17404

16172

3 Hours / 100 Marks   Seat No. ☐☐☐☐☐☐☐

Instructions :   *(1)* ***All*** *questions are* ***compulsory****.*

(2) *Answer* ***each*** *next main question on a* ***new*** *page.*

(3) *Illustrate your answers with* ***neat*** *sketches* ***wherever*** *necessary.*

(4) *Figures to the* ***right*** *indicate* ***full*** *marks.*

(5) ***Assume*** *suitable data,* ***if necessary****.*

(6) *Mobile Phone, Pager and* ***any other*** *Electronic Communication devices are* ***not permissible*** *in Examination Hall.*

Marks

1. Attempt **any ten** of the following :   **20**

a) Give the difference between AC and DC supply (any two).

b) Define :

   i) Frequency

   ii) Form factor.

c) Draw connection diagram for ammeter and voltmeter.

d) Give different ratings of energy meter.

e) State any two parts of D.C. motor along with function.

f) Define KVA rating of transformer.

g) State any two important applications of autotransformer.

h) List the applications of universal motor (any four).

i) How the direction of rotation of 3 phase induction motor is reversed ?

j) State two limitations of individual drive.

k) Name any two electrical machines used in electro-agro system.

l) Compare MCB and kit kat fuse on basis of (1) operation (2) cost.

Marks

2. Attempt **any four** of the following : **16**

   a) Compare two winding transformer with autotransformer.

   b) Describe the construction of rotating field type alternator with neat sketch.

   c) A 50 Hz, 4 pole, 3-phase induction motor runs at 1450 rpm at full load. Calculate :

     i) Synchronous speed

     ii) Full load slip of motor.

   d) Explain the factors for the selection of motor for different drives.

   e) State the principle of dielectric heating. State its any four applications.

   f) Why earthing is essential in electric installation ? State its different types.

3. Attempt **any four** of the following : **16**

   a) Current flowing through the circuit is $I = 141.4 \, \text{Sin}\left(314t - \dfrac{\pi}{2}\right)$ Amp.

   Calculate :

     i) Frequency

     ii) Rms value

     iii) Phase difference

     iv) Amplitude.

   b) Derive EMF equation of transformer.

   c) With diagram, explain the speed control of induction motor by VFD method.

   d) Draw and explain capacitor start and run single phase induction motor.

   e) List four types of electric motor enclosures and state advantage of each.

   f) Explain in short different fire extinguishing methods.

4. Attempt **any four** of the following : **16**

   a) Draw delta connected load. State the relationship between line and phase values for the same.

   b) Explain construction and working of transformer.

c) Explain shaded pole induction motor with sketch.

d) Describe working of AC servo motor with sketch. State its two applications.

e) What is electroplating ? Give its two applications.

f) Explain how energy conservation is done in homes and industry.

5. Attempt **any four** of the following :   **16**

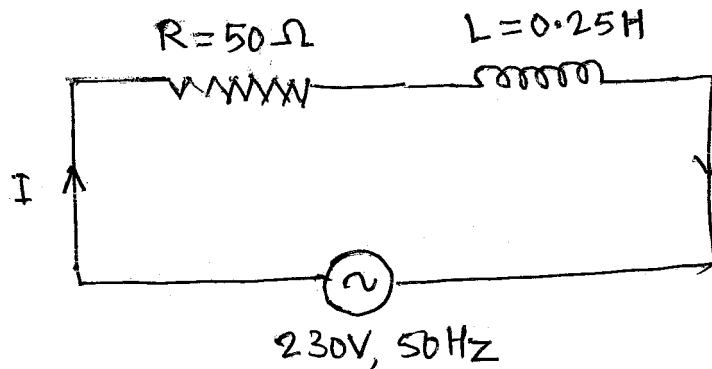a) Calculate voltage across individual element for the circuit shown in Figure 5 (a).

Figure 5 (a)

b) Draw single line diagram of electrical power system and show different stages.

c) Explain direct loading test on single phase transformer with neat circuit diagram.

d) Why starters are required ? Draw neat sketch of DOL starter.

e) Explain with sketch, direct resistance heating.

f) Draw neat wiring diagram of control 2 lamps, 2 fans and 1 socket.

6. Attempt **any four** of the following :   **16**

a) Explain for series R.C. circuit.

  i) Circuit diagram

  ii) Voltage equation

  iii) Current equation

  iv) Power

b) State the advantages of polyphase (3-phase) system over single phase system (any four).

c) Explain with neat diagram working of dynamometer type wattmeter.

d) Draw speed-torque characteristics of DC shunt and series motors and explain in brief.

e) Give any two applications of

   i) Stepper motor and

   ii) Servo motor.

f) Explain carbon arc welding with neat diagram.

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