KATHMANDU UNIVERSITY
End Semester Examination [C]
January, 2018

Marks Scored:

Level : B.E.
Year : II

Course : EEEG 215
Semester: II

Exam Roll No.:

Time: 30 mins.

F. M. : 10

Registration No.:

Date JAN 17 2018

SECTION "A"
[20 Q. × 0.5 = 10 marks)

Choose the most appropriate answer.

1. The two windings of a transformer is _____
   a. inductively linked
   b. conductively linked
   c. not linked at all
   d. electrically linked

2. No load test on a transformer is carried out to determine
   a. Copper loss
   b. Magnetizing current
   c. Efficiency of transformer
   d. Magnetizing current and loss

3. Power transformers are generally designed to have maximum efficiency around
   a. No-load
   b. Half load
   c. Near full load
   d. 10% overload

4. The type of load for which the voltage regulation of transformer is negative is
   a. Inductive
   b. Capacitive
   c. Resistive
   d. none of the above

5. The synchronous speed of a motor with 3 pole pair and operating at 50 Hz is ..... rpm
   a. 2000
   b. 1000
   c. 3000 rpm
   d. 750 rpm

6. In a DC generator, armature reaction results in
   a. Demagnetization of the centres of poles
   b. Magnetization of interpoles
   c. Demagnetization of the leading pole tip and magnetization of the trailing pole tip
   d. Magnetization of the leading pole tip and demagnetization of the trailing pole tip

7. In a d.c. machine, the armature magneto motive force (mmf) is
   a. stationary w.r.t. armature
   b. rotating w.r.t. field
   c. stationary w.r.t. field
   d. rotating w.r.t. brushes

8. The following methods help in reducing armature reaction effect in a D.C
   a. Interpoles
   b. Compensating windings
   c. Interpoles and compensating windings both
   d. Interpoles, compensating windings and dummy coils

9. In a DC generator
   a. External characteristic = internal characteristic – armature reaction.
   b. Internal characteristic = magnetization characteristic-ohmic drop.
   c. External characteristic = magnetization characteristic-ohmic drop- armature reaction.
   d. External characteristic = magnetization characteristic

10. The following component of a D.C generator plays vital role in providing direct current of D.C generator
a. Dummy coils b. Equalizer rings c. Commutator d. Slip rings

11. A ceiling fan uses
a. split-phase motor b. capacitor start and capacitor run motor
c. universal motor d. capacitor start motor

12. Field winding of a D.C series motor is usually provided with thick wires
a. To provide large flux b. To reduce the use of insulating materials
c. As it carries large load current d. In order to reduce eddy current

13. A 220 V D.C motor if connected to 220 V A.C supply
a. Armature winding of motor will burn
b. Motor will vibrate violently
b. Motor will not run
c. Motor will run with less efficiency and more sparking

14. The slip of an induction machine is 0.02 and the stator supply frequency is 50 Hz. What will be the frequency of the rotor induced emf?
a. 10 Hz b. 50 Hz c. 1 Hz d. 2500 Hz

15. A 3 phase 440V induction motor with 4% slip has a rotor frequency of 2 Hz. The frequency of supply will be
a. 60 Hz b. 50 Hz c. 2 Hz d. 8 Hz

16. A three phase slip ring induction motor has
a. double cage rotor b. short-circuited rotor
c. wound rotor d. any of the above

17. The stator of a three phase induction motor produces.....magnetic field.
a. Steady b. Rotating c. Alternating d. None of the above

18. The relation between synchronous speed (Ns, rotor speed (N) and slip (s) is.....
a. N=(s-1)Ns b. N=(1-s)Ns c. N=(1+s)Ns d. N=sNs

19. The full load efficiency of an alternator.....with the size of machine.
a. Increases b. Decreases
c. Remains unchanged d. None of the above

20. The field winding of an alternator is.....excited.
a. d.c. b. a.c. c. both d.c and a.c. d. none of the above

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SECTION "B"

[5 Q.×8=40 marks]

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

1.

a. A 25 kVA, 2200/220 V, 50 Hz distribution transformer is tested for efficiency and regulation as follows:

Open Circuit test:	220 V	4	150 W	LV side
Short Circuit test:	90V	10	350W	HV side

Determine:
(i) Equivalent impedance referred to primary.
(ii) Efficiency at full load at 0.8 power factor lagging current. [2+2=4]

b. Derive the emf equation of a transformer. [4]

2.

a. *"The efficiency of a transformer will be maximum when copper losses are equal to iron losses"*. Prove the statement. [4]

b. Two single phase transformers with equal voltage ratios have impedances of (0.819+j2.503) Ω and (0.8+j2.31) Ω with respect to secondary. If they operate in parallel, how they will share a load of 2000 kW at p.f 0.8 lagging? [4]

3.

a. Derive the emf equation of a dc generator. [5]

b. A4 pole armature has 30 conductors. The armature is to be simplex wave wound with single turn coils. Determine for a retrogressive winding (i) back pitch (ii) front pitch and (iii) commutator pitch. [1+1+1=3]

4.

a. A long shunt compound generator delivers a load current of 50A at 500V and has armature, series field and shunt filed resistances of 0.05Ω, 0.03Ω and 250Ω respectively. Calculate, (i) the armature current and (ii) the generated emf. Allow 1V brush for contact drop. [2+2=4]

b. Explain the different characteristic of a dc shunt motor. [4]

5.

a. Explain torque-slip characteristic of an induction motor. [4]

b. A 500 hp, 3 phase, 440V, 50 Hz induction motor has a speed of 950 rpm on full load. The machine has 6 poles. (i) Calculate he full load slip (ii) How many circles will the rotor voltage make per minute? [2+2=4]

6.

a. Explain the construction and working principle of a synchronous motor. [4]

b. A three phase, 50 Hz, star connected alternator has 180 conductors per phase and flux per pole is 0.0543 Wb. Find (i) emf generated per phase and (ii) emf between line terminals. Assume the winding o be full pitched and distribution factor to be 0.96. [2+2=4]