PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

Weightage: 20 %   Max Marks: 40   Max Time: 1 hr.   Monday, 24th September, 2018

TEST – 1

Odd Semester 2018-19   Course: **EEE 101 Elements of Electrical Engineering.**   I Sem. Physics Cycle

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Instruction:

(i)   Read the question properly and answer accordingly.
(ii)   Question paper consists of 3 parts.
(iii)   Scientific and Non-programmable calculators are permitted.

Part A

(3 Q x 4 M = 12 Marks)

1. Define phase difference. Calculate the phase angle between $v_1 = -10cos(\omega t + 50^o)$ and $v_1 = 12sin(\omega t - 10^o)$. State which sinusoid is leading.

2. State and define Kirchoffs law using electric circuit.

3. Draw basic structure of power generation, transmission and distribution system with respective voltage level.

Part B

(2 Q x 8 M = 16 Marks)

4. The instantaneous value of voltage in an a.c. circuit at a time t seconds is given by v = 100 sin(50πt – 0.523) V. Find:

   a. the frequency, the periodic time and the phase angle

   b. voltage when t=0 and t=8ms

   c. the times in the first cycle when voltage is 60V and -40V

   d. find the mean and rms value

   Sketch the curve for one cycle showing relevant points

5. A network consists of five branches AB, BC, CD, AD and BD. The first four branches consists of pure resistance of 2 Ω , 6 Ω , 8 Ω and 3 Ω respectively. The fifth branch BD consists of a battery of 10V in series with resistance of 4 Ω with terminal B connected to the positive of the battery. Calculate the current in the battery, the current in each branch and the potential difference across the branch AB of the network. Also determine the power absorbed or dissipated by each branch.

6. If the current is 0.2 mA, determine the source voltage and the phase angle. Draw voltage, impedance and power triangle.
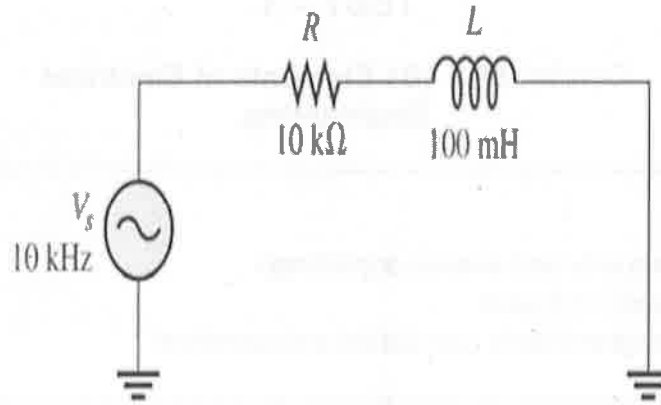
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SCHOOL OF ENGINEERING

TEST 2

Odd Semester: 2018-19

Course Code: EEE 101

Course Name: Elements of Electrical Engineering

Branch & Sem: Physics Cycle & I Sem

Date: 27 November 2018

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:
  (i)   *All questions are compulsory*
  (ii) *Preferably, write the answers in sequential order.*
  (iii) *Illustrate answers with neat sketches whenever necessary.*

Part A

Answer **all** the Questions. **Each** question carries **four** marks.   (3x4=12)

1. Draw the pictorial view of a D.C. Machine and label all the parts

2. A 220V DC shunt motor has an armature resistance of 0.2 ohms and rated armature current of 50 A. Find the voltage generated in the armature and power developed.

3. What are different types of transformer?

Part B

Answer **all** the Questions. **Each** question carries **eight** marks.   (2x8=16)

4. a. What is a transformer? Explain the principle of operation of a transformer.

   b. A 250 kVA, 11 000 V/400 V, 50 Hz single-phase transformer has 80 turns on the secondary. Calculate the maximum value of the flux in the transformer core and the approximate number of primary turns.

5. a. What are the basic differences between motor and generator?

   b. A 4 pole generator with wave wound armature has 51 slots, each having 24 conductors. The flux per pole is 0.01 wb. At what speed must the must the armature rotate to give an induced emf of 220V?

Part C

Answer the Question. Question carries **twelve** marks.   (1x12=12)

6. What is DC motor? Draw and explain different types of DC motor. Also mention one application of each motor.

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SCHOOL OF ENGINEERING   SET B

END TERM FINAL EXAMINATION

Odd Semester: 2018-19   **Date**: 10 January 2019

Course Code: EEE 101   **Time**: 2 Hours

Course Name: Elements of Electrical Engineering   **Max Marks**: 80

Programme & Sem: B.Tech (Physics Cycle) & I Sem   **Weightage**: 40%

Instructions:

(i)   All parts of the question paper are compulsory to answer

Part A

Answer **all** the Questions.   **(1Qx10M=10M) (2Qx5M=10M)**

Q1. Select the appropriate answer from the 4 choices provided. Each question carries 1 marks

i)   Synchronous Generator works on --------------------------
       (a) Only on D.C. Source
       (b) Only on A.C. Source
       (c) Both on A.C.&D.C Sources
       (d) Only on three Phase A.C. Source.

ii)   In Alternators field winding is kept on --------------------------
       (a) Stator   (c) Rotor
       (b) Both Rotor and Stator   (d) None of these

iii)   Out of the list of parts mentioned below, ----------------- part is missing in Alternators.
       (a) Commutator   (c) Armature Conductors
       (b) Field Poles   (d) Shaft

iv)   An Alternator - I is designed to work at Water input and the Alternator-II is designed to
       Work at Steam input ---------------------- &-------------------- Type of rotors are to be used.
       (a) Smooth Cylindrical & Salient Pole
       (b) Smooth Cylindrical & Smooth Cylindrical
       (c) Salient Pole & Salient Pole
       (d) Salient Pole & Smooth Cylindrical

v)   PMMC Instruments are used to measure --------------------------
       (a) For DC measurements only
       (b) For A.C. measurements only
       (c) For both A.C & D.C measurements
       (d) For Power Measurements.

vi)   ----------------------------Torque is required to bring back the pointer to zero or initial
       position in Deflecting type of instruments.
       (a) Controlling
       (b) Deflecting
       (c) Gravity
       (d) Damping

vii) Virtual Instruments working as user defined Instruments need ----------------
   (a) Software only
   (b) Both Software and Hard ware
   (c) Hardware only
   (d) None of these
viii) Digital Instruments has --------------- reading error
   (a) maximum
   (b) least
   (c) Very high
   (d) None of these
ix) MCB is provided in the Circuit to--------------------during high currents
   (a) to open the circuit
   (b) to short the circuit
   (c) to provide extra current
   (d) to reduce the overloading
x) Earthling path always must provide to ensure
   (a) Increase the magnitude of current
   (b) decrease the magnitude of current
   (c) Immediate and safe discharge of current
   (d) quick storage of current in the circuit

Q.2. A three phase Induction Motor used in a laboratory has the following data: (5M)
   Poles=6, frequency=50 c/s, voltage 440 volts rotor speed =980 rpm
   List the Unknown and compute the same

Q.3. Mention any 2 features and 3 applications of three phase Induction motor. (5M)

Part B

Answer **all** the Questions. **Each** question carries **ten** marks. **(4Qx10M=40M)**

Q.4. a) Define slip speed of a three phase induction Motor. Write the equation for determining
   slip. (3M)
   b) An Alternator used to supply power to some place has the following data
      Poles =6; Average flux per pole=0.009; Kc=0.98; Kd=0.94; T (per phase turns) =238
      and E=440V. List the unknowns and find the same. (4M)
   c) Why revolving field is preferred in case of alternators? (3M)

Q.5. a) Mention any two advantages of Digital Instruments and Virtual Instruments. (4M)
   b) Draw the block Diagram of Digital Voltmeter. (3M)
   c) Write three basic components of House Wiring. (3M)

Q.6. a) Define Error? A meter used to measure the voltage reads 127.5 Volts and the
      corresponding value obtained from the computations is found to be 127.43 Volts.
      Identify and compute the Unknown. (4M)
   b) Describe three different types of torques used in deflecting type Instruments. (3M)
   c) Define Energy meter? What is the purpose of recording system in Energy meter? (3M)

Q.7. a) Write different types of single phase Induction Motor. (4M)
   b) Explain anyone type of earthing. (4M)
   c) Distinguish between Cylindrical rotor and salient pole rotor of Alternator. (2M)

Part C

Answer **both** the Questions. **Each** question carries **ten** marks. **(2Qx10M=20M)**

Q.8. a) Draw the neat diagram and label each part of Moving Iron Instrument. Write the
      working principle and also the application? (8M)
   b) Write different forms of Traditional Measuring Instruments (2M)

Q.9. Draw the lay out diagram and the connection diagram to carry out a wiring for a House
   with 2 rooms.
   Room No 1: 1 lamp Point, 1 fan Point, 1- 3 pin socket point
   Room No 2: 2 Lamp Point,   1 fan Point, 1- 3 pin socket point (10M)

