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

G.R. No.	

U118-104B (BE-FS)

DEC 2018 - BACKLOG EXAM

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

COURSE NAME: BASIC ELECTRICAL ENGINEERING

COURSE CODE: ET 10174B

(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) **Assume suitable data wherever required.**

Q.1) 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) Derive an emf equation of a dc generator with usual notations. **[6]**

c) State any two appropriate applications of i) dc shunt motor ii) dc series motor. **[4]**

OR

Q.2) a) Draw torque-armature current, speed-armature current and speed-torque characteristics of a dc shunt motor. **[6]**

b) A 4 pole lap connected dc generator has 600 armature conductors and runs at 1200 rpm. This generator has a flux per pole of 6 mWb in it. Calculate i) the emf induced in the dc generator and ii) the speed at which it should be driven to produce the same emf when wave connected. **[6]**

c) Draw a neat diagram of a three point starter and label its various parts. **[4]**

Q.3) a) Draw and explain torque-slip characteristics of a three phase induction motor. **[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 capacitor start single phase induction motor with respect to the following points:-

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

OR

Q4) a) State any two advantages of :- i) squirrel cage ii) slip ring type three phase induction rotor constructions. **[4]**

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

c) A three phase 2 HP slip ring type induction motor wound for 2 poles is supplied from 400 V, 50 Hz three phase ac supply. Calculate

i. Synchronous speed
ii. Rotor speed and frequency of induced emf in rotor, when slip is 5%
iii. Rotor frequency and percentage slip when rotor runs at 2800 rpm
iv. Speed of the motor when the slip is 0 **[6]**

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

a) If the power in a three phase star connected balanced load is 10 W, Then the power in the same load when connected in delta is _____W. **[2]**

i. 10
ii. 30
iii. 3.33
iv. 20

b) For a series R-L circuit if R is 6 Ω, L is 0.1H and supