b. In an AC circuit, resistor R and inductor L are connected in series, voltage and current equations are given as

$e(t) = 200\sin 314t$ and

$i(t) = 20\sin(314t - 30°)$

Calculate

  (i)   RMS value of the voltage and current
  (ii) Frequency
  (iii) Power factor
  (iv) Power
  (v)   Values of R and L

(handwritten:) $I_{rms} = 14.142$) $V_{rms} = 141.42$ $p = 1732 W$ $f = 50 Hz$ $cg = 0.866$ $Z = 10Ω$

29. a. Explain the constructional features and working principle of DC generator with suitable diagram.

(OR)

b. The flux produced in the air gap between two electro magnetic poles is 0.05 Wb. If the cross sectional area of the air gap is 0.2 m², find

  (i)   Flux density,
  (ii) Magnetic field intensity
  (iii) Reluctance and
  (iv) Permeance of the air gap

Find also the mmf dropped in the air gap, when the length of air gap is 1.2 cm.

(handwritten:) $B = 0.25 T$ $S = 0.4125 \times 10^5$ $H = 19.89$ mmf $= 2387.5$ $P = 2.094 \times 10^{-5} A$

30. a. Explain the working principle of moving coil instrument with suitable diagram.

(OR)

b. Write short notes on
  (i) PN junction diode under forward bias condition
  (ii) CE configuration of BJT

31. a. Explain the construction, working and applications of semiconductor strain gauges.

(OR)

b. Write short notes on
  (i) Photovoltaic cell
  (ii) Photoconductive cell

32. a.i. Simplify the Boolean function $Y = \Sigma m(3,5,6,7)$ using K-map and implement it using logic gates.

(handwritten:) $Y = AB + BC + AC$

  ii. Simplify the Boolean expression $Y = \left((AB' + ABC)' + A(B + AB') \right)'$.

(OR)

b. Write short notes on
  (i) Frequency modulation
  (ii) Amplitude modulation

* * * * *

22NA118EES101J

B.Tech. DEGREE EXAMINATION, NOVEMBER 2018
First Semester

18EES101J – BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(For the candidates admitted during the academic year 2018-2019)

Note:
(i) Part - A should be answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45th minute.
(ii) Part - B and Part - C should be answered in answer booklet.

Time: Three Hours   Max. Marks: 100

PART – A (20 × 1 = 20 Marks)
Answer ALL Questions

1. Energy is dissipated in the form of heat in
   (A) Resistor   (B) Inductor
   (C) Capacitor   (D) Dielectric

2. For maximum power transfer to the load
   (A) Load resistance must be equal to   (B) Load resistance must be greater than
       internal resistance of circuit   internal resistance of circuit
   (C) Load resistance must be less than   (D) Load resistance must be equal to reciprocal
       internal resistance of circuit   of internal resistance of circuit

3. Form factor is the ratio of
   (A) Maximum to RMS value   (B) Maximum to average value
   (C) RMS to average value   (D) RMS to maximum value

4. Power factor is the ratio of
   (A) Impedance to resistance   (B) Resistance to reactance
   (C) Resistance to impedance   (D) Reactance to impedance

5. The unit of magnetic flux density is
   (A) Henry/meter   (B) Tesla
   (C) Amp/meter   (D) Volt/meter

6. The flux is analogous to
   (A) Voltage in electric circuit   (B) Current in electric current
   (C) Power in electric circuit   (D) Resistance in electric current

7. Which motor is constant speed motor?
   (A) DC series motor   (B) DC shunt motor
   (C) DC compound motor   (D) Induction motor

8. The primary winding of a transformer has 110 V across it. What is the secondary voltage if the turns ratio is 8?
   (A) 8.8 V   (B) 88 V
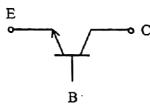   (C) 880 V   (D) 8800 V

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9. Moving parts of instruments are supported in
   (A) Bush bearings
   (B) Ball bearings
   (C) Roller bearings
   (D) Jewelled bearings

10. Diode is a/an_____
    (A) Unilateral elements
    (B) Bilateral element
    (C) Conducting element
    (D) Insulating element

11. Figure below represents:

E o——|< o C

B

   (A) NPN transistor
   (B) PNP transistor
   (C) Zener diode
   (D) Power diode

12. A single lamp controlled by two-way switches at two places is called
    (A) Stair case wiring
    (B) Corridor wiring
    (C) Cleat wiring
    (D) Batter wiring

13. If at one end, the two wires made of different metals are joined together, then a voltage will get produced between the two wires due to difference of temperature between the two ends of wire. This effect is observed in
    (A) Thermocouples
    (B) Thermistors
    (C) RTD
    (D) Ultrasonic

14. The linear variable differential transformer transducer is a/an_____
    (A) Inductive transducer
    (B) Non-inductive transducer
    (C) Capacitive transducer
    (D) Resistive transducer

