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:** VII

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	Power System Operation and Control	EEC701		✓	
2	High Voltage DC Transmission	EEC702		✓	
3	Electrical Machine Design	EEC703		✓	
4	Control System – II	EEC704		✓	
5	Elective HVE	EEE70X		✓	
6					

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

BE-sem VII - CBGS - Electrical - PSOC 11/5/18

(2)

Q.P. Code :22963

Duration: 3 Hours **Total Marks: 80**

NOTE

1.Question number 1 is compulsory
2.Attempt any three from the remaining
3.Figures to right indicates full marks
4.Assume suitable data if necessary and mention the same

1. Attempt any four of the following :- 20

a) In turbine speed governor system $\Delta Pc=0, \Delta f$ is unit step, R=2.5, Ksg=1,Tsg=0.4, Determine ΔY_E after 0.4 s 05

b) For following Y_{BUS} fill in the blanks, all $y_{i0}=0$ 05

$$j\begin{bmatrix} -13 & 10 & 5 & - \\ - & -18 & 10 & - \\ - & - & -13 & - \\ - & - & - & - \end{bmatrix}$$

c) Define power system stability and classify it on the basis of nature of disturbance 05

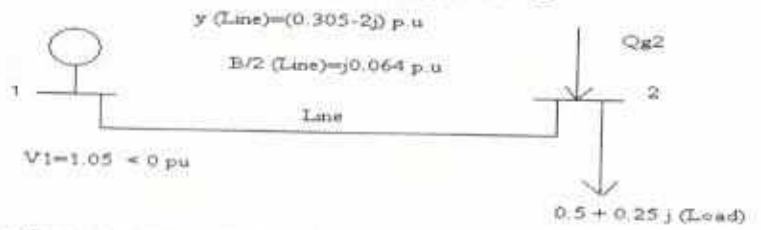
d) State whether statement is 'true' or 'false' and justify your answer "The equal area criterion gives only qualitative answer to system stability" 05

e) Write difference between GS and NR, methods of load flow studies 05

2. 20

a) Explain Y_{BUS} formation by singular transformation 10

b) A simple two-bus power system is shown in fig 10



$|V_2|=1.0$ p.u (Bus 2 is PV bus). Obtain δ_2 and Q_{g2} at the end of first iteration of N-R method.

3. 20

a) The fuel cost functions for three thermal plant in Rs/h are given by 10

$$C_1=500+5.3P_1+0.004P_1^2$$
$$C_2=400+5.5P_2+0.006P_2^2$$
$$C_3=200+5.8P_3+0.009P_3^2$$

Where P_1, P_2 and P_3 are in MW. The total load P_D is 800 MW. Neglecting transmission line losses and generator limits, find the optimal dispatch and the total cost in Rs/h

b) Derive formula for Bmn coefficients in transmission loss formula 10

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4.			20
	a)	Find the steady state power limit of a system consisting of a generator equivalent reactance 0.5 p.u connected to an infinite bus through a series reactance of 1.0 p.u. The terminal voltage of the generator is held at 1.2 p.u and the voltage of the infinite bus is 1 p.u	10
	b)	A syncronous generator having H= 8 MJ/MVA is connected to an infinite bus and supplying power of 1 pu with initial power angle as 25 degree. Assume three phase fault ocurring at t=0 and cleared at t=0.2 sec. The power equations expressed in pu are as under Power transfer in pre-fault condition=2.5 sin δ Power transfer in during-fault condition=0.6 sin δ Power transfer in post-fault condition=1.5 sin δ. The system frequency is 50 Hz, use step by step method to solve the swing equation with step size 0.05 till the fault is cleared	10
5.			20
	a)	Draw turbine speed governor system and explain briefly 4 major parts in it	10
	b)	Explain dynamic response of change in frequency for step change in load of an isolated power system. How dynamic response changes with integral control action	10
6.		Write short notes on (any two)	20
	a)	power pool and its advantages and disadvantages	10
	b)	Surge impedance and surge impedance loading	10
	c)	AGC in restructured power system	10

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(9) BE-sem-VII – Electrical – CBSGS – HVDCT 17/5/18

Q.P. Code : 25945

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

N.B. : (1) **Question No.1** is **compulsory**.
(2) Attempt **any three** from remaining.
(3) **Figures** to the **right** indicate **full marks**.

1. Solve **any four** : **20**
   (a) Draw different types of HVDC links.
   (b) Draw the equivalent circuit of HVDCT line.
   (c) Explain IPC scheme of firing of HVDC Converter bridge.
   (d) Give classification of faults in HVDCT.
   (e) State causes and consequences of harmonics in HVDCT.

2. (a) For a bridge converter with grid control and overlap less than 60° Prove that **10**

$$\cos\phi \equiv \cos\alpha - \frac{R_C \cdot I_d}{V_{do}}$$

   (b) Explain single commutation with neat diagram and waveform. **10**

3. (a) Calculate the secondary line voltage of the transformer for a three phase bridge rectifier to provide de voltage of 120KV. Assume $\alpha = 30°$ and $\mu = 15°$. What is the effective reactance? when the rectifier gives 800A of dc current. **10**
   (b) Discuss desired features of control of HVDC and explain basic control characteristic **10**

4. (a) Explain with neat diagrams and waveforms the principle of 12 pulse converter. **10**
   (b) Explain the importance of current margin. **10**

5. (a) Write a note on 'Ground return'. **10**
   (b) Write a note on 'Power reversal in HVDC'. **10**

6. (a) Explain over voltage and over current protection of HVDC. **10**
   (b) Write a note on 'Harmonics and filters in HVDC'. **10**

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(6) BE-Sem-VII – OBSGS– Electrical – EMD 23/5/19

Q.P.Code: 37326

(3Hrs) **Marks: 80**

NB. (1) Question no: 1 is Compulsory
(2) Solve any three questions out of remaining.
(3) Assume suitable data if required and Specify the same.

1. Answer the following: -

a. Explain different types of magnetic material. [5]
b. Discuss design modification in stator of energy efficient motor. [5]
c. Explain effect of dispersion coefficient on maximum power factor. [5]
d. What is window space factor? [5]

2a Write short note on cross over winding and disc winding [10]
2b Derive the output equation of a three phase transformer. [10]

3a Derive the equation for leakage reactance calculation for a two winding core type transformer. [10]
3b. Develop output equation for induction motor in terms of main dimensions. [10]

4a A 11 KW, 3 phase, 6 pole, 50HZ, 220 V, star connected induction motor has 55 stator slots each containing 9 conductors. Calculate value of bar and end ring current. The number of rotor bars is 64. The machine has efficiency of 0.86 and power factor 0.85. The rotor mmf may be assumed as 85 % of stator mmf. [10]
4b Derive expression for magnetizing current per phase of 3 phase induction motor. [10]

5a 250KVA, 6600/400V, 3 phase, core type transformer has a total loss of 4800 W at full load. The transformer tank is 1.25m in height and 1m x 0.5m in plan. Design a suitable scheme for tubes if the average temperature rise is to be limited to 35° C. The diameter of tube is 50mm and is spaced 75mm from each other. The average height of tube is 1.05m. Specific heat dissipation due to radiation and convection is 6 and 6.5 W/m^2- ^oC. Assume that convection is improved by 35% due to provision of tubes. [10]

5b. Discuss the various mechanical forces developed in transformer with sketches. Explain how they are taken care while fabrication. [10]

6a. Discuss the designing of end ring in the induction motor. [10]

6b Discuss rules of selecting rotor slots in induction motor [10]

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(15) BE-sem-VII-CBSGS-Electrical-CS-II 29/5/18

Q.P. Code :27291

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

Please check whether you have got the right question paper.

N.B:
1. Q. No 1 is compulsory. Attempt any three questions from rest.
2. Make suitable assumption wherever applicable.
3. Use of graph paper or semi log paper is mandatory wherever applicable.
4. Write legible.

Q. 1 Attempt any four. (20)

a) Explain what is lag, lead and lag-lead compensators.

b) Why and how much compensation is required in phase margin while designing lag compensator using frequency response.

c) Describe the configuration of an observer. Before that answer what is an observer.

d) Explain briefly the phase variable form of state-space representation.

e) Explain stability in digital control system.

