Register Number.....

B.E. DEGREE EXAMINATIONS: NOVEMBER 2009

Second Semester

U07EE203: BASIC ELECTRICAL ENGINEERING

(Common to B.E – Aeronautical Engineering and B.E – Mechanical Engineering)

Time: Three Hours **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. An external resistance R is connected to a cell of internal resistance r. The maximum current flows in the external resistance when _____.

   A. R < r B. R > r C. R = r D. any other value of R

2. In an RC series circuit, $X_c = R$. The phase angle between applied voltage and circuit current is _____.

   A. 30° B. 45° C. 60° D. 90°

3. The motor equation is given by _____.

   A. $V = E_b - I_a R_a$ B. $V = E_b + I_a R_a$ C. $E_b = I_a R_a - V$ D. $V = E_b + I_a^2 R_a^2$

4. When the synchronous motor is on no load, the axes of the rotor poles _____ that of stator poles.

   A. nearly coincide with B. are far ahead C. are far behind D. never coincide with

5. Transformer cores are laminated in order to _____.

   A. Simplify its construction B. minimize eddy current loss

   C. reduce cost D. reduce hysteresis loss

6. A transformer has negative voltage regulation when its load power factor is _____.

   A. Zero B.unity C. leading D. lagging

7. A 50Hz, 4 pole single phase induction motor will have a synchronous speed of _____.

   A.1500rpm B. 750rpm C. 1200rpm D. 1800rpm

8. A three phase induction motor is _____.

   A. essentially a constant speed motor B. a variable speed motor

   C. very costly D. not easily maintainable

9. An ammeter is _____ instrument.

   A. an indicating B. an integrating C. a recording D. a differentiating

10. For measuring high values of alternating current with a dynamometer ammeter, we use a _____.

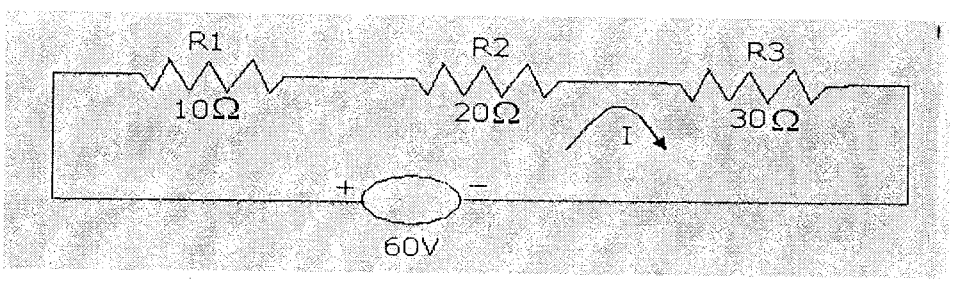
    A. shunt B. multiplier C. potential transformer D. current transformer

PART B (10 X 2 = 20 marks)

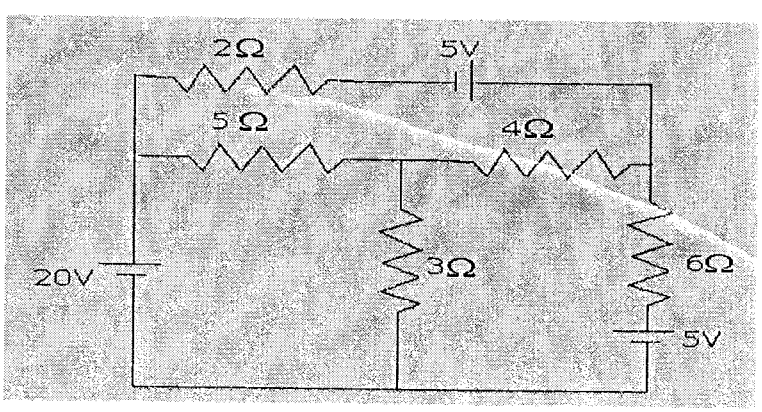
11. State Kirchoff's current law.
12. Define apparent power and reactive power.
13. What is the practical significance of back emf in dc motor?
14. What is the function of damper windings in synchronous generator and synchronous motor?
15. Define voltage regulation of a transformer.
16. Why transformers are rated in kVA?
17. What are the losses in 3 phase induction motor?
18. Write the application of split phase induction motor.
19. What are the different types of damping torque in indicating instruments?
20. List the sources of error in dynamometer wattmeter.

PART C (5 x 14 = 70 Marks)

21. (a) i) Find the voltage across the three resistances shown. (4)



ii) Using mesh analysis find current through 4Ω resistor. (10)



(OR)

(b) i) Define RMS value, average value and peak factor. (6)

ii) A 3 phase motor load has a p. f of 0.397lagging. Two wattmeters connected to measure power show the input as 30kW. Find the reading on each wattmeter. (8)

22. (a) i) Draw and explain the constructional features of a dc machine. (10)

ii) Derive an emf equation for d. c. generator. (4)

(OR)

(b) i) Explain three point starter with a neat diagram. (8)

ii) Derive emf equation of an alternator. (6)

23. (a) The open circuit and short circuit tests on a 10kVA, 125/250V, 50Hz, single phase transformer gave the following results:

O. C. test: 125V, 0.6A, 50W (on L. V. side)

S. C. test: 15V, 30A, 100W (on H. V. side).

Calculate (i) Copper loss on full load (ii) Full load efficiency at 0.8 leading p. f. (iii) Half load efficiency at 0.8 leading p. f. (iv) regulation at full load and 0.9 leading p. f.

(OR)

(b) i) Calculate the regulation of a transformer in which the copper loss is 1% of output and the percentage reactance drop is 5% when load power factor is 0.9 lagging and 0.9 leading. (7)

ii) List the various types of three phase transformer connections and explain any one of them. (7)

24. (a) Explain various types of starting methods in 3 phase induction motor.

(OR)

(b) i) Explain the principle of operation of single phase induction motor. (7)

ii) Explain the shaded pole single phase induction motor. (7)

25. (a) Explain the construction and working principle of Moving Iron Instruments.

(OR)

(b) Describe the induction type energy meters. Also write its errors.

****