**AIKTC/KRRC/SoET/ACKN/QUES/2018-19/** **Date:** _____

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

**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 Analysis | EEC601 | | ✓ | 02 |
| 2 | Electrical Machine – III | EEC602 | | ✓ | 02 |
| 3 | Utilisation Of Electrical Energy | EEC603 | | | |
| 4 | Control System – I | EEC604 | | ✓ | 02 |
| 5 | Microcontroller & Its Applications | EEC605 | | ✓ | 02 |
| 6 | Project Management | EEC606 | | | |
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**Note: SC – Softcopy, HC - Hardcopy**

(Shaheen Ansari)
**Librarian, AIKTC**

TE-sem-V – CBSGS – Electrical

10/5/19

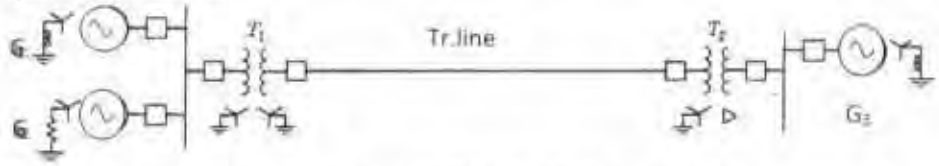
**Paper / Subject Code: 30901 / POWER SYSTEM ANALYSIS**

**Duration-3 Hours** **Total Marks - 80**

**N.B.:** - (1) Question No.**1** is compulsory.
(2) Attempt any **Three** questions out of remaining **five** questions.
(3) Assume suitable data if necessary and justify the same.

**Q 1.** Answer **all questions**.

A) Draw the positive, negative and zero sequence diagram for the power system given below. **05**




B) Discuss the importance of short circuit MVA for fault analysis in power system **05**

C) Illustrate the significance of surge impedance loading in transmission line. **05**

D) Inspect the concept of power invariance in symmetrical component transformation for asymmetrical fault analysis. **05**

**Q 2 a)** Derive the necessary equation to determine the fault current for an L-L fault in power system and draw the interconnection of sequence networks for the same. **10**

**Q 2 b)** Two generators $G_1$ and $G_2$ rated at 11kV, 3MVA, 20% $X_d$ are interconnected by 100km transmission line, $X_{tr.line}$=0.1 ohm/km. Transformer near generators are rated at 6MVA, 11/66kV and 5% reactance. A three phase fault occur at a distance of 20 km from generator $G_1$, when the system is at no load. Calculate fault MVA and fault current. **10**

**Q 3 a)** Explain the short circuit on synchronous alternator under no load with respect to sub transient, transient and steady state condition. **10**

**Q 3 b)** A generator supplies a motor through transformer $T_1$, transmission line and transformer $T_2$. Find the fault current at the point of fault if an LG fault occurs at the midpoint of the transmission line. All reactances are on same base. **10**

| Equipment | $Z_1$(p.u) | $Z_2$ (p.u) | $Z_0$(p.u) |
|---|---|---|---|
| Generator (star grounded) | j 0.16 | j 0.12 | j 0.03 |
| Transformer $T_1$(delta/star grounded) | j 0.2 | j 0.2 | j 0.2 |
| Transmission line | j 0.38 | j 0.38 | j 0.5 |
| Transformer $T_2$(star grounded/delta) | j 0.2 | j 0.2 | j 0.2 |
| Motor (star grounded through neutral reactance of j 0.3 p.u) | j 0.52 | j 0.29 | j 0.14 |

Q 4 a) Explain the variation of current and voltage on an overhead transmission line when one end of the line is open circuited and derive the transmitted and reflected voltages and current. **10**

Q 4 b) Discuss the disadvantages of Corona. **10**

Q 5 a) What is the effect of line length, load power and power factor on the voltage and power flow in transmission line? **10**

Q 5 b) Illustrate the working principle of lightning arrestor and explain the operation of any type of arrester in detail. **10**

Q 6 a) Describe the algorithm for short circuit studies. **10**

Q 6 b) Explain the following (i) Fortescue theorem (ii) volt time curves **10**

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TE - sem - VI - CBSGS - Electrical

(A)

**Paper / Subject Code: 36902 / ELECTRICAL MACHINES -III**

16/5/19

Time: 3 hours Marks: 80

Q.1 is compulsory.

Solve ANY THREE questions out of remaining.

ASSUME SUITABLE DATA wherever necessary.

Q.1 Answer (**ANY FOUR**). (20 Marks)

*a*) Derive condition for maximum output power for synchronous motor.

*b*) Explain Coil Span factor and hence derive an expression for it.

*c*) Whether or not a synchronous motor self starting? Justify your answer.

*d*) Explain excitation circle concept for synchronous motor.

*e*) List down advantages of modeling of electrical machines.

Q.2 (20 Marks)

*a*) A 4 pole, 3 phase, 50 Hz star connected alternator has 60 slots with 2 conductors per slot and having a two layer winding. Coils are short pitched such that if one coil side lies in slot number 1, the other coil side lies in slot number 13. Determine useful flux per pole required to generate a line voltage of 6000 V.

*b*) Explain the assumptions made in calculating voltage regulation by EMF method.

Q.3 (20 Marks)

*a*) Find the synchronous reactance for a star connected, 1500 KVA, 2300 V alternator in which, given field current produces 700 V on open circuit and an armature current of 376 A on short circuit. The effective per phase armature resistance is 0.12Ω. Calculate % voltage regulation for full load, 0.8 lagging power factor.

*b*) Draw neat labeled phasor diagrams for salient pole synchronous motor for lagging, leading and unity power factor.

Q.4 (20 Marks)

*a*) The synchronous impedance of a 3 phase, 50 Hz, star connected 6600 V synchronous motor is $(0 + j20)\Omega$ per phase. For a certain load the input power is 900 kW at normal voltage and the induced e.m.f. is 8500 V. Determine its line current and power factor.

*b*) Effect of change in excitation on parallel operation of two alternators under loaded condition.

Q.5 (20 Marks)

*a*) Explain Blondel's Two Reaction theory.

*b*) Two alternators operate in parallel and supply a load of 12 MW at 0.8 lagging power factor. **i)** By adjusting the prime mover input of alternator 1 it real power output is changed to 7 MW and by adjusting its excitation the power factor is changed to 0.9 lag. Find power factor of alternator 2. **ii)** If prime mover input is left unchanged but excitation is changed for alternator 2 such that its new power factor becomes 0.9 leading determine power factor for alternator 1.

Q.6 Write short notes on (**ANY TWO**). (20 Marks)

*a*) Effect of variation in load with constant excitation on synchronous motor.

*b*) Slip Test.

*c*) Steady state analysis of an induction machine.

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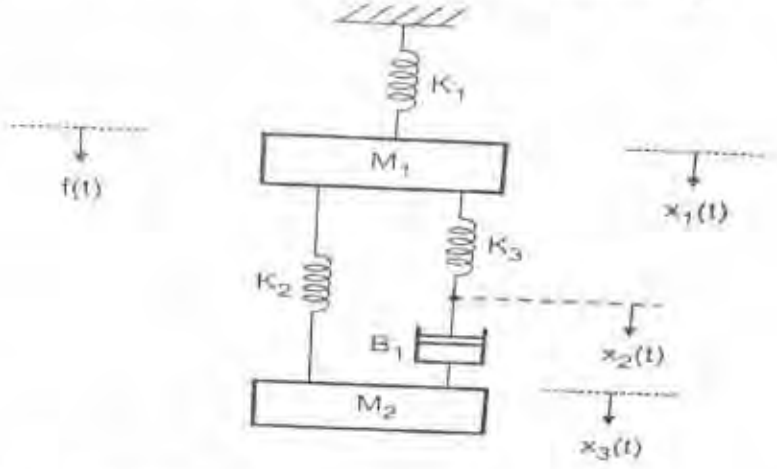
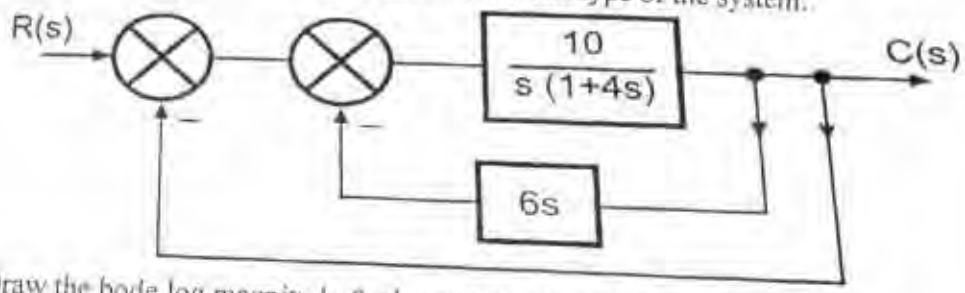
(b) Draw the equivalent mechanical system of the given system. Hence write the set of equilibrium equation for it and obtain the force voltage analogy. 10




Q.4 (a) Given the unity feedback system that has the transfer function $G(S)=\frac{K}{S(S+2)(S+4)(S+8)}$ Sketch the complete root locus. 1

(b) Using the routh table tell how many poles of the following equation are in the RHS, LHS & on the imaginary axis and also comment for stability 10
$S^6+5S^5+2S^4+3S^2+1=0$

Q.5 (a) For a given system find error coefficients and type of the system. 10




(b) Draw the bode log magnitude & phase angle plots for the system given by $G(S)H(S)=\frac{80}{S(S+2)(S+20)}$ Find phase margin, gain margin, phase & gain crossover frequency .Also Comment on stability.

Q.6 (a) Sketch the Nyquist plot for a system with $G(S)H(S)=\frac{10(S+3)}{S(S-1)}$ 20

(b) Explain gain cross over frequency, phase cross over, gain margin and phase margin in frequency response technique.

(3) TE-sem-VI - Electrical - CBSGS

Paper / Subject Code: 36904 / CONTROL SYSTEM -I

28/5/19

(3 Hours) Total Marks: 80

N.B : (1) Question No.**1** is compulsory.

(2) Attempt any **Three** from the remaining questions.

(3) Use **graph paper and semi log paper** wherever necessary.

Q.1 Attempt any **Four** 20

(a) Derive the expression to obtain transfer function from state model.

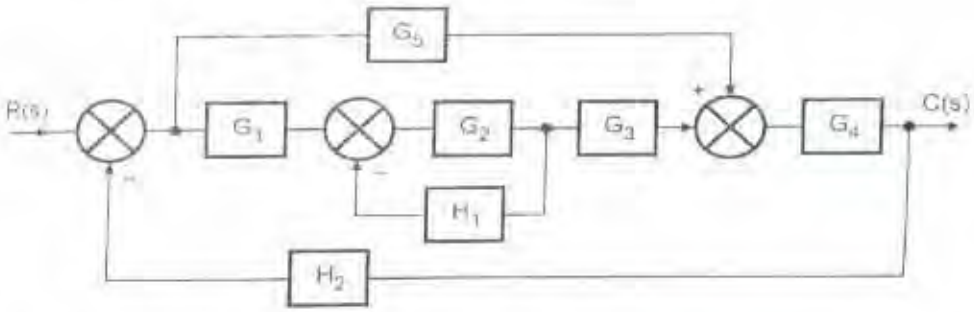
(b) Define 'Stability' , 'Unstability' , Marginal Stability' with respect to pole position.

(c) How to convert a system represented in state space to transfer function.

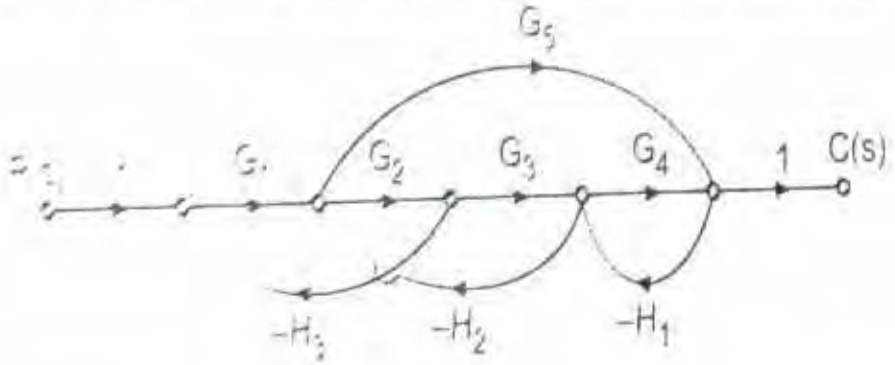
(d) Explain Nyquist criteria for stability.

(e) Explain the difference between open loop and closed loop systems.

Q.2 (a) Reduce the block diagram to a single block $T(S)=\frac{C(S)}{R(S)}$ 10




(b) Masson's gain formula to obtain the transfer function for the given figure 10




Q.3 (a) Find Kp, Kv, Ka and steady state error for a system with open loop transfer function as $G(S)H(S)=\frac{10(S+2)(S+3)}{S(S+1)(S+5)(S+4)}$. Where input is, $r(t)=3+t+t^2$. 10

TE - sem - V1 - CBSGS - Electrical 3/6/19

**Paper / Subject Code: 36905 / MICROCONTROLLER AND ITS APPLICATION**

[3 hrs] Total Marks:80

Question no 1 is compulsory.
Attempt any THREE from the remaining questions.

Q. 1 Attempt ant FOUR questions.
a) Explain rotate instructions used in PIC18F microcontroller. [5]
b) Write the differences between interrupt and polling. [5]
c) Explain the working of Watch Dog timer of PIC18F [5]
d) Explain the pipelining feature in PIC microcontroller [5]
e) Explain the status register in pic18 Microcontroller [5]

Q. 2 a) Explain the Table Read operation in PIC18f4520 microcontroller [10]
b) Explain the structure of TMR0 and T0CON registers in PIC microcontroller [10]

Q. 3 a) What is mean by addressing mode and hence explain different addressing modes used in pic18f458 microcontroller. [10]
b) Draw the IO port structure in PIC18 microcontroller and explain the registers associated with them. [10]

Q. 4 a) Explain the concept of Global Interrupt Enable (GIE) and Peripheral Interrupt Enable (PEIE) [10]
b) Explain the different registers of PIC18F associated with serial communication [10]

Q. 5 a) Explain the CCP (Compare, Capture, PWM) module in PIC18F4520 microcontroller in detail. [10]
b) Which are the different instruction formats used in PIC18f microcontroller. [10]

Q. 6 Write short notes on:
a) ADC module and associated registers with ADC [10]
b) DC Motor interfacing with PIC18f microcontroller. [10]

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