15. The temperature coefficient of thermistor transducer is
    (A) Negative
    (B) Positive
    (C) Zero
    (D) Unity

16. Photo conductive cell consists of a thin film of
    (A) Quartz
    (B) Lithium sulphate
    (C) Barium titanate
    (D) Selenium

17. According to Boolean law, A+1=_____
    (A) 1
    (B) A
    (C) 0
    (D) A'

18. A combination of AND function and NOT function results in
    (A) OR gate
    (B) Inversion
    (C) NAND gate
    (D) NOR gate

19. FM signal is better than AM signal because
    (A) Less immune to noise
    (B) Less adjacent channel interference
    (C) Amplitude limiters are used to avoid amplitude variations
    (D) All of the above

20. Phase locked loop can be used as
    (A) FM demodulator
    (B) AM demodulator
    (C) FM receiver
    (D) AM receiver

PART – B (5 × 4 = 20 Marks)
Answer ANY FIVE Questions

21. State Kirchoff's current and voltage law.

22. Define form factor and peak factor. $FF = \dfrac{rms}{av}$ $PF = \dfrac{P}{rms}$

23. List the analogy between magnetic circuit and electric circuits.

24. Why the single phase induction motor is not self-starting?
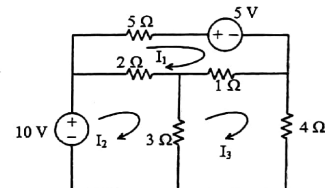
25. Explain the working of corridor wiring.

26. Define passive and active transducers with examples. Thermocouple solar cell LVDT

27. Convert $(28)_{10}$ into binary by actual division method. $(11100)_2$

PART – C (5 × 12 = 60 Marks)
Answer ALL Questions

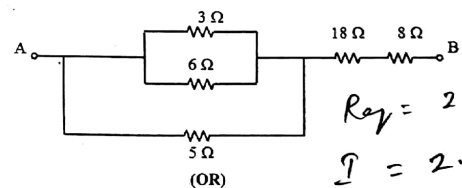28. a.i. Find the current through 5 Ω resistor using mesh method.   **(4 Marks)**

$I_5 = \dfrac{7}{4}$
$= 0.175\,A$

ii. Calculate the effective resistance of the following combination of resistances and the voltage drop across each resistance when a potential difference of 60 V is applied between points A and B.   **(8 Marks)**

$R_{eq} = 27.428\,\Omega$

$I = 2.1875\,A$

$V_{16} = 39.375\,V$

$V_8 = 17.5\,V$

$V_2 = 3.125\,V$

(OR)

Reg. No.													

B.Tech. DEGREE EXAMINATION, JANUARY 2019
First Semester

18EES101J – BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(For the candidates admitted during the academic year 2018)

Note:
(i) **Part - A** should be answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45th minute.
(ii) **Part - B** and **Part - C** should be answered in answer booklet.

Time: Three Hours

Max. Marks: 100

PART – A (20 × 1 = 20 Marks)
Answer ALL Questions

1. Three resistors of values, R_1, R_2 and R_3 are connected in series. The combination draws a current of 'I' A. When excited with a battery of 'V' volts, the voltage across R_2 is

   (A) $\dfrac{VR_3}{R_1 + R_2 + R_3}$

   (B) $\dfrac{VR_2}{R_1 + R_2 + R_3}$

   (C) $\dfrac{VR_1}{R_1 + R_2 + R_3}$

   (D) V

2. Two incandescent lamps of 200 W, 250 V and 100 W, 250 V are connected in series across a supply of 250 V. The power consumed is _____
   (A) 67 watts
   (B) 33 watts
   (C) 100 watts
   (D) 300 watts

3. Three equal value of resistors of 10 Ω each are connected in delta. The equivalent star connection has _____ ohms in each branch.
   (A) 30 Ω
   (B) 6.66 Ω
   (C) 10 Ω
   (D) 3.33 Ω

4. The reluctance of a magnetic circuit is_____
   (A) $S = \dfrac{\mu A}{l}$
   (B) $S = \dfrac{\mu L}{A}$
   (C) $S = \dfrac{l}{\mu A}$
   (D) $S = \mu_0 N^2 \dfrac{A}{L}$

5. The power factor in a resistive circuit is _____
   (A) 0.6 pf lagging
   (B) 0.8 pf lagging
   (C) 0.8 pf lagging
   (D) 1

6. DC generator works on the principle of _____
   (A) Fleming's right hand rule
   (B) Fleming's left hand rule
   (C) Faraday's law
   (D) Lenz's law

7. Two windings of a transformer are _____ coupled.
   (A) Magnetically   (B) Electrically
   (C) Both electrically and magnetically (D) Not

8. The synchronous speed of a 4 pole induction motor for 50 Hz power supply is _____ rpm.
   (A) 1500   (B) 1000
   (C) 750   (D) 1440

9. Permanent Magnet Moving Coil (PMMC) instrument are used for _____ quantity measurement.
   (A) AC   (B) Magnetic
   (C) DC   (D) Both AC and DC

