AIKTC/KRRC/SoET/ACKN/QUES/2018-19/ **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		✓	02
3	Electromagnetic Fields & Waves	EEC503		✓	02
4	Power Electronics	EEC504		✓	02
5	Communication Engg.	EEC505		✓	02
6					

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

TE. sem - V - CBSGS - Electrical

Paper / Subject Code: 30402 / ELECTRICAL MACHINE II

15/5/19

2

Time: 3 Hours **Total Marks: 80**

Note-

a) Question No. 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) Explain Double revolving field theory.
c) Draw and Explain connection and phasor diagram of Dy 11 and Yy6.
d) Explain Cogging And Crawling Phenomenon In 3 Phase Induction Motor.
e) Explain similarity between three phase transformers and induction Why induction motor is called generalized transformer

Q2. a) Explain Oscillating neutral phenomenon in three phase transformers. Remedies to overcome this phenomenon **(10)**

b) A 500-kVA transformer with 0.012 PU resistance and 0.06PU reactance, is connected in parallel with a 250-kVA transformer with 0.014 PU resistance and 0.045 PU reactance to share a load of 600 kVA at 0.8 power factor lagging. Find the KVA and power factor shared by each transformer. Do write the necessary formula utilized to solve the numerical **(10)**

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 R1 = 0.15, X1=0.45, R2=0.12 X2=0.45 Xm=28.5Fixed 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%.

Q4.a) Discuss V/F speed control method of three phase induction motor **(10)**

b). Draw and Write all the steps and draw circle diagram. Take suitable example to draw circle diagram **(10)**

Q5. a) Draw and explain power stage of 3 phase induction motor and drive the equation for output power. **(10)**

b) Draw and explain the working of capacitor start capacitor run induction motor along with application. **(10)**

Q6.Short notes(attempt any 2) **(20)**

a) Induction Generator
b) Switching in transient phenomenon
c) Scott connection

TE-sem-V – CBSGS – Electrical

Paper / Subject Code: 30401 / ELECTROMAGNETIC FIELDS & WAVES

9/5/19

[Time: 3 Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
1. Question No.1 is compulsory.
2. Answer any three from the remaining five questions.
3. Figures to the right indicate full marks.

Q.1 Solve **any four:-** **(20)**

a) Find a unit vector in cylindrical coordinates pointing from a point in xy plane to a point Q (0,0,z).
b) State and explain Ampere's circuital law.
c) Derive dielectric –dielectric boundary condition.
d) What is Lorents force equation for a moving charge?
e) What do you mean by irrotational and solenoidal fields?

Q.2 **(20)**

a) A total charge of (40/3) nC is uniformly distributed around a circular ring of radius 2m. Find the potential at a point on the axis 5m from the plane of the ring.
b) Point charges $Q1 = 300\mu C$ located at (1,-1,-3) m experiences a force $\bar{F}_1 = 8\bar{a}_x - 8\,\bar{a}_x + 4\bar{a}_z$ N due to point charge Q2at (3,-3,-2) m. Determine Q2.

Q.3 **(20)**

a) Derive an electric field intensity due to infinite line charge.
b) Given that $\bar{D}\ \frac{5r^2}{4\bar{a}_r}$ in spherical coordinates, evaluate both sides of the divergence theorem for the volume enclosed between r=1 and r=2.

Q.4 **(20)**

a) In a cylindrical conductor of redius 2mm, the current density varies with distance from the axis according to $J = 10^3 400\rho(A/m^2)$. Find the total current.
b) V = 0volts for r=0.1m and V = 100volts for r = 2m in spherical co-ordinates assuming free space between the concentric spherical shells. Find $\bar{E}$ *and* $\bar{D}$ using Laplace's equation.

Q.5 **(20)**

a) Derive magnetic field intensity due to infinite wire carrying a current I.
b) Given $\bar{E} = E_0 z^2 e^{-t}\bar{a}_x$ in free space .Determine if there exists a magnetic field such that both Faraday's law and ampere's circuital law are satisfied simultaneously.

