Code: 15O-3201 & 11O-3201 EEE

THIAGARAJAR POLYTECHNIC COLLEGE, SALEM

(Autonomous) Reg. No.

October/November 2018 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)**

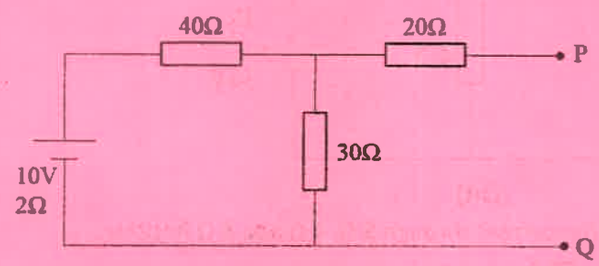
Note: (i) Answer any FIVE questions out of which question No.8 is compulsory.
(ii) All questions carry equal marks.

1 State Ohm's law.

2 Three capacitors have capacitance of 4 mfd, 6 mfd and 8 mfd respectively. Find the total capacitance when they are connected (a) in series (b) Parallel.

3 State Superposition theorem.

4 Find the Thevenin's resistance at terminals PQ



5 A coil of inductance 0.4 H draws a current of 0.8 A when connected to 250 V, 50 Hz supply. What is the resistance of the coil?

6 Find the product of two phasors given by A = 5+j8 and B =7−j6.5

7 Each branch of a delta connected load has an impedance of (16+j12) Ω. Calculate the line current when connected to a 400 V, 3 phase 50 Hz mains.

8 Compare Series and parallel resonant circuits.

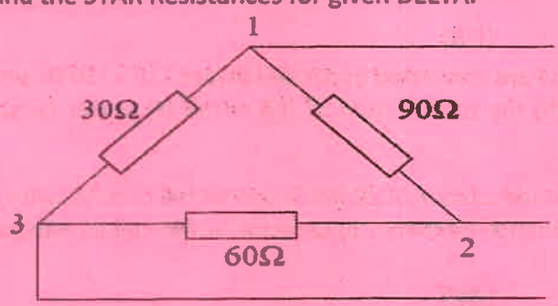
PART-B **(5 x 3 = 15 Marks)**

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

9 Derive an expression for total resistance of the circuit when 3 resistors are connected in parallel.

10 State and explain Coulomb's laws of electrostatics.

11 Find the STAR Resistances for given DELTA.



12 Draw the 1. Thevenin's equivalent circuit 2. Norton's equivalent circuit

13 Define 1. Form factor 2. Peak Factor

14 Define the following terms: 1. Cycle 2. Power factor 3. Frequency

15 Derive the expression for resonance frequency and quality factor in series resonance circuit.

16 Two wattmeters are connected to measure the power of a 3 phase circuit indicated 2500 W and 500 W respectively. Find the power factor of the circuit.

Contd...2

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 divisions carry equal marks.

17 A i. Show that $\alpha_1 = \alpha_0 / (1 + \alpha_0 t_1)$ where α_0 is the temperature coefficient at 0° C and α_1 is the temperature coefficient at t_1°C. 6

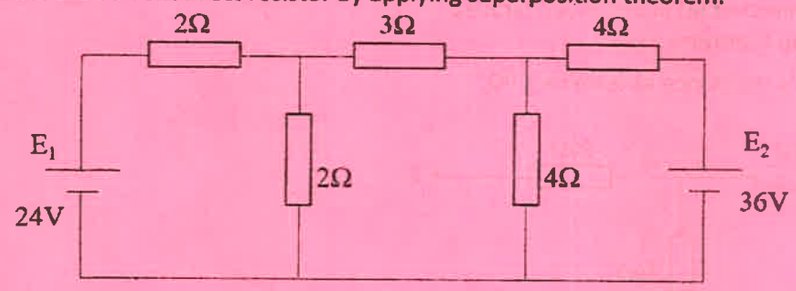
ii. Derive an expression for energy stored in a capacitor. 4

(OR)

B i. A circuit consists of two resistors 20 Ω and 30 Ω connected in parallel. They are connected in series with a resistor of 15 Ω. If the current through 15 Ω resistor is 3 amps find the current in the other resistors, total voltage and total power. 6

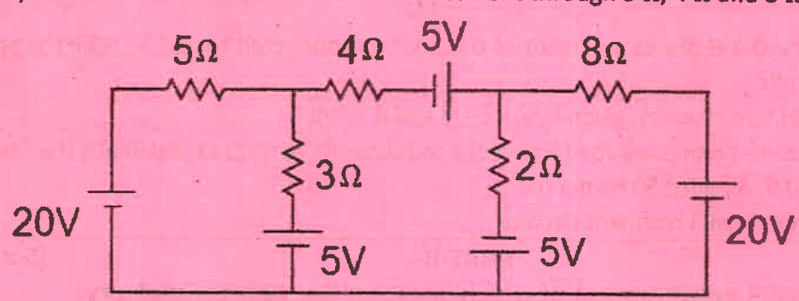
ii. A resistor of R Ω is connected in series with a parallel circuit consisting of 12 Ω and 8 Ω. The total power in the circuit is 80 Watts when the applied voltage is 20 V. Calculate the value of R. 4

18 A Find the current in 3Ω resistor by applying superposition theorem. 10



(OR)

B By mesh current method determine the current through 5 Ω, 4 Ω and 8 Ω Resistor. 10



19 A When a voltage of 100 V, 50 Hz is applied to a choking coil 'A', the current is 8 A and the power is 120 Watts. The same voltage is applied to a coil B, the current is 10 A and the power is 500 Watts. What current and power will be taken when 100 V, 50 Hz is applied to the two coils connected in series. 10

(OR)

B Two impedances $Z_1 = 8+j6$ and $Z_2 = 3-j4$ are connected in parallel across 230 V, 50 Hz supply. Calculate (a) Current in each branch (b) the total current of the circuit (c) power factor (d) Power taken by the circuit. 10

20 A A coil having a resistance of 8 Ω and an inductance of 20 mH is connected in series with a 10 microfarad capacitor. Calculate i) Resonance frequency ii) Q-factor of the coil iii) Bandwidth and iv) Half power frequencies. 10

(OR)

B A parallel circuit consists of a 2.5 µF capacitor and a coil whose resistance and inductance are 15 Ω and 260 mH respectively. Determine (i) Resonant frequency (ii) Q-Factor of the circuit at resonance (iii) Dynamic resistance of the circuit. 10

21 A Derive an expression to find the relationship between line voltage, phase voltage, line current and phase current in a 3 phase balanced 1. Delta connected system 2. Star connected system. 10

(OR)

B Derive an expression to find three phase power and power factor by using two wattmeter method. 10

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Code: 15O- 3202 **EEE**

THIAGARAJAR POLYTECHNIC COLLEGE, SALEM

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October/November 2018 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 Write the expression for emf equation of a DC generator.
2 Mention the purpose of overload relay in three point starter.
3 Define all day efficiency of a transformer.
4 Why the transformer rating is in KVA?
5 Mention the purpose of bucholz relay.
6 State the necessity of cooling in transformer.
7 What is a primary cell?
8 List out the methods of charging.

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 Derive the condition to get maximum efficiency in a DC generator
11 Draw the no load vector diagram of a single phase transformer.
12 Mention the conditions to be satisfied for parallel operation of transformer.
13 Mention the losses occurring in DC machines.
14 State the applications of lead acid battery.
15 What are the indications of a fully charged battery?
16 Draw the speed torque characteristics of D.C. series motor.

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 divisions carry equal marks.

17 A Explain armature reaction in D.C. generator with neat sketches. 10

(OR)

B A 4 pole D.C. shunt generator with a wave wound armature has to supply a load of 40kW at 230 volts. The armature and shunt field resistances are 0.04 Ω and 150 Ω respectively. Allowing a contact drop of 1 V per brush, calculate the generated emf. 10

18 A With a neat sketch explain the principle of operation of DC motor. 10

(OR)

B Explain how speed control of DC shunt motors can be achieved by armature control method and field control method. 10

19 A Explain the constructional details of core type and shell type transformer. 10

(OR)

B Derive the emf equation of a single phase transformer. 10

20 A Explain the operation of the following transformer accessories. 10
(i) Consevator (ii) Breather (iii) Explosion vent.

(OR)

B With neat sketch explain the working of ON load tap changer. 10

21 A With a neat sketch, explain the constructional details of Lead acid cell. 10

(OR)

B (i) Explain trickle charging. 5
(ii) Explain the chemical reactions of Ni-Cd cell. 5

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October/November 2018 Examinations

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

Electronics 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 semiconductor and mention its types.
2 Define zener diode and state its applications.
3 State the characteristics of emitter follower.
4 Define positive feedback and negative feedback.
5 Why is FET called unipolar transistor?
6 Differentiate FET and BJT.
7 Draw the VI characteristics of DIAC.
8 Define LDR and draw its symbol.

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 Compare the characteristics of Half wave, Full wave and Bridge rectifiers.
10 How is transistor used as an amplifier?
11 Compare the characteristics of CE , CB and CC Transistor configurations.
12 Explain the conditions for sustained oscillation.
13 Explain two transistor analogy of SCR.
14 Explain MOSFET as a switch.
15 Draw the circuit diagram and wave form of an Astable Multivibrator.
16 Explain the construction details of FET.

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 divisions carry equal marks.

17 A Explain the operation of semiconductor diode and draw its characteristics. 10

(OR)

B i) Explain the operation of half wave rectifier and draw output wave form. 10
ii)Explain the operation of PI filter.

18 A Explain the input and output characteristics of a common emitter configuration with a neat circuit diagram. 10

(OR)

B Explain why is the gain of RC coupled amplifier reduced at low and high frequency range? 10

19 A Explain the working principle of Hartley oscillator with neat diagram. 10

(OR)

B Explain the operation and emitter characteristics of UJT. 10

20 A Explain the principle of operation and VI characteristics of TRIAC. 10

(OR)

B Explain the construction and working of depletion mode N channel MOSFET. Draw its transfer characteristics. 10

21 A i) Explain the operation of LCD. 10
ii)Explain the working of solar cell.

(OR)

B Explain the operation of Schmitt trigger with suitable waveforms. Also mention its applications. 10

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