THIAGARAJAR POLYTECHNIC COLLEGE, SALEM

(Autonomous) Reg. No.

October/November 2019 Examinations

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

Electrical Circuit Theory

Year/Sem: II / III (ODD-II) Max. Marks : 75 Time : 3 hr.

PART-A **(5 x 2 = 10 Marks)**

Note: (i) Answer any FIVE questions out of which question No.8 is compulsory.
(ii) All questions carry equal marks.

1 Define electric flux density. State its unit.

2 In a circuit, three resistors $R_1\Omega$, $R_2\Omega$, and $R_3\Omega$ are connected in series. What is the total resistance?

3 Write the condition to transfer maximum power from source to load in a circuit.

4 Convert the vector $10\angle 30°$ in to rectangular form.

5 Define power factor.

6 Define Q factor in RLC series circuit.

7 What is the relationship between line voltage and phase voltage, line current and phase current in a balanced 3Ø star connected system?

8 Write the Equation to find total power and power factor of a balanced 3Ø load by using two wattmeter method.

PART-B **(5 x 3 = 15 Marks)**

Note: (i) Answer any FIVE questions out of which question No. 16 is compulsory.
(ii) All questions carry equal marks.

9 Three capacitors 2μF, 4μF and 6μF are connected in parallel across a 24V DC supply. Find the total charge in the circuit.

10 State Kirchoff's laws.

11 State Thevenin's theorem.

12 Convert the following delta connected resistors as shown in Fig.1 into equivalent star.

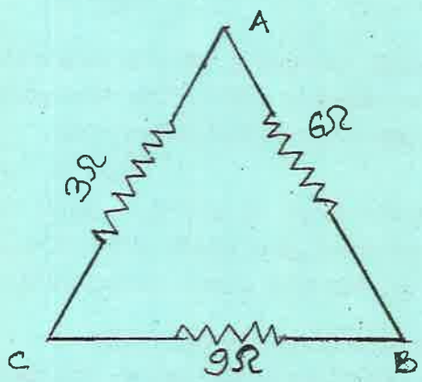

Fig. 1

13 The equation for an AC sinusoidal current is 100sin314t. Find the Maximum value, RMS value of current and supply frequency.

14 Draw the power triangle and define different powers in AC.

15 Compare series and Parallel resonance.

16 What is meant by balanced and unbalanced load?

PART-C **(5 x 10 = 50 Marks)**

Note: (i) Answer all the questions choosing either sub-division (A) or sub-division (B) of each question.
(ii) All questions carry equal marks.

17 A i) State and explain coulomb's laws of electrostatics. 4

ii) A coil of copper wire has a resistance of 20 Ω at 20°C. Determine its resistance at 70°C. Temperature coefficient of copper is 0.00394/°C at 20°C. 6

(OR)

B For the circuit as given below in Fig.2, Find (i) Total resistance (ii) Total current (iii) Branch current and (iv) Total power dissipated in the circuit. 10

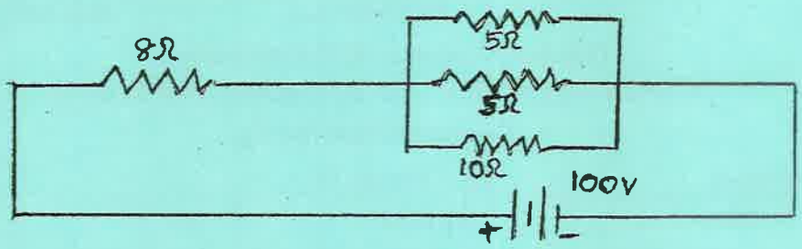

Fig.2

18 A By using mesh current analysis for the Fig.3 given below, Find the current supplied by the batteries. 10

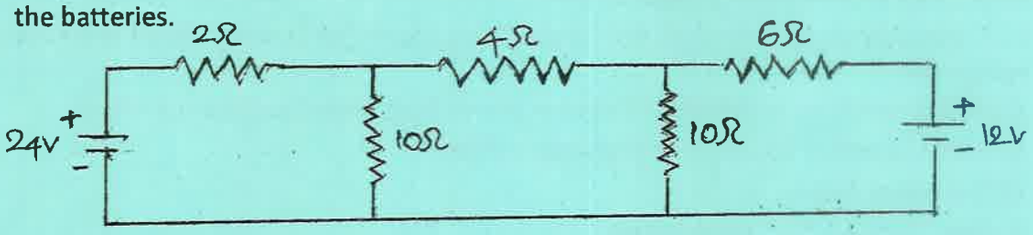

Fig.3

(OR)

B i) State and explain Thevenin's theorem. 4

ii) For the circuit as given below in Fig.4, calculate the value of the load resistance for maximum power transferred from source to load. Also find the value of maximum power in R_L 6

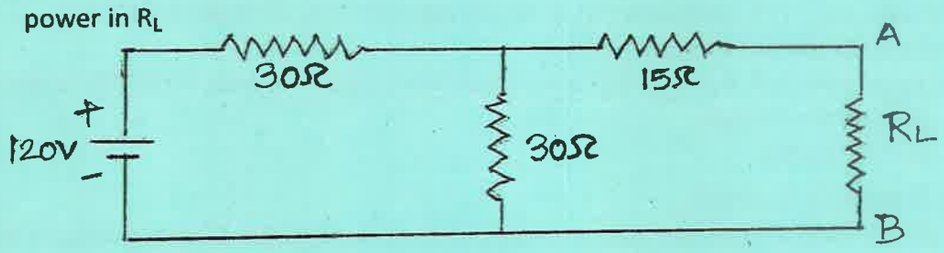

Fig.4

19 A A series RLC circuit consisting of 20Ω resistance, 0.2H inductance and 100μF capacitance is connected to 230V, 50Hz AC supply. Calculate impedance, current, power factor and power consumed in the circuit. 10

(OR)

B Two impedances Z_1= (6+j8) Ω and Z_2 = (3-j4) Ω are connected in parallel. This combination is connected across 230V, 50Hz AC supply. Calculate the current in each branch, total current and total power consumed by the circuit. 10

20 A i) List the applications of resonance circuits. 4

ii) A coil having a resistance of 10Ω and an inductance of 20mH is connected in series with 100μF capacitor. Calculate resonance frequency and Q factor of the coil. 6

(OR)

B A coil of 10Ω resistance and 0.2H inductance is connected in parallel with a capacitor of 100μF. Calculate the frequency at which the circuit will act as non inductive resistance of RΩ. Find also the value of dynamic resistance. 10

21 A Derive an expression to calculate the power and power factor of a balanced 3 phase load by using two wattmeter method 10

(OR)

B Three identical coils each having a resistance of 20Ω and inductive reactance of 15Ω are connected in star across 3ø, 400V, 50Hz supply. 10

i) Draw the circuit diagram

ii) Calculate the line current and phase current

iii) Power factor of the coil

iv) Power consumed by the circuit

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October/November 2019 Examinations

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

Electrical Machines-I

Year/Sem: II / III (ODD-II) Max. Marks : 75 Time : 3 hr.

PART-A **(5 x 2 = 10 Marks)**

Note: (i) Answer any FIVE questions out of which question No.8 is compulsory.
(ii) All questions carry equal marks.

1 Define critical field resistance of a DC generator

2 List the two effects of armature reaction.

3 Write the expression for torque equation of a DC motor.

4 List the methods of speed control employed for DC motors.

5 State the condition for maximum efficiency in a transformer.

6 Name the material used in breather.

7 State the active materials used in Nickel-Iron battery.

8 List any two applications of auto transformer.

PART-B **(5 x 3 = 15 Marks)**

Note: (i) Answer any FIVE questions out of which question No. 16 is compulsory.
(ii) All questions carry equal marks.

9 State Faraday's laws of Electromagnetic Induction.

10 State the conditions to be fulfilled for a self-excited generator to build up voltage.

11 State the necessity of starter for a DC motor.

12 State Fleming's left hand rule.

13 Define voltage regulation of a transformer.

14 What are the advantages of parallel operation of transformers?

15 Explain the term "Capacity of a battery".

16 State the importance of Bucholz Relay.

PART-C **(5 x 10 = 50 Marks)**

Note: (i) Answer all the questions choosing either sub-division (A) or sub-division (B) of each question.
(ii) All questions carry equal marks.

17 A Derive the EMF equation of a DC generator.

(OR)

B Explain with neat diagram the load characteristics of DC shunt generator.

18 A Draw and explain (i) Torque - current (ii) Speed - current and (iii) Speed - torque characteristics of DC series motor.

(OR)

B With the neat diagram, explain the working of 3 point starter.

19 A Explain with neat diagram the method of finding efficiency in a transformer from OC and SC test.

(OR)

B Draw and explain the phasor diagram of transformer with resistive load.

20 A Derive the expression for load sharing of transformers with equal rating.

(OR)

B With a neat diagram, explain the principle of OFF load tap changer in a distribution transformer.

21 A Explain with chemical equations, the chemical changes and physical changes during charging and discharging of a battery.

(OR)

B Explain the different methods of charging system for battery charging.

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October/November 2019 Examinations

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

Electronic Devices and Circuits

Year/Sem: II / III (ODD-II) Max. Marks : 75 Time : 3 hr.

PART-A **(5 x 2 = 10 Marks)**

Note: (i) Answer any FIVE questions out of which question No.8 is compulsory.
(ii) All questions carry equal marks.

1 Define peak Inverse voltage of diode.
2 Define semiconductor and mention its types.
3 Define feedback and mention its types.
4 State the applications of UJT.
5 Draw the symbols of DIAC and TRIC and mark its terminals.
6 State the applications of MOSFET.
7 Define Multivibrator and mention its types.
8 Define the condition for oscillation.

PART-B **(5 x 3 = 15 Marks)**

Note: (i) Answer any FIVE questions out of which question No. 16 is compulsory.
(ii) All questions carry equal marks.

9 Explain the forward characteristics of PN junction diode.
10 How is transistor used as an amplifier?
11 Differentiate FET and BJT.
12 Draw and explain the equivalent circuit of UJT.
13 Explain MOSFET as switch.
14 Write short notes on LDR.
15 Explain solar cell.
16 State the advantages of negative feedback.

PART-C **(5 x 10 = 50 Marks)**

Note: (i) Answer all the questions choosing either sub-division (A) or sub-division (B) of each question.
(ii) All questions carry equal marks.

17 A With neat circuit diagram and waveform explain the forward and reverse characteristics of Zener diode. 10

(OR)

B Explain the operation of bridge rectifier with capacitor filter. 10

18 A With necessary diagram explain the operation of NPN transistor. 10

(OR)

B With relevant circuit diagram explain the operation of emitter follower. 10

19 A Draw and describe about the construction and working of RC phase shift oscillator. 10

(OR)

B Draw and describe about the operation of UJT relaxation oscillator. 10

20 A Explain the construction, working and VI characteristics of DIAC. 10

(OR)

B Draw and describe about the speed control of fan using DIAC and TRIAC. 10

21 A Explain
(i) Positive clipper 5
(ii) Negative clamper 5

(OR)

B With necessary diagram explain Schmitt trigger. 10

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