Q. 2 a) For a unity feedback system with open loop transfer function $G(s) = \frac{k}{s(s+7)}$ is operating with 15 % overshoot and 2sec setting time. Using frequency response technique, design a compensator for Kv = 50 with the phase margin frequency and phase margin remaining approximately same as in the uncompensated system. (10)

b) Design a linear state feedback controller to give 20% overshoot and a setting time of 2 second for a plant. (10)

$G(s) = \frac{s+6}{(s+9)(s+8)(s+7)}$

that is represented in cascade form. Use transformation matrix.

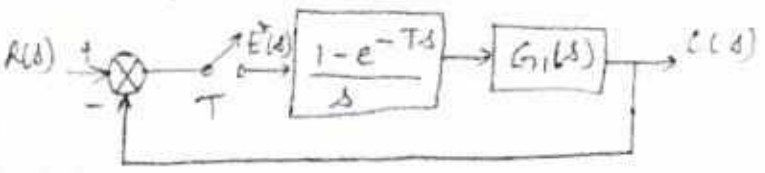
Q. 3 a) Explain how steady state error design via integral control is implemented in design via state space model. (10)

b) Consider the plant $G(s) = \frac{s+2}{(s+5)(s+9)}$ (10)

Design an observer for $\xi = 0.6$ and $w_n = 120$ using observer canonicals form only.

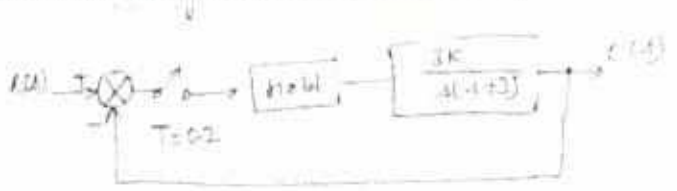
Q. 4 a) For step, ramp and parabolic inputs, find the steady error for the feedback control system if (10)

$G_1(s) = \frac{10}{s(s+1)}$



Let T = 0.1 sec.

b) Find the range of gain K to make the system shown in the figure stable. (03)



Q. 5 a) Explain what is three term P/D controller. (05)
b) Explain what modification in D controller is done while using it in a noisy system and why. (05)
c) Explain following instructions used in PLC ladder programming.
i) MOV
ii) Examine OFF
iii) Latch and unlatch
iv) ADD
v) Return (10)
Explain each with the help of at least two rung ladder program.

Q. 6 a) Write a ladder program to flash a light at a frequency of 0.05 Hz using ON delay timer instruction. (10)
b) Write short note on any one. (10)
a) Memory unit of PLC
b) Arithmatic instructions of PLC ladder programming
c) Counter instructions in PLC ladder programming

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BE - Sem - VII - Electrical - CBSGS - HVE 4/6/12

QP CODE: 37839

(3 Hours) Total Marks: 80

NB. (1) Question no: 1 is Compulsory.

(2) Solve any three questions out of remaining.

(3) Assume suitable data if required and Specify the same.

1. a) Explain the Streamer theory of breakdown in air at atmospheric pressure. (10)
   b) Define and explain the following terms
   (i) Statical time lag
   (ii) Formative time lag
   (iii) Over voltage and impulse ratio
   (iv) Total time lag
2. a) Draw basic circuit of radio interference measurement. Explain its principle of operation and its application in high voltage testing laboratories. (10)
   b) What is principle of operation of Resonant Transformer? How is it advantages over cascade connection transformers? (10)
3. a) What is partial discharge? Differentiate between internal and external discharges. (10)
   b) Explain how sphere gas measurement can be used to measure the peak value of the voltage for the effect of voltage measurement. (10)
4. a) With reference to conduction and breakdown in commercial liquids explain (10)
   (i) Suspended Particle Mechanism
   (ii) Cavitation and Bubble Mechanism
   (iii) Stressed oil volume mechanism

   b) What is 'Cascade Transformer'? Explain why cascading is necessary? With neat diagrams, explain a three stage cascaded transformer system. (10)
5. a) Write short note on:- H V Laboratory Layout ,grounding and Shielding. (10)
   b) Explain Generating Voltmeters. (10)
   (i) Objectives
   (ii) Schematic diagram (Rotating Vane type)
   (iii) Principle of operation
   (iv) Applications & Limitations
6. a) Describe various tests that are carried on 'Transformers 'as per IS codes. (10)
   b) What do you understand by 'intrinsic strength' of a solid dielectric? How does breakdown occur due to electron in a solid dielectric? (10)

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