Total No. of Questions – [5] Total No. of Printed Pages: 4

G.R. No.	

Paper Code:- U128-104B (BE-FS)

MAY-2018/BACKLOG

F. Y. B. TECH. (COMMON) (SEMESTER - II)

COURSE NAME: BASIC ELECTRICAL ENGINEERING

COURSE CODE: ET10174B

(2017 PATTERN)

Time: [**2 Hours**] [Max. Marks: **50**]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4 and Q.5**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data wherever required**

Q.1) a) Draw a neat sketch of a four pole dc machine and label its parts. **[6]**

b) A back emf of 240 V is developed in a dc motor at 1500 rpm. Find the developed torque for an armature current of 25 A. **[6]**

c) Derive equation for induced EMF in a D.C. generator. **[4]**

OR

Q.2) a) A 4 pole lap wound DC shunt motor has 600 conductors and draws a line current of 21 A from the supply. Its field winding takes a current of 1 A. If the flux per pole is 0.02 Wb, calculate the torque developed by an armature and speed of the motor if the back emf developed by motor is 200 V. **[6]**

b) Draw torque-armature current and speed-torque characteristics of a dc series motor and mention any 2 applications of dc series motor. **[6]**

c) A dynamo has a rated armature current at 240 amps. What is the current per path of the armature if the armature winding is i) lap ii) wave wound. The dynamo has 12 poles. **[4]**

Q.3) a) A 3 HP, three phase, 4 pole, 400 V, 50 Hz induction motor runs at 1440 rpm. What will be the frequency of the rotor induced EMF? **[4]**

b) State any two applications of i) squirrel cage and ii) slip ring type of a three phase induction motor **[4]**

c) Write a note on capacitance start single phase induction motor with respect to the following points:-

i) Neat circuit diagram with proper labels ii) Advantages iii) Disadvantages iv) Applibcations **[6]**

OR

Q4) a) State any two applications of i) resistance split phase single phase induction motor and ii) capacitor start and run single phase induction motor. **[4]**

b) A 3 Phase, 4 pole induction motor is connected to a 50 Hz supply. If frequency of rotor EMF at full load is 3 Hz, find full load slip and full load speed of motor. **[4]**

c) Differentiate between squirrel cage and slip ring induction motor. (Any 6 significant points) **[6]**

Q.5) Attempt following multiple choice questions: **[10x2=20 marks]**

a) Three resistances each of equal value R are connected in star formation. The equivalent delta formation will have three resistances of equal value which is **[2]**

i. R/3
ii. 3R
iii. 2R/3
iv. R/2

b) For a series R-L circuit if R is 4 Ω, L is 0.2 H and supply frequency is 50 Hz then total impedance Z in Ω will be: **[2]**

i. 4 + j 62.83
ii. 4 - j 62.83
iii. 4 - j 0.0159
iv. 4 + j 0.0159

c) If two resistances each of 10 Ω are connected in parallel across a voltage source of 20 V, then the current in each resistance will be [2]

i. 1.5A
ii. 4.5 A
iii. 2 A
iv. 4 A

d) For a series circuit if the supply voltage is 230 V, current is 4 A and phase angle Φ is 90^0 then the active power will be [2]

i. 920 W
ii. Zero
iii. 57.5 W
iv. 92 W

e) If three resistances each of 9 Ω are connected in delta then their equivalent resistance in star connection is _____ [2]

i. 9 Ω
ii. 3 Ω
iii. 27 Ω
iv. 18 Ω

f) The transformation ratio of a single phase transformer of 1 KVA and having Primary and secondary voltage respectively 230V and 115 V, will be _____. [2]

i. 1
ii. 1.15
iii. 4
iv. 0.5

g) The peak value of an ac sinusoidal current is $10\sqrt{2}$ A. Its rms value is: [2]

i. $10\sqrt{2}$

ii. 20

iii. 10A

iv. Data not sufficient

h) The reading of wattmeters connected on supply side and load side are 100 W and 85 W respectively during a direct loading test of a 115 V /230 V transformers having a capacity of 1 KVA. The efficiency will be **[2]**

i. 85%

ii. 100%

iii. 86.6%

iv. None of the above

i) In _____ type transformer, core encircles the winding. **[2]**

i. core

ii. shell

iii. berry

iv. none of the above

j) Thevenin's resistance R_{Th} is found **[2]**

i. By removing only voltage sources along with their internal resistance.

ii. By short-circuiting the given two terminals.

iii. Between any two 'open' terminals.

iv. Across same open terminals as for V_{th}.