(77) TE-sem-V-CBSGS- Electrical - PSE 30/11/17

**Q. P. Code: 24373**

**(3 Hours)**

**Total Marks – 80**

**N.B.:-** (1) Question No.**1** is compulsory.
(2) **Attempt** any **three** questions out of remaining **five** questions.
(3) Draw neat diagrams wherever it is necessary.

Q 1. Answer the following questions. **20**

A) Explain time-grading & current-grading used in protection system.

B) Explain the importance of instrument transformers in power system protection

C) What do you mean by resistance switching

D) Why reactance relay is used for earth faults.

Q 2 a) Compare Static and Electromechanical Relays in detail **10**

Q 2 b) What is meant by HRC fuse? Explain the working and cut off characteristics of HRC fuse. **10**

Q 3 a) Draw & explain three step distance relaying scheme for the protection of transmission line. **10**

Q 3 b) Draw & explain a scheme for motor against single phasing. **10**

Q 4 a) Explain phenomenon of current chopping and its effect in the circuit breakers. **10**

Q 4 b) Explain construction & working of Vacuum circuit breaker. **10**

Q 5 a) Differentiate between BOCB and MOCB. **10**

Q 5 b) Explain restricted earth fault protection of alternator. How 100 % winding is protected? **10**

Q 6 a) Explain Carrier Aided Distance protection for transmission line. **10**

Q 6 b) Explain effect of power swing in distance relays. **10**

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(27) TE – sem – V – Electrical – CBSGS – EM-II 24/11/17

**Q.P. Code: 24376**

**Time: 3 Hours** **Total marks : 80**

Note: 1) Question No.1 is compulsory.
2) Attempt any three questions out of remaining five question.
3) Assume suitable data if required.

1. Solve any four each carry equal marks. **20**

a) Why the induction motor is called as a poor power factor machine? Also explain why it is called as a generalised transformer?

b) Derive the equation for maximum torque under running condition for a 3-phase induction motor.

c) Explain split phase 1-phase induction motor

d) Explain switching in transient phenomenon in 3-phase transformer.

e) Draw and explain torque slip characteristics of 3 phase I.M.

2) a. Explain Harmonic phenomenon in 3-phase transformer. **10**

b. Two three phase transformers rated at 500 KVA and 1000 KVA respectively and connected in parallel to supply a load of 1500 KVA at 0.8 PF lagging. The per phase leakage resistance and reactance of the first transformer is 0.004ohm and 0.018 ohm respectively and of second transformer 0.002 ohm and 0.012 ohm respectively.Calculate the KVA load and PF at which each transformer operates. **10**

3. a Explain different speed control methods of 3-phase induction motor. **10**

b. A 6 pole 50Hz,3-phase induction motor runs at 960 rpm when the torque on the shaft is 200 N-m. If the stator losses are 1500 watts and friction and windage losses are 500 watts.
Find (i)Rotor copper loss (ii) Efficiency of the motor. **10**

4. a. Explain the need of starter for 3 phase I.M. and explain any one starter in detail. **10**

b. A 3 phase 10KW 400 V,4 pole delta connected squirrel cage induction motor gave the following test results
No load Test : 400 v , 8A , 250 W
Block Rotor test: 90 V, 35A 1350W
DC resistance per phase of stator is 0.6 ohms.
Calculate equivalent circuit parameters. **10**

5. a . Draw equivalent circuit diagram of single phase I.M. based on double field revolving theory and explain the double field revolving theory. **10**

b. Explain shaded pole 1 phase I.M. in detail. **10**

6. Write short note on any two 20

a. Double cage induction motor.

b. Oscilating neutral in 3- phase transformer.

c. Excitation phenomenon in 3-phase transformer.





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20/11/17

TE- sem-V- CBSGS- Electrical

Q.P. Code : 22954

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

Please check whether you have got the right question paper.

N.B: 1. Questions no. 1 is compulsory.
2. Attempt any three questions from remaining five questions.

