Mark Scored:

KATHMANDU UNIVERSITY
End Semester Examination [C]
November, 2018
(Special Compt.)

Level : B. E.
Year : I
Course : EEEG 102
Semester : I

Exam Roll No. :
Time: 30 mins.
F. M. : 20

Registration No.:
Date NOV 16 2018

SECTION "A"
[20Q × 1 = 20 marks]

Choose the most appropriate answer.

1. The color coding of a four band resistor with range of value of resistance from 2.25Ω to 2.75Ω is _____.
   [a] Red-Violet-Green-Gold
   [b] Red-Red-Green-Gold
   [c] Red-Green-Silver-Gold
   [d] Red-Green-Gold-Silver

2. Ideal current source has _____.
   [a] Zero internal resistance
   [b] Large value of current
   [c] Infinite internal resistance
   [d] Low value of voltage

3. If the resistance of a gold wire at 30°C is 20Ω, the approximate resistance at 74°C is _____ given that the inferred absolute temperature of gold is -274°C.
   [a] 25 Ω
   [b] 22 Ω
   [c] 23 Ω
   [d] 27 Ω

4. The value of R1 such that R2 = 5R1 and R3 = (½)R1 in figure 1 is _____.
   [a] 30 Ω
   [b] 50 Ω
   [c] 200 Ω
   [d] 64 Ω

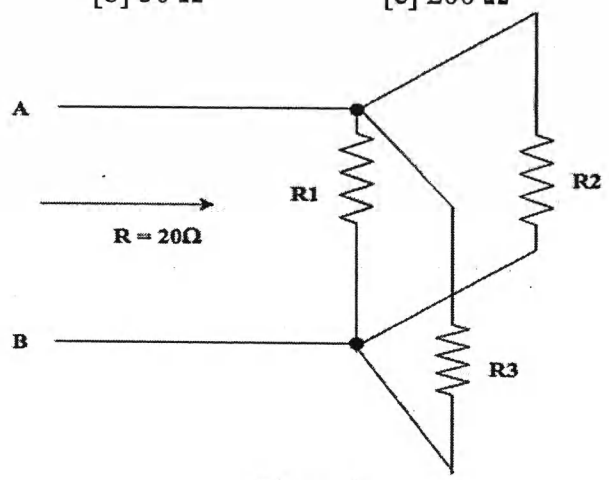

Figure 1

5. The value of current I in the Figure 2 is _____.
   [a] – 4 A
   [b] 4 A
   [c] 8 A
   [d] – 6 A

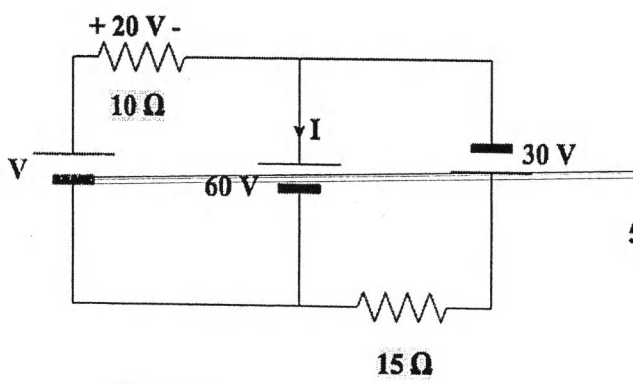

Figure 2

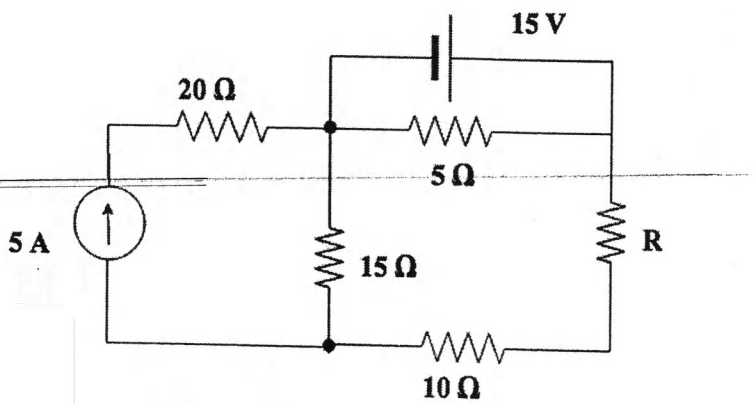

Figure 3

6. If the maximum power is transferred to the load R in Figure 3, the value of R is _____.
[a] 34 Ω [b] 24 Ω [c] 30 Ω [d] 29 Ω

7. In Figure 4 below, the voltage drop across resistor R1 with value 5kΩ _____ if the potentiometer R with initial value set at 10 kΩ is increased to a value of 20kΩ.
[a] decreases by 40% [b] increases by 40%
[c] decreases by a fraction of 2/15 [d] increases by a fraction of 2/15

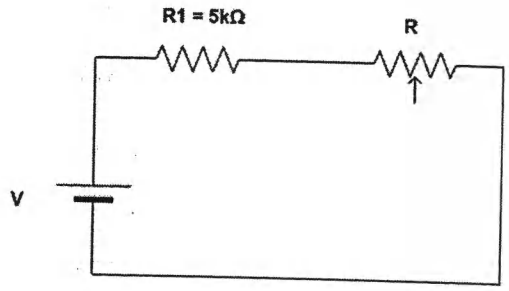

Figure 4

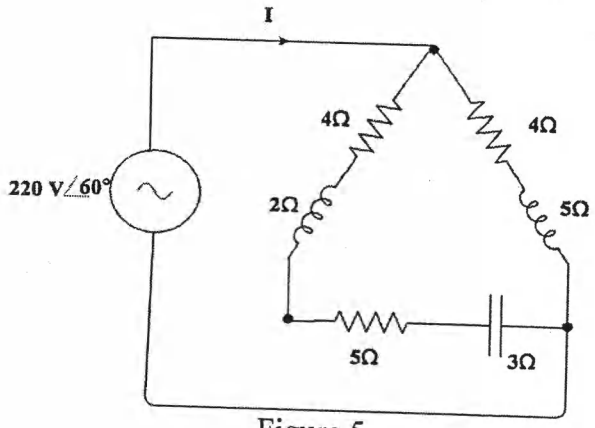

Figure 5

8. If a resistance of 50 Ω connected in parallel to a capacitor of capacitance 51.6 μF is supplied by the ac source of frequency 50 Hz, the power factor of the circuit is _____.
[a] 0.78(lead) [b] 0.78(lag) [c] 0.63(lead) [d] 0.63(lag)

9. The value of current I of the circuit in Figure 5 is approximately _____.
[a] 72.57 ∠38° [b] 40.16 ∠60° [c] 51.61 ∠ 32° [d] 43.36 ∠ 66°

10. In a resonant circuit, if quality factor (Q) is greater than or equal to 10, resonant frequency _____ bandwidth.
[a] is less than [b] exceeds [c] is greater than [d] bisects

11. The average value of a periodic, half wave symmetrical triangular waveform having a time period of 2π is _____ times its peak value.
[a] 0.500 [b] 0.577 [c] 0.637 [d] 0.318

12. The voltage developed across the capacitor in Figure 6 is _____.
[a] 15 ∠ -30° [b] 15 ∠ 30° [c] (15/√2) ∠ -30° [d] (15/√2) ∠ 30°

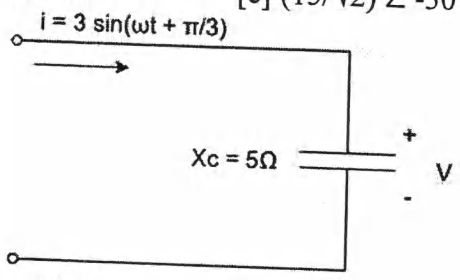

Figure 6

13. In a series RL circuit, if the apparent power is 200 kVA and the power absorbed is 120 kW, the reactive power is _____.
[a] 80 kVAR [b] 160 kVAR [c] 233 kVAR [d] 90 kVAR

14. A 220 V, 3 phase supply is applied to a balanced delta connected load with impedance of (4+j6) ohms per phase. The power consumed by the load per phase is _____.

[a] 1936 W [b] 2904 VAR [c] 4840 VA [d] 4840 W

15. The magnetic field produced in a straight conducting wire on passing current through it is _____.

[a] in the direction of current
[b] in the direction opposite to the current
[c] circular around the wire
[d] in the direction parallel to the wire

16. Magnetizing force in a magnetic circuit is independent of _____.

[a] number of turns of coil
[b] current through the coil
[c] length of core
[d] type of core

17. If the rate of change of flux in secondary coil having 100 turns is 400 weber/second and rate of change of current in primary coil having 150 turns is 0.4 Ampere/second, the mutual inductance between the two coils is _____.

[a] 0.15 H [b] 0.1 H [c] 1.5×10^5 H [d] 1×10^5 H

18. The purpose of an iron core in a transformer is to _____.

[a] provide support to windings
[b] reduce hysteresis loss and eddy current loss
[c] decrease reluctance of the magnetic path
[d] mitigate copper loss

19. The part will surely tell us that given motor is a DC motor and not an AC motor is _____.

[a] winding [b] stator [c] commutator [d] brush

20. An ideal ammeter acts as _____.

[a] open circuit
[b] short circuit
[c] high resistive circuit
[d] low resistive circuit

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Level : B. E.
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(Special compt.)

Course : EEEG 102
Semester : I
F. M. : 55

SECTION "B"
[5 Q × 11=55 marks]

Attempt *ANY FIVE* questions. Assume any suitable data if necessary.

1. a. Find the source current in the network of Figure-1. [5]

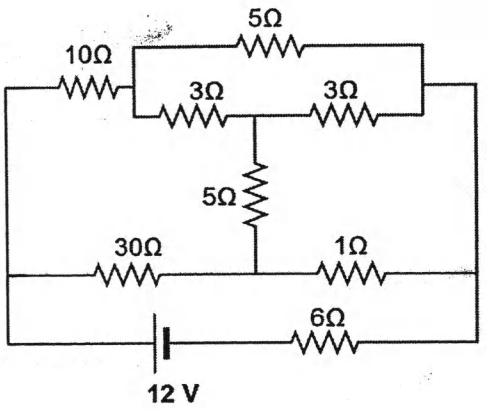


Figure-1

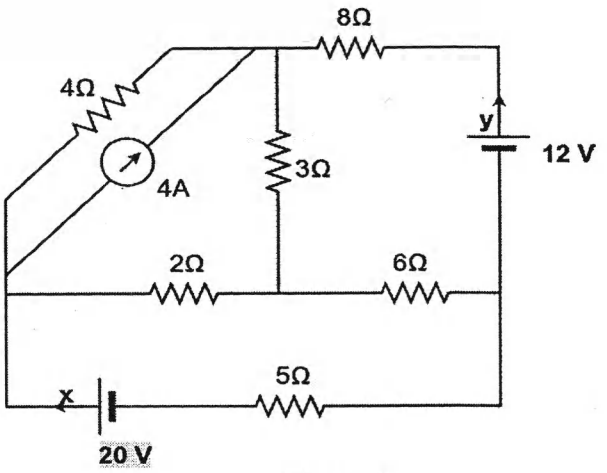


Figure-2

b. Explain Kirchhoff's laws. Determine the currents x and y as indicated in Figure-2. [2+4]

2. a. Find the current through 5Ω using superposition theorem in Figure-3. [5]

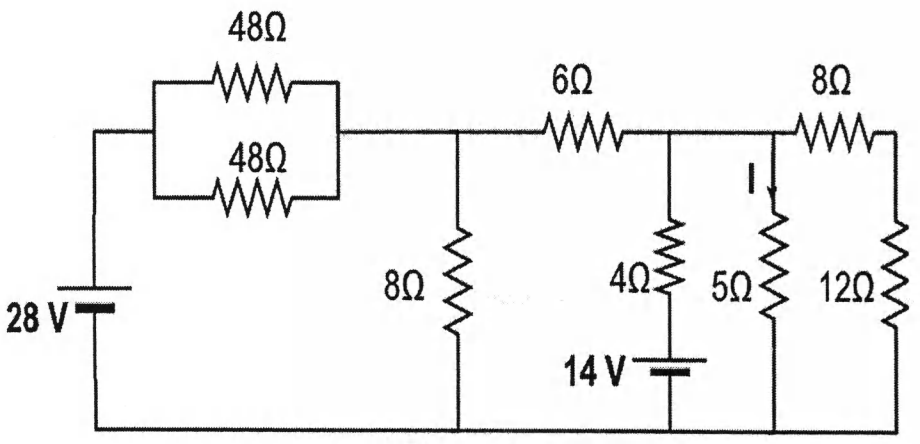


Figure-3

b. Differentiate between dependent and independent sources. Determine the voltage drop across terminal AB in Figure-4 using Norton's Theorem. [2+4]

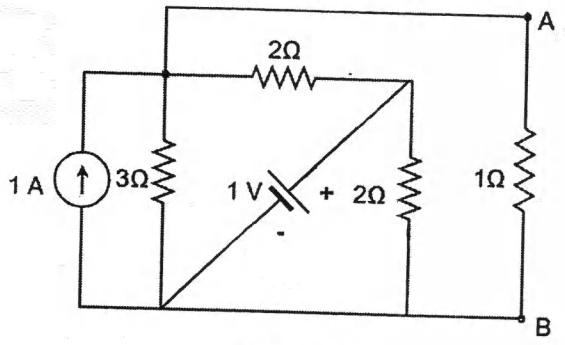


Figure-4

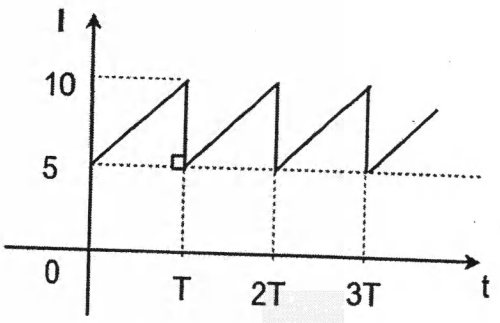


Figure-5

3. a. Define RMS value of an AC. Find the average and RMS value of the waveform given in Figure-5 using integration method. [1+4]

b. Two impedances Z_1 and Z_2 when connected separately across a 220 V, 50 Hz supply consumed 100 Watts and 60 Watts at power factor 0.5 lagging and 0.6 leading respectively. If these impedances are now connected in series across same supply, find [6]

i) Total power absorbed
ii) Reactive power
iii) Apparent power
iv) Power factor

4. a. Explain maximum power transfer theorem. Find the voltage at each node using nodal analysis in network of Figure-6. [2+4]

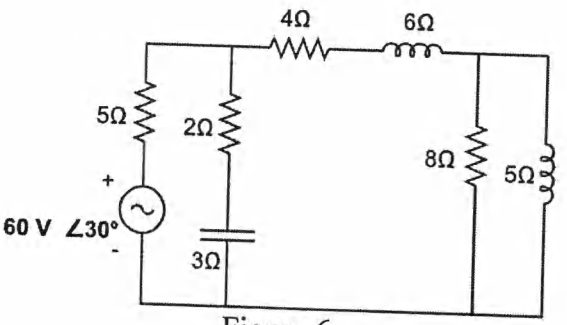


Figure-6

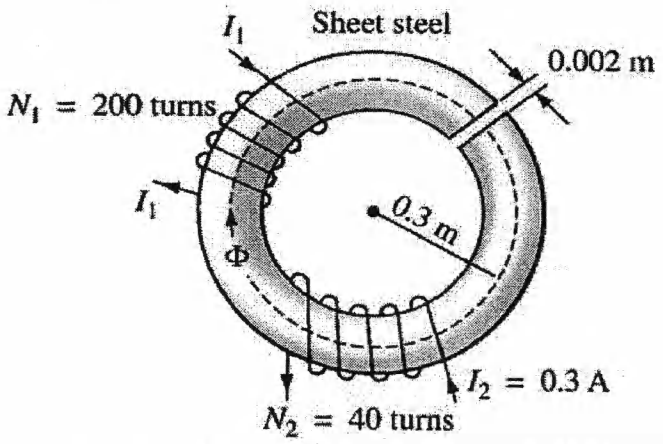
b. Three similar choke coils are connected in star to a three phase supply. If the line currents are 15 amperes, the total power absorbed is 11 kW and the total input power is 15 kVA, find [5]

i) Line and phase voltages with magnitude and phase angles.
ii) Input reactive power
iii) The elements of the coil.

5. a. Why is the power rating of transformer done in kVA? An ideal single phase transformer has primary winding with 100 turns and secondary winding with 200 turns. If the voltage supplied at primary side is 220 V, find the value of induced voltage at secondary side if secondary winding is left open. Find the current at primary side if the secondary winding is connected to the load of 6+8j. [1+5]

b. Explain construction and working principle of DC motor. [5]

6. a. For the given magnetic circuit of figure-7, find the value of I_1 required for establishing a flux of $2 * 10^{-4}$ weber in the gap of air. Refer the hysteresis curve for necessary data. [5]



Area (throughout) = 1.3×10^{-4} m^2

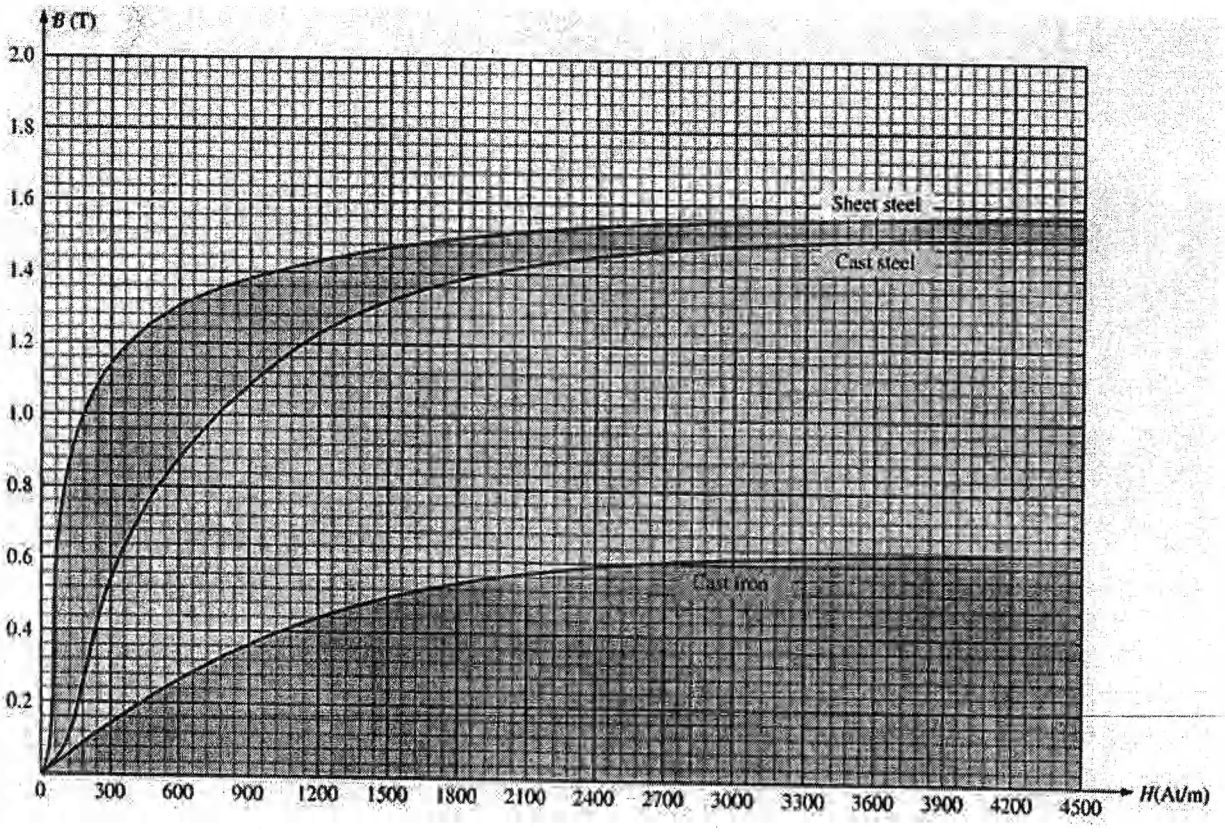
Figure-7

b. Explain type of losses in DC machines. [3]

c. Explain the significance of Hysteresis curve in construction of electromechanical devices. [3]

Hysteresis curve

Normal magnetization curve for three ferromagnetic materials.



KATHMANDU UNIVERSITY

OFFICE OF THE CONTROLLER OF EXAMINATIONS
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December 17, 2018

NOTICE

End-Semester Compartmental Examinations of B.E.\B.Sc.\B.Pharm.\B.Tech.\B.Arch. is scheduled accordingly.

Date	Day	Courses
December 26, 2018	Wednesday	PHYS 102, MATH 208, INAN 211, COEG 301, PHYS 313, BIOT 306, CIEG 310, MATH 322, INAN 301, ETEG 304, COMP 307, COMP 409
December 27, 2018	Thursday	BIOL 206, CIEG 208, GEOM 204, COMP 201, CHEG 210, PHAR 214, PHYS 212, ETEG 303
December 28, 2018	Friday	ARCH 112, ENGG 112, CHEM 102, MCSC 202, PHAR 311, CHEG 313, MEEG 306, COMP 314, MGTS 303, MGTS 301, CIEG 308
December 30, 2018	Sunday	ENGT 102, BIOT 207, CHEG 212, CIEG 206, MEEG 206, COMP 204, CHEM 203, EEEG 214, CHEM 212, COMP 315, CIEG 313, COMP 484, PHYS 213
December 31, 2018	Monday	COMP 116, COMP 102, EPEG 318, ETEG 305, BIOT 309, PHAR 313, PHAR 315, MEEG 302, COMP 341
January 1, 2019	Tuesday	MEEG 207,CHEG 211, GEOM 206, BIOT 209, CIEG 207, PHYS 211, COMP 232, COMP 342, MEEG 317, GEOM 319
January 2, 2019	Wednesday	MATH 104, MATH 102, MATH 103, BIOT 208, EPEG 315, MEEG 309, BIOT 308, PHAR 316, COMP 323, CIEG 312
January 3, 2019	Thursday	BIOT 101, CHEG 213, MATH 217, COMP 231, EPEG 301, MEEG 308, COMP 306, COMP 317, GEOM 315
January 4, 2019	Friday	ENVE 101, PHAR 111, BIOT 206, MATH 207, PHAR 212, EEEG 215, MEEG 202, EEEG 309, MEEG 318

Examination Time : 11.00 A.M. to 2.00 P.M.
Venue : Kathmandu University, Dhulikhel.

Professor PANNA THAPA, PhD
Controller of Examinations

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November 05, 2018

NOTICE

This is to notify that all the students of School of Engineering and School of Science who have filled up the form for Compartmental and GPA makeup Examinations, November 2018 (notice published on October 25, 2018), the examinations will be held according to the following schedule.

(special compart.)

Date	Day	Courses
November 15, 2018	Thursday	CHEM 101, COMP 407, EEEG 202, CIEG 405, CIEG 403, PHYS 202, PHYS 421, PHYS 212, CHEM 203, MEPP-412, MCSC -202
November 16, 2018	Friday	EEEG 102, EEEG 207, GEOM 402, CIEG 204, PHYS 213, PHYS 412, ENVE 209, BIOT 202
November 18, 2018	Sunday	COEG 304, EPEG 318, COMP 409, GEOM 411, PHYS 405, PHYS 302, MATH 201, MEEG-206
November 19, 2018	Monday	PHAR 316, STAT 201, PHYS 431, COMP 342

Examination Time : 11.00 A.M. to 2.00 P.M.
Venue : Kathmandu University, Dhulikhel.

Professor PANNA THAPA, PhD
Controller of Examinations