10. The forward breakdown voltage in silicon diode is _____ volts.
    (A) 0.3   (B) 0.7
    (C) 0.3 to 0.7   (D) Less than 0.7

11. Full wave bridge rectifier is constructed using _____ diodes.
    (A) 4   (B) 2
    (C) 1   (D) Any number

12. The wire thickness is usually identified in _____.
    (A) Micrometer   (B) Standard wire gauge
    (C) Vernier   (D) Wein's bridge

13. _____ is a "self generating" type transducer.
    (A) Primary transducer   (B) Secondary transducer
    (C) Analog transducer   (D) Active transducer

14. LVDT works on the principle of _____
    (A) Self inductance   (B) Mutual inductance
    (C) Both self and mutual inductance   (D) Reluctance

15. _____ can be measured using piezo-electric transducer.
    (A) Force   (B) Velocity
    (C) Displacement   (D) Acceleration

16. The practical ohm meter is designed using
    (A) Maxwell's bridge   (B) Wein's bridge
    (C) Wheatstone bridge   (D) Any one of the above

17. $(111)_2 + (001)_2 = (\underline{\hspace{1cm}})_2$
    (A) 0111   (B) 0001
    (C) 1111   (D) 1000

18. $AB + A\bar{B} = \underline{\hspace{2cm}}$
    (A) AB   (B) A
    (C) B   (D) A+B

19. The Boolean expression $Y = \overline{AB}$ is logically equivalent to _____ gate.
   (A) NAND
   (B) AND
   (C) NOR
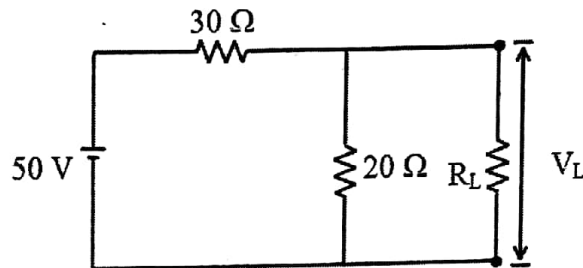   (D) EX-OR

20. The drawbacks of FM over AM is _____
   (A) Wider channel bandwidth is required
   (B) FM systems are made complex
   (C) Less noise
   (D) Both A and B

PART – B (5 × 4 = 20 Marks)
Answer ANY FIVE Questions

21. State and explain Ohm's law.

22. Draw the Thevenin's equivalent circuit for the circuit shown below.

23. Mention any two applications of DC motors and three phase induction motors.

24. Explain the working principle of transformer.

25. State the importance of earthing. Also mention the range of resistance values used for earthing.

26. List any two transducers used to measure electrical and mechanical quantity.
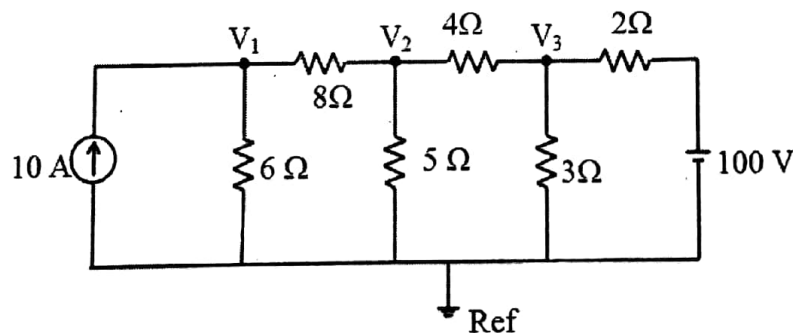
27. Which number system is used in digital computers? Why?

PART – C (5 × 12 = 60 Marks)
Answer ALL Questions

28. a.i. State and explain Kirchoff's voltage law with an example.   (4 Marks)

   ii. Find the current flowing through 5 Ω resistor in the circuit shown below using nodal equations.   (8 Marks)

(OR)

b.i. Explain the maximum power transfer theorem with an example.

ii. A coil has a resistance of 5 Ω and an inductance of 31 mH. The coil is supplied with 200 V, 50 Hz. Find impedance, current, power factor and power dissipated.

29. a. Draw the internal structure of a practical DC generator and discuss its operation.

(OR)

b.i. Explain the principle of operation of a single phase induction motor.

ii. An air cored toroid has radius of 0.1 m and cross sectional area of 5 cm². A coil with 200 turns is wound on it. Find inductance of the circuit.

30. a. With neat diagram, discuss the construction and principle of PMMC instruments.

(OR)

b.i. Explain the structure and working of a PN junction diode.

ii. Explain the principle of full wave bridge rectifier with waveforms and circuit diagram.

31. a. Explain the constructional details and working principle of LVDT.

(OR)

b. Explain briefly about
    (i)   Thermocouple and
    (ii)   Solar cell

32. a. Design a half adder and full adder using K-maps. Realize the adder circuit using basic gates.

(OR)

b. Draw the block diagram of a communication system and explain the functions of each block.