PRESIDENCY UNIVERSITY
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SCHOOL OF ENGINEERING   SET A

END TERM FINAL EXAMINATION

Odd Semester: 2018-19   **Date**: 10 January 2019

Course Code: EEE 101   **Time**: 2 Hours

Course Name: Elements of Electrical Engineering   **Max Marks**: 80

Programme & Sem: B.Tech (Physics Cycle) & I Sem   **Weightage**: 40%

Instructions:
(i)   All parts of the question paper are compulsory to answer

Part A

Answer **all** the Questions.   **(1Qx10M=10M) (2Qx5M=10M)**

Q1. Select the appropriate answer from the 4 choices. Each question carries 1 marks

i.   The basic operation of an induction motor is based on
(a) Self-induction.   (c) Magnetic knocking.
(b) Mutual induction.   (d) Lorentz Force.

ii.   When the supply frequency of a three phase induction motor is increased, then its synchronous speed is
(a) Decreases.   (c) Remain same.
(b) Increases.   (d) None of the above.

iii.   An alternator is also called
(a) Synchronous generator.   (c) Asynchronous generator.
(b) Turbo generator.   (d) Generator.

iv.   Synchronous motors are
(a) not-self-starting.   (c) Essentially self-starting.
(b) Self-starting.   (d) None of the above.

v.   Which of the following meter is an integrating type instrument?
(a) Ammeter.   (c) Wattmeter.
(b) Voltmeter.   (d) Energy meter.

vi.   In a moving coil instrument, the damping torque is developed by
(a) Fluid friction damping.   (c) Eddy current damping.
(b) Air friction damping.   (d) Gravity friction damping.

vii.   Virtual Instruments working as user defined Instruments need ------------------
(a) Software only   (c) Hardware only
(b) Both Software and Hard ware   (d) None of these

viii.   Earth wire is connected to the
(a) ground
(b) appliance   (d) transformer
(c) power house

ix. The objective of earthing or grounding is:
   (a) to provide as low resistance possible to the ground
   (b) to provide as high resistance possible to the ground
   (c) to provide flow of positive, negative and zero sequence currents
   (d) none of the above

x. Voltage Levels used for all the Domestic Installations are ----------------Volts
   (a) 230 & 440
   (b) 230 &11,000
   (c) 440 &11,000
   (d) 230 only

Q2. (a) Define slip speed of a three phase induction Motor. Write the equation for determining slip. (2M)

   (b) A 3-φ 4 pole induction motor is supplied from 3φ, 50Hz ac supply. Find (3M)
      i. synchronous speed
      ii. Slip if rotor speed is 1440 rpm
      iii. the rotor frequency

Q3. Mention different types of Single Phase Induction motors and its application. (5M)

Part B

Answer **all** the Questions. **Each** question carries **ten** marks. **(4Qx10M=40M)**

Q4. (a) Write the emf equation of an Alternator and express the terms used in the equation with their units. (2M)

   (b) A 12 pole alternator used in a generating station runs at 500 rpm. It has the following data Flux is 0.095 wb, K_c is 0.9 and K_d is 0.95, number of turns is 800. Calculate emf value of alternator. (3M)

   (c) Why in synchronous machine armature winding is placed on stator and field winding on rotor? (5M)

Q5. Define virtual and digital meters with their block diagram. Also write about advantages of each meter. (10M)

Q6. (a) Explain any two important characteristic features of a measuring instruments. (2M)

   (b) An Voltage appearing across a component of a circuit is 1.5 Volts as per the calculations but the measured value is found to be 1.46 Volts. Calculate error, percentage error and adjustment to be made in instrument. (3M)
   (c) Describe three different types of torques used in deflecting type Instruments (5M)

Q7. (a) Briefly explain the working principle of a three phase Induction Motor. (5M)
   (b) Explain about fuse and Miniature Circuit Breaker wiring protection used in house wiring. (5M)

Part C

Answer **both** the Questions. **Each** question carries **ten** marks. **(2Qx10M=20M)**

Q8. Draw the lay out and wiring Diagram for a part of the House with the following data:
      Room No 1: 1 lamp Point, 1 fan Point, 1- 3 pin socket point
      Room No 2: 1 Lamp Point,   2 fan Point, 1- 3 pin socket point (10M)
Q9. (a) Draw the neat Diagram of a Moving Iron Instruments and name the parts. (5M)
   (b) Write about different precautions to be observed while installing different Electric Appliances in Houses? (5M)