid, Prentice Hall of India, 4^{th}edition, 2020.
Reference Books:	
1.	Power electronics – M.D. Singh & K.B. Kanchandhani, Tata McGraw – Hill Publishing Company, 2nd edition
2.	Power Electronics – Vedam Subramanyam, New Age International (p) Limited, Publishers.

		Course Code: B20EEM401			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		IV B.Tech. I Semester MODEL QUESTION PAPER			
		BASIC POWER ELECTRONICS			
		ELECTRICAL & ELECTRONICS ENGINEERING			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer **ONE Question** from **EACH UNIT**			
		All questions carry equal marks			
		Assume suitable data if necessary			
			CO	**KL**	**M**
		UNIT-I			
1.	**a).**	**Explain** the history and applications of power electronics	**1**	**3**	**7**
	b).	**Explain** in detail about Design of Power Electronic Equipment	**1**	**3**	**7**
		OR			
2.	**a).**	**Classify** different types of Power Converters	**1**	**3**	**7**
	b).	**Illustrate** the Characteristics and specifications of power electronic switches	**1**	**3**	**7**
		UNIT-II			
3.	a.	**Explain** the static characteristics of MOSFET?	**2**	**4**	**7**
	b.	**Classify** Various types of power diodes and their applications	**2**	**4**	**7**
		OR			
4.	**a).**	**Illustrate** the V-I characteristics of a power MOSFET and explain different operating regions.	**2**	**4**	**7**
	b).	**Describe** about the IGBT? **Enumerate** the advantages of IGBT over Power-BJT and Power-MOSFET?	**2**	**4**	**7**
		UNIT-III			
5.	**a).**	**Explain** the working of three-phase half wave uncontrolled rectifier with relevant wave forms for 'R' load.	**3**	**3**	**7**
	b).	**Infer** the expressions for average and rms load voltages for a three-phase full-wave uncontrolled rectifier connected to a resistive load.	**3**	**3**	**7**
		OR			
6.	**a).**	A single-phase, full-wave, uncontrolled rectifier has a supply voltage is 110 V, 50 Hz. The load resistor is 25 Ω, **Calculate:** (a)The average values of the output voltage and current. (b)The rms values of the output voltage and current.	**3**	**3**	**7**
	b).	**Infer** the expressions for average and rms load voltages for a single-phase half and full-wave uncontrolled rectifier connected to a resistive	**3**	**3**	**7**

		load.			
		UNIT-IV			
7.	**a).**	**Explain** the principle of operation and working of buck converter with relevant waveforms.	**4**	**3**	**7**
	b).	With the help of a neat circuit diagram and associated waveforms, **Discuss** the operation of Boost converter.	**4**	**3**	**7**
		OR			
8.	**a).**	**Explain** the operation of step-down chopper and derive the output equation?	**4**	**3**	**7**
	b).	**Explain** various types of choppers in DC - DC Circuits	**4**	**3**	**7**
		UNIT-V			
9.	**a).**	**Explain** the Principle of operation of Single-phase half bridge Inverters with waveforms for R-Load	**5**	**3**	**7**
	b).	**Explain** the Principle of Three-phase Three phase Inverter with 180^0 mode with waveforms for R-Load	**5**	**3**	**7**
		OR			
10.	**a).**	**Explain** the Principle of operation of Single-phase full-bridge Inverters with waveforms for R-Load	**5**	**3**	**7**
	b).	**What** are pulse width modulated inverters? **Explain** the advantages of PWM techniques in Inverter.	**5**	**3**	**7**

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

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks