S.E. (Electrical)

ELECTRICAL MACHINES - I

(2019Pattern) (Semester-II)

1. Derive emf equation of dc generator.

2. State and explain characteristic of DC shunt Motor.

3. A dc shunt motor operating on 220V supply draws current of 20A and runs at 1200 rpm. Its armature resistance is 0.5Ω and field resistance is 200Ω. Calculate the additional resistance to be inserted in series with armature to reduce the speed to 520 rpm keeping load on motor constant.
4. What is armature reaction? Describe its effect on operation of dc machine. How armature reaction is minimized?
5. Obtain torque equation of dc motor. State applications of dc series motor.

6. A 220V, 6 pole, lap wound, dc shunt motor has 800 conductors of armature winding. Armature and field winding resistances are 0.9 Ω and 120Ω respectively. The motor takes 25A and flux/pole is 30mWb. Find speed and torque developed.
7. Explain flux control method for controlling speed of dc shunt motor. State its merits and demerits.
8. Why is starter needed in dc motor? State the types of starters used in dc motors. Explain the function of no-volt coil and overload relay in three-point starter.
9. An 20kW, 4 pole, 3-ph, 50 Hz induction motor has friction and windage losses are 2.5% of output. The full load slip is 4%. Calculate rotor copper loss, rotor input and shaft torque of the motor.
10. Enlist various types of starters for 3-ph induction motor. With neat sketch, explain Star-delta starter.

11. Derive the condition for maximum torque of 3-phase induction motor.

12. Explain the power flow diagram of 3-ph induction motor.

13. Draw and explain the torque-slip characteristics of 3-ph induction motor. State the effect of rotor resistance on torque-slip characteristics.

14. State the similarities and differences between 3-ph induction motor and transformer. Draw the phasor diagram of 3-ph induction motor.
15. Explain the v/f method and stator voltage method of speed control of 3-ph induction motor.

16. A cage rotor 3-ph induction when started by means of a star-delta starter takes 150% of full load line current and develops 45% of full load torque at starting. Calculate the starting torque and current in terms of full load values, if an autotransformer with 75% tapping were employed.
17. Derive the equation for a) Armature Torque b) Shaft torque of DC motors.
18. State and explain LAP and wave winding.
19. Draw Power flow diagram of DC motor.
20. State and explain characteristic of DC shunt Motor.

S.E. (Electrical)

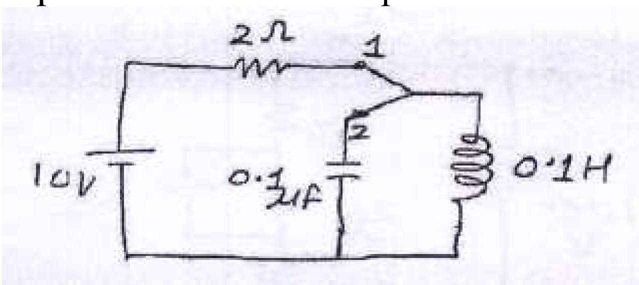
FUNDAMENTAL OF MICROCONTROLLER AND APPLICATIONS

(2019Pattern) (Semester-II)

1. Write in detail stepper motor control using 8051 Microcontroller.
2. Explain the functions of following Pin of 8051
   1) ALE 2) EA 3) RST.
3. Find the delay generated by timer 0 if TL0=03H and TH0=0B8H.
4. Explain in brief Data types in C.
5. Draw and explain IE register in Detail.
6. Assume that a 1-Hz external clock is being fed into pin TO (P3.4). Write a C program for counter 0 in mode -1 (16-bit) to count the pulses and display the THO and TLO registers on P2 and PI, respectively.
7. Write a program using C language to generate square wave with 50% duty cycle from P1.5. Use timer 0, Total time period = 25.30 micro sec, clock frequency 11.5 MHz.
8. Propose one instruction each using the following addressing modes.
   1) Immediate 2) Register 3) Register Indirect.
9. Explain Interrupt sources of 8051 and write steps to execute interrupt.
10. Discuss the role of timers in 8051.
11. Explain RMS voltage measurement using 8051.
12. Write c program for the8051 to transfer the letter “A” serially at 4800 baud rate
13. Draw Interfacing diagram of ADC 0809 with 8051 and write C-code for same.
14. Explain interrupt structure of 8051 microcontroller and ISR table.
15. State and explain importance TI and flag.
16. Write c program for Transmitting data serially on serial port of 8051 microcontroller assume serial communication Mode 1 and receive enable.
17. Draw and explain SCON register in detail
18. Write a short note on GSM.
19. Write c program to interface single Key with 8051
20. Write c programming to send and read SMS using GSM module.

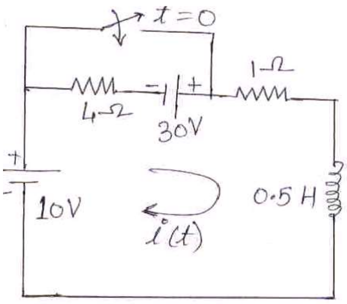
S.E. (Electrical)
NETWORK ANALYSIS
(2019Pattern) (Semester-II)

1. After being on position 1 for long time, the switch is thrown on position 2 at time t = 0, find current using Laplace transform technique.



2. Obtain 'Z' parameters in terms of transmission parameters.

3. A direct voltage of 220 V is suddenly applied to a series R-L circuit having R=40Ω and inductance 0.4 H. Determine the voltage drop across inductor at the instant of 'switching on' and at 0.04 sec later.
4. The switch is opened for long time. Find current through inductor for all time after switch is closed at t = 0



5. Explain: Locations of poles, functions and time domain behavior from pole zero plot. How stability varies with the location of poles? Draw necessary diagrams.
6. Obtain 'Y' parameters in terms of transmission parameters.

7. Write short note on
   1) Low Pass Filter 2) High Pass Filter
8. Write the restrictions on pole & zero location in the transfer function.

9. For the given network function draw pole zero plot & hence obtain the time domain response of the voltage. I(s)= 20(s+4) / s(s+4)
10. Derive the expression for constant-K low pass filter.

11. State and explain the following
    i) Characteristic impedance (Z0); ii) Cut-off frq (fc); iii) L &C in the form of R0 & fc iv) Nominal Impedance (R0); v) Attenuation (α); vi) Phase Constant (β)
12. Design a constant –K low pass filter having cut off frequency 4 KHz & design resistance R_0=400Ω. Obtain the value of attenuation at 6 KHz.

13. Design a constant k High Pass Filter (T & pi section). Given: fc=6 kHz., R0=500 ohm. Calculate attenuation (α) and phase constant (β) at 10 kHz. Also determine frequency at which the attenuation is 10 dB.
14. Design a const-K, T-section Low Pass Filter for the following specifications: Design impedance R0= 600 ohm; Cut-off freq (fc)= 1 MHz

15. For the given VOLTAGE function, draw the pole-zero plot and obtain time-domain voltage
    V(s)= 20(S+4) / (S+2)(S+4)

S.E. (Electrical)

NUMERICAL METHODS AND COMPUTER PROGRAMMING

(2019Pattern) (Semester-II)

1. Explain Gauss Seidel method for solution of linear simultaneous equation

2. If y(75)=246, y(80)=202 y(85)=118, y(90)=40 find y(79) using Newton's forward interpolation

3. State and explain Newton's Forward interpolation formula

4. Using Lagrange's interpolation, find f(2) given that :

x	0	1	3	4
y=f(x)	12	0	6	12

5. Explain in brief an Interpolation with electrical engineering application.

6. Derive Simpson's (1/3)rd rule using Newton-Cote's formula for numerical integration

7. Evaluate $\int_0^{\pi/2} e^{\sin x}\, dx$ using Simpson's (1/3) rd rule with 6 sub-intervals.

8. Solve the following system of equations using Gauss Elimination method:
   $4x - y + 1z = 12\ ;\quad x + 2y + 3z = 11\ ;\quad 2x - 2y - z = 2$

9. Explain Gauss elimination method.

10. Using Gauss-Jacobi iterative method, obtain solution of the system of linear simultaneous equations in the fifth iteration. Take initial value of all variables equal to zero.
    $4x + y - z = 4\ ;\ 2x + 3y + z = 4\ ;\ x + y + 5z = 16$

11. Explain fourth order RK method to find solution of ordinary differential equation

12. Explain Taylor series method for solution of ordinary differential equation

13. Apply fourth order RK method to find the value of y when x=0.2 if $\frac{dy}{dx} = x + y$ and y=1 when x=0

14. Using Gauss-Jacobi iterative method, obtain solution of the system of linear simultaneous equations in the fifth iteration. Take initial value of all variables equal to zero:
    $$3x - y + 2z = 12\ ;\quad x + 2y + 3z = 11\ ;\quad 2x - 2y - z = 2$$

15. Derive the formula of Euler's method for solution of ordinary differential equation.

S.E. (Electrical)
POWER SYSTEM-I
(2019Pattern) (Semester-II)

1. State and explain in brief Skin effect and proximity effect.

2. Derive an expression for sag with support at equal levels.

3. A 3-phase 80 km long single circuit 66 kV transposed overhead line has horizontal spacing with 5 m between adjacent conductors and 6 m between outer conductors. The conductor diameter is 2.5 cm. Find the Inductance per phase.
4. State and explain different types of insulators used in power System.

5. Explain representation of medium lines as 'Nominal Π' and 'Nominal T' circuits.

6. Explain evaluation and estimation of generalized circuit constants (ABCD) for short lines.
7. Explain performance of medium transmission lines with voltage current relationship and phasor diagram.
8. Define string efficiency. Drive an expression for string efficiency

9. Explain evaluation and estimation of generalized circuit constants (ABCD) for medium lines
10. Explain representation of long lines as 'Nominal Π' and 'Nominal T' circuits.

11. Write short note on pin type Insulator. Also explain applications, advantages and disadvantages.
12. Derive an expression for external flux linkages of single conductor.

13. Derive an expression for external flux linkages of single conductor.

14. Suspension string has 3 units. Each unit can with stand a maximum voltage of 11kV. The capacitance of each joint and metal work is 30 percent of the capacitance of each disc. Find
    i) Maximum line voltage for which the string can be used?
15. Derive an expression for Inductance of three phase line with symmetrical spacing with transposition.