ANJUMAN-I-ISLAM'S
AIKTC KALSEKAR TECHNICAL CAMPUS
INNOVATIVE TEACHING EXUBERANT LEARNING

School of Architecture

School of Engineering & Technology

School of Pharmacy

Knowledge Resource & Relay Centre (KRRC)

AIKTC/KRRC/SoET/ACKN/QUES/2017-18/ **Date:** _____

School: SoET-CBSGS **Branch:** ELECT. ENGG. **SEM:** V

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Protection & Switch Gear Engg.	EEC501		✓	
2	Electrical Machine – II	EEC502		✓	
3	Electromagnetic Fields & Waves	EEC503		✓	
4	Power Electronics	EEC504		✓	
5	Communication Engg.	EEC505		✓	
6					

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

(9) TE-sem-V - Electrical - CBSGS - PSE 25/5/18

Q.P. Code: 40221

(3 Hours) **[Total marks: 80]**

N.B:- (1) **Question 1 is compulsory**
(2) Solve any **three** questions from remaining **five** questions.
(3) Figures to the right indicate **full** marks.

Q 1.	Answer the following questions. A) Draw single line diagram and show all substation devices. B) Explain primary backup and remote backup protection of relay. C) Why isolators, contactors and circuit breaker are used in power system. D) What is the use of instrument transformer in power system	20
Q 2 a)	Differentiate between 3 types of distance relay	10
Q 2 b)	State different types of fault that occurs in transformer. Explain protection for incipent faults	10
Q 3 a)	Explain with neat diagram construction and working of MOCB	10
Q 3 b)	What are the different types of fuse available? Explain the constructional details of HRC fuse with its characteristics. Write advantages over other type.	10
Q 4 a)	Explain high resistance and low resistance method of arc quenching.	10
Q 4 b)	Differentiate between static and electromagnetic relays	10
Q 5 a)	Explain construction and working principle of vacuum circuit breaker with its advantages and disadvantages	10
Q 5 b)	State various abnormal conditions of induction motor. Explain motor protection against single phasing	10
Q 6 a)	Explain REF protection for alternator. How 100% winding is protected in an alternator.	10
Q 6 b)	Explain working principle of induction disc type of relay with help of diagram.	10

(6) TE - Sem-V-CBSGS- Electrical - EM-II 21/5/18

Q. P. Code: 40538

Time: 3 hours Marks: 80

Note-

a) Question N0. 1 is compulsory
b) Attempt any 3 question remaining five
c) Assume Suitable Data If Required

Q1.Attempt any four each question Carry Equal Marks (20)

a) Explain the need of parallel operation of transformer and write the necessary condition for parallel operation of 3 phase transformer
b) Draw and Explain connection and phasor diagram of Dy11
c) Explain Oscillating neutral phenomenon in three phase transformer.
d) Explain Cogging And Crawling Phenomenon In 3 Phase Induction Motor.
e) Explain similarity between transformers and induction motor. Why induction motor is called generalized transformer

Q2.a) Explain Switching in transient phenomenon in transformer. (10)

b) Two 3 phase transformers which have same turn ratio are connected in parallel are supplying a load of 800W at 0.8 PF lagging. Their ratings are as follows: (10)

Transformer	Rating	P.U Resistance	P.U Reactance
A	400KVA	0.02	0.04
B	600KVA	0.01	0.05

Determine the power output and power factor of each transformer on the basis of 1000 KVA

Q3.a) Draw and explain working of star-delta starter for three phase induction motor also derive expression for starting current and starting torque. (10)

b) A 3 phase star connected 400V, 50 Hz, 4 pole induction motor has the following per phase constant referred to stator (10)
R1 = 0.15, X1=0.45, R2=0.12 X2=0.45 Xm=28.5
Fixed losses (core and friction and windage losses) =400w. Calculate stator current, rotor speed, output torque and efficiency when motor is operated at rated voltage and frequency at a slip of 4%.

Q4a). Explain Double revolving field theory in single phase induction motor draw equivalent circuit diagram of single phase induction motor based on this theory. (10)

b) Explain the working of capacitor start capacitor run induction motor. Draw its circuit diagram along with torque speed characteristic (10)

Q5. a) Draw and explain power stage of 3 phase induction motor and derive the equation for output power. (10)
b) Draw and explain speed torque Characteristic for three phase induction motor for variable rotor resistance. (10)

Q6. Write short note on **any two** each question carry equal marks (20)
a) Scott connection of transformer
b) Double cage induction motor
c) Induction generator

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(12) TE - sem-V- CBSGS - Electrical -EFW 15/5/18

Q.P.Code: 38371

Duration: 3Hrs **Marks: 80**

Note: (a) Question No:1 is compulsory

(b) Attempt any 3 Questions from the remaining questions

Q1. Attempt any four questions from the remaining questions. **(20)**

(a) What do you mean by irrotational and solenoidal fields?

(b) What is Lorentz force equation for a moving charge?

(c) Enlist 5 properties of electromagnetic waves.

(d) Define gradient. Derive the relation between E and voltage gradient.

(e) State and explain coulombs law in electrostatics. Hence define unit charge.

Q2. (a) A point charge $Q_1 = 2mC$ is located in free space at $P_1(-3, 7,-4)$ while $Q_2 = 5mC$ is at $P_2(2, 4,-1)$. Find $\mathbf{F_2}$ and $\mathbf{F_1}$. **(10)**

(b) Derive an electric field intensity due to an infinite plane having density ρ_s (C/m^2). **(10)**

Q3. (a) An electric flux density $\mathbf{D} = 2xa_x + 3a_y\ C/m^2$. Determine the net flux crossing the surface of a cube of 2m side and centred at origin, with edges parallel to the axes. Evaluate both side of the divergence theorem. **(10)**

(b) Derive boundary condition at the interface of two dielectric material. **(10)**

Q4. (a) Explain Maxwell equation for the time varying field. **(10)**

(b) Starting from Maxwell equation obtain wave equation for the field E and H for free space. **(10)**

Q5. (a) State and explain Biot-Savart Law. Derive the mathematical expression for Biot- Savart Law. **(10)**

(b) Derive the E-field intensity due to a infinite line charge. **(10)**

Q6. (a) Given that $\mathbf{H} = \mathbf{H_m}e^{j(\omega t + \beta z)}a_x$ (A/m) in free space. Find **E**. **(10)**

(b) Derive Poisson's and Laplace equation. Also derive the point form of continuity equation. **(10)**

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(6) T.E - sem-V- Electrical - CBSGS - P.E 6/6/18

Q.P. CODE: 36006

(3 Hours) **[Total Marks: 80]**

N.B.: (1) Question No. **1** is **compulsory.**
(2) Answer any **three** from the remaining **five** questions.
(3) **Assume** suitable **data** if necessary and justify the same.
(4) **Figures** to the **right** indicate the marks.

1. (a) State and explain the application of controlled rectifier and Inverter. **[5]**
   (b) Once SCR is triggered gate loses its control. Why? **[5]**
   (c) Explain the principal of operation of power MOSFET. **[5]**
   (d) Write short note on protection of SCR. **[5]**

2. (a) Define and explain any two firing circuit along with the difference between them. **[10]**
   (b) Explain the constructional detail of IGBT with equivalent circuit and discuss its characteristics. **[10]**

3. (a) Draw a neat circuit and explain the working of full wave fully controlled 3-pulse 3-phase bridge circuit with resistive load. Draw the corresponding input and output voltage waveforms when the firing angle is 60. Also obtain the expression for output voltage. **[10]**
   (b) Explain 1-phase Half controlled rectifier with RL load with and without freewheeling diode. **[10]**

4. (a) Explain with circuit diagram and waveforms 3 phase bridge inverter for 120° conduction mode. **[10]**
   (b) Discuss the different method of Harmonic reduction. **[10]**

5. (a) Explain with a neat circuit diagram and relevant waveforms the working of BOOST regulator and derive the expression for output voltage filter capacitance and filter inductance. **[10]**
   (b) A BUCK- Converter has an input voltage of Edc=14V. The required average output voltage is Eo=6V and the peak to peak output ripple voltage is 15mV. The switching frequency is 30kHz. If the peak to peak ripple current of inductor is limited to 0.6 A. Determine: (a) the duty cycle ∝, (b) the filter inductance L, and (c) the filter capacitor C. **[10]**

6. (a) Explain in detail with circuit diagram and waveforms, single phase step up cycloconverter. **[10]**
   (b) Explain single phase bidirectional AC voltage controller with R-L load. **[10]**

Q.P.Code: 39121

(3 Hours) [Total Marks: 80]

Instructions:

1. Question No: 1 is compulsory.
2. Answer any three from the remaining questions.

1			(5 x 4)
	a)	State and prove Sampling theorem.	
	b)	Write down the basic principle used in Super heterodyne receivers.	
	c)	Explain the need of modulation in a communication system.	
	d)	Brief the properties of entropy	
2	a)	Explain FET Reactance modulator for FM generation.	(10)
	b)	A modulating signal $m(t)=10 \cos (2\pi \times 10^3 t)$ is amplitude modulated with a carrier signal $c(t)=50 \cos (2\pi \times 10^5 t)$. Find the modulation index, the carrier power, and the power required for transmitting AM wave.	(10)
3	a)	Generate Huffman's code for the five symbols of a source having probabilities 0.5, 0.25, 0.125, 0.0625, and 0.0625. Find the entropy of the source, average code word length and efficiency of the code.	(10)
	b)	Explain the generation of a Delta modulated signal. State the drawbacks of DM and suggest methods to overcome it.	(10)
4	a)	A message 101101 is to be transmitted in cyclic code with a generator polynomial $G(D) = D^4 + D^3 + 1$. Obtain the transmitted code word. How many check bits does the encoded message contain? Draw the encoding arrangement for the same.	(10)
	b)	Draw the block diagram of a PCM communication system. Explain the function of each block with a neat sketch of input and output at each stage.	(10)
5	a)	Explain the working principle of an BPSK modulator.	(10)
	b)	With a neat block diagram, explain the operation of Armstrong Frequency modulation system.	(10)
6	a)	Write short notes: 1) Optical Fiber Communication 2) Quantization process. 3) Advantages of Digital Communication Systems	(20)