Q.6 **(20)**

a) Derive the wave equation for electric field and magnetic field in free space.
b) Calculate the intrinsic impedance ,propagation constant and the wave velocity for a conducting medium in which $\sigma = 58\frac{Ms}{m}, \mu_r = 1$, at a frequency f=100MHz

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(3) TE-Sem-V-CBGS-Electrical 31/5/19

Paper / Subject Code: 30405 / POWER ELECTRONICS

(Time: 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) What is DC-DC converter? List few applications of it. [5]
   (b) Briefly explain Latching current and Holding current. [5]
   (c) Two transmitter analogy of SCR. [5]
   (d) Once SCR is triggered gate loses its control. Why? [5]

2. (a) Define and explain any two communication circuits of SCR. [10]
   (b) Explain the operation of a single phase full wave rectifier with RL load for continuous and discontinuous load. [10]

3. (a) Draw a neat circuit and explain the working of full wave fully controlled 3phase bridge circuit with resistive load. Draw the corresponding input and output voltage waveforms. [10]
   (b) Explain with circuit diagram and waveform of 1- phase dual converter. [10]

4. (a) Draw and Explain 3 phase inverter where 3 switches conduct together also do the calculation of output voltage. [10]
   (b) Define and explain a 1-phase Inverter with RL Load along with output voltage and output current wave forms and also obtained the expression. [10]

5. (a) Explain the step down chopper with and without CCM Mode. [10]
   (b) A BOOST Converter has input voltage 6V. The average output voltage E_o=18 V and the average load current I_o=0.4A. The switching frequency is 20 kHz of L=250 μH and C=420μF. Determine: (a) the duty cycle $\propto$, (b) the ripple current of inductor, ΔI, (c) the peak current of inductor, I_2, and (d) the ripple voltage of filter capacitor, ΔV_c. [10]

6. (a) Explain in detail with circuit diagram and waveforms, single phase step down cycloconverter. [10]
   (b) Explain the principle of ON OFF control of AC voltage controller. [10]

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TE-sem-V - CBSGS - Electronics 27/5/1

Paper / Subject Code: 30404 / COMMUNICATION ENGINEERING

Q.P.Code: 39123

(3 Hours) [Total Marks: 80]

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

1. (a) Draw and explain the block diagram of Digital communication system. [20]
(b) Explain with block diagram Power Line Carrier Communication.
(c) Explain Nyquist criteria for sampling theorem
(d) Explain how Power and Bandwidth saving is achieved using SSB system.

2. For a systematic linear block code, the three parity check digits C_4,C_5 and C_6 are given by:

$C_4=d_1 \oplus d_2 \oplus d_3$

$C_5=d_1 \oplus d_2$

$C_6=d_1 \oplus d_3$

(a) Construct generator matrix.
(b) Construct all possible codes generated by this matrix.
(c) Determine the error correcting capability.
(d) Prepare a suitable decoding table and Decode the received words 101100 and 000110. [10]

(b) Derive AM wave equation and also explain a method for SSB generation of AM. [10]

3. (a) What is quantization and quantization noise. [10]
(b)Compute Huffman code and calculate code efficiency for the following. [10]

Symbol	S0	S1	S2	S3	S4	S5	S6
Probabilities	0.25	0.25	0.125	0.125	0.125	0.0625	0.0625

4. (a) Explain the functioning of Foster-Seeley Discriminator for FM detection with neat circuit diagram and phase diagrams. [10]
(b) Explain regarding DPSK (i) Transmission (ii) Reception (iii) waveform for data bit sequence b(t) = 1011001 [10]

5. (a) The Generator Polynomial of a (7,4) cyclic code is X^3+X+1.
(i) Implement the Encoder.
(ii) Using the Encoder determine the codeword for D = 0011 [05]
(b) Explain the need for channel coding and state various types of channel coding. [05]
(c) The Antenna current of an AM Transmitter is 10 Amps when it is modulated to a depth of 30% by an audio signal. It increases to 11 Amps when another signal modulates the carrier. What is modulation index due to second wave . [10]

6. Write short notes on (any two) [20]
(a) Fourier Transform and its properties.
(c) Convolution codes.
(d) Delta modulation