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Candidate should write his/her Roll No. here.

Total No. of Questions : 03

No. of Printed Pages : 4

M-SFS-II-2017 (15)
ELECTRICAL ENGINEERING
(Optional Subject)
Second Paper

Time : 3 Hours]

[Total Marks : 200

Instructions to the candidates :

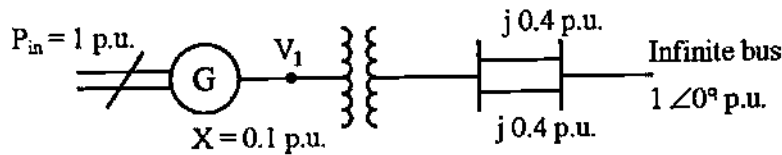
1. This question paper consists of **three** questions and all questions are compulsory.
2. Marks for each question have been indicated on the right hand margin.
3. There is no internal choice in Question No. 1, remaining questions carry internal choice.
4. The first question is of very short-answer type consisting of **15** compulsory questions. Each one is to be answered in one or two lines. Question No. 2 is short answer type, word limit is **100**. Question No. 3 is long answer/Essay type, word limit is **300**.
5. Wherever word limit has been given, it must be followed to.
6. Question should be answered exactly in the order same as mentioned in the question paper. Answer to the various parts of the same question should be written together compulsorily and no answer of the other question should be inserted between them.



1. Attempt all the questions and answer in **two lines** : **15 × 4 = 60**
- (A) Why are program counter and stack pointer 16 bit registers in 8085 Micro-processor ?
 - (B) Write the interrupt inputs of 8085 in priority order :
TRAP, RST 5.5, RST 6.5, RST 7.5, INTR
 - (C) Why damper windings are used in synchronous machines ?
 - (D) Mention the different methods of speed control of DC shunt motor.
 - (E) What are the specific advantages of Dielectric heating ?
 - (F) What are symmetrical components ?
 - (G) What is the use of Swing curve ?
 - (H) Mention any four advantages of air blast Circuit Breaker.
 - (I) In what way is distance protection superior to overcurrent protection for the protection of transmission lines ?
 - (J) Define signal to Noise ratio.
 - (K) Draw the optical fiber link showing the elements in it. What is an optical fiber ?
 - (L) "Pulse modulation systems are not digital, whereas pulse code modulation is". Justify.
 - (M) Write the analogous Electrical elements in force voltage analogy for the elements of Mechanical Translational System.
 - (N) State the principle of homogeneity or Principle of superposition in Control System.
 - (O) What is the need for a starter in a DC Motor ?
2. Attempt any **ten** questions and answer in **100 words**. **10 × 8 = 80**
- (A) Explain the operation of capacitor start and run Single Phase Induction Motor with suitable phasor diagram. Write any two of its applications.
 - (B) Discuss about the desirable characteristics of traction motor.

(C) A 200 V series motor runs at 1000 rpm and takes 20 A. Armature and field resistance is 0.4 ohms. Calculate the resistance to be inserted in series so as to reduce the speed to 800 rpm, assuming torque to vary as cube of the speed and unsaturated field.

(D) The Generator shown in the figure is delivering power to Infinite bus. Take $|V_t| = 1.1$ pu. Find the maximum power that can be transferred when (i) the system is healthy & (ii) one line is open.



(E) Describe the operating principle and constructional details of a Directional over current relay.

(F) Write the general overview on various forms of satellite communication system with uplink and downlink section.

(G) Explain the operation of a basic amplitude Modulator circuit using BJT.

(H) Using Routh criterion, determine the stability of the system represented by the characteristic equation $S^4 + 8S^3 + 18S^2 + 16S + 5 = 0$. Comment on the location of the roots of characteristic equation.

(I) Construct the block Diagram of field controlled DC Motor.

(J) Describe the various conditions of the flags available in the flag register of 8085. Also draw the bit configuration of flag register.

(K) Explain the following Instructions in 8085 :

(i) LDA 2050 (ii) LXI B, 1600 (iii) DCX H, (iv) CALL 2075, (v) NOP

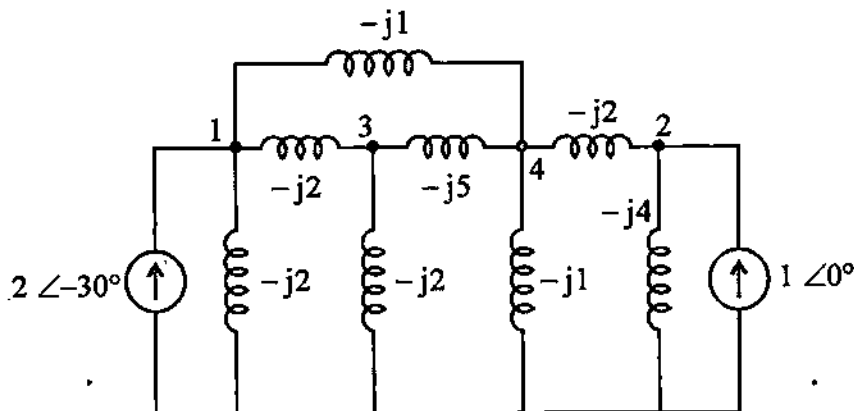
(L) A three phase Y- Δ transformer is constructed using three identical single phase transformers of rating 200 kVA, 63.51 kV/11 kV transformer. The impedances of primary and secondary are $(20 + j45)\Omega$ and $(0.1 + j0.2)\Omega$ respectively. Calculate the per unit impedance of the transformer choosing high voltage rating as base value.

(M) Write notes on any two types of surge diverters.

3. Attempt any three questions and answer in 300 words :

3 × 20 = 60

- (A) What is a Stepper Motor ? Explain the construction and different modes of operation for a variable Reluctance Stepper Motor.
- (B) Explain the following methods of speed control for an Induction Motor Drive from the rotor side.
- Cascade control
 - Kramer control
 - By Scherbius machine
- (C) Determine the bus admittance matrix of the system whose reactance diagram is shown in figure. The currents and admittances are given in p.u. Determine the reduced bus admittance matrix after eliminating node 3.



- (D) With suitable block and equations, discuss about the frequency shift and phase shift keying schemes involved in data transmission system.
- (E) A positional control system with velocity feedback is shown in figure. What is the response of the system for unit step input ?