**1.** (a) If, $\nabla \times V = 0$ find constants a,b and c so that $V=(x + 2y + az)\ \bar{a}_x + (bx - 3y - z)\ \bar{a}_y + (4x + cy + 2z)\ \bar{a}_z$ is irrotational. **5**

(b) Explain the relation $E = -\nabla V$.

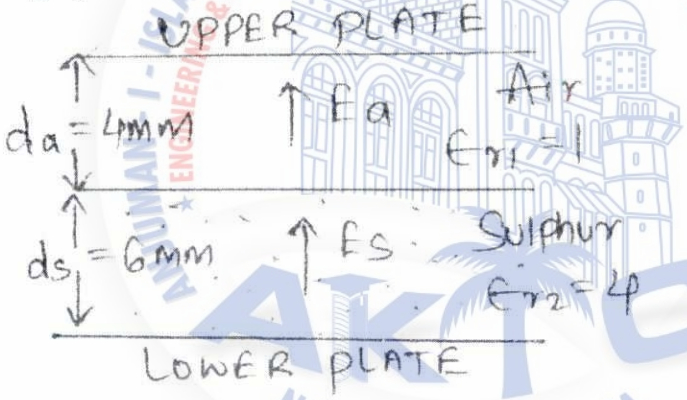
(c) State and explain coulomb's law in electrostatics. Hence define unit charge. **5**

(d) Write down the Maxwell's equation for different material media. **5**

**2.** (a) Given points A (1, 2, 4) B(-2, -1, 3) and C (3, 1, -2) let a differential current element with I = 6 A and $|dL| = 10^{-4}$ m be located at A. The direction of dL is from A to B find dH at C. **10**

(b) Prove that the electric flux passing through any closed surface is equal to the total charge enclosed by that surface. **10**

**3.** (a) Find the total capacitance (see fig.1) if plates are square with 500 mm side. Neglect fringing. **10**




(b) Show that $\nabla \times \bar{E} = \frac{-\partial B}{\partial t}$ If $\bar{E} = 200e^{(4-kx)}\ \bar{a}_y\ (V/m)$ in free space, use maxwells equation to find $\bar{H}$ knowing that all fields vary with time as $e^{-kt}$. **10**

**4.** (a) Evaluate both the sides of the divergence theorem for the field $\bar{D} = 2xy\ \bar{a}_x + x^2\ \bar{a}_y\ (C/m^2)$ and the rectangular parallel piped formed by the planes X = 0 and X = 1, Y = 0 and Y = 2 and Z = 0 and Z = 3. **10**

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

5. (a) A charge of 10 nc is moving with a velocity of $10^7(-0.5\bar{a}_x + \bar{a}_y - 0.71\bar{a}_z)$ m/s determine the force exerted on the test charge when: **10**

   i) A magnetic Induction $\bar{B} = (\bar{a}_x + 2\bar{a}_y + 3\bar{a}_z)$ m wb / $m^2$ is applied.

   ii) An electric field $\bar{E} = (3\bar{a}_x + 2\bar{a}_y + \bar{a}_z)$ Kv/m is applied.

   iii) When $\bar{B}$ and $\bar{E}$ given above are applied simulanteously.

   (b) Derive the expression for electric field due to infinite sheet charge.

6. (a) A dielectric – free space interface has the equation 3x + 2y + z = 12m The origin side of the interface has $\varepsilon_{r1} = 3$ and $\bar{E}_1 = 2\bar{a}_x + 5\bar{a}_z$ (v / m) find $\bar{E}_2$ **10**

   (b) A charge Q located at the origin in free space produces a field for which $E_r$ = 1k v/m at a point P(-2, 1, -1) find Q. Also find $\bar{E}$ at M (1, 6, 5) in Cartesian co-ordinates. **10**

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TE-sem-V- CBSGS- Electrical - P.E

14/12/17

**Q.P. Code: 25771**

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

N.B.:

- Question No. 1 is compulsory.
- Answer **any three** from the remaining five questions.
- Assume suitable data if necessary and justify the same.
- Figures to the right indicate the marks.

**Q1.** All the questions carry equal marks. Answer any four. **[20M]**

(a) Explain the gate protection circuit of SCR.
(b) Explain the operation of MOSFET with a neat structural diagram.
(c) Explain the inverting mode of a converter.
(d) Give comparison between VSI and CSI.
(e) Draw the circuit diagram of a Buck - Boost converter with the following waveforms (i) inductor voltage and current (ii) capacitor voltage and current and (iii) output current.

**Q2.** (a) Explain the structure and static characteristics of SCR. **[10M]**

(b) Draw a neat circuit and explain the working of three – phase semi converter with R load. Draw the corresponding input and output voltage waveforms when the firing angle is 60°. **[10M]**

**Q3.** (a) Draw the circuit and explain the working of single – phase dual converter with relevant voltage waveforms. **[10M]**

(b) Explain three – phase bridge inverter for 180° conduction mode with neat circuit diagram and waveforms. **[10M]**

**Q4.** (a) Explain the following PWM techniques: (i) Multiple PWM (ii) Sinusoidal PWM . **[10M]**

(b) The buck-boost regulator has an input voltage of 14V. The duty cycle is 0.25 and the switching frequency 25 kHz. The inductance value is 160μH and filter capacitance is 200μF. The average load current is 1.25A. Calculate (i) average output voltage (ii) peak to peak output voltage ripple (ΔVc) (iii) peak to peak ripple current of inductor (iv) critical values of L and C. **[10M]**

**Q5.** (a) Explain the working of single – phase ac voltage controller (unidirectional and bidirectional) with R load with relevant waveforms. **[10M]**

(b) Explain class C and class D commutation techniques of SCR. **[10M]**



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**Q6.** (a) A single – phase full converter is connected to 230V, 50Hz source, is feeding a load R = 10Ω in series with a large inductance that makes the load current ripple free. For a firing angle of 45° calculate (i) rectification efficiency (ii) form factor (iii) input power factor. **[10M]**

(b) Mention the applications of MOSFET, IGBT and BJT. **[5M]**

(c) Explain the basic working principle of cycloconverter. **[5M]**





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77

TE-Sem-V - CBSGS - Electrical - CE

8/12/17

**Q. P. Code: 23923**

**[3 Hrs.]** **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 any two properties of Fourier Transform.
b) Write down the basic principle used in Super heterodyne receivers.
c) Explain the quantization process in PCM.
d) Brief the properties of entropy

**2** a) Explain a method of generating a single side band signal using Balanced modulators. **(10)**

b) Draw the spectrum of AM wave, if the modulating signal is $m(t) = (\cos 2000 \pi t) + 0.5 (\cos 4000 \pi t)$. And the carrier is $c(t) = 1.5 (\cos 10000 \pi t)$. calculate total power, side band power and bandwidth. **(10)**

**3** a) Give the procedure for Shannon-Fano coding and use the procedure for obtaining the source code for the source symbols $S_0, S_1, S_2, S_3, S_4, S_5$ with their respective probabilities: 0.4, 0.2, 0.2, 0.1, 0.1. Also compute the code efficiency. **(10)**

b) Explain the generation of a Delta modulated signal. State the drawbacks of DM and suggest methods to overcome it. **(10)**

**4** a) Briefly discuss on various error control codes and explain in detail the convolution code with one example. **(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 ASK modulator. **(10)**

b) With a neat block diagram, explain the operation of Armstrong Frequency modulation system. **(10)**

**6** a) **(20)**

Write short notes: **Any Two**

1) Optical Fiber Communication
2) Pre-Emphasis and De-Emphasis.
3) Advantages of Digital Communication Systems

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18, 19, 20, 22, 21

Correction : T2925 / T0484 - COMMUNICATION ENGINEERING QP Code: 23923

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Correction : T2925 / T0484 - COMMUNICATION ENGINEERING **QP Code: 23923**
**Q. 2 b. Assume R = 50 ohms.**

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Correction : T2925 / T0484 - COMMUNICATION ENGINEERING **QP Code: 23923**
Q. 3 a. **S0 = 0.4 , S1 = 0.2 , S2 = 0.2 , S3 = 0.1 ,S4= 0.1 . Please ignore S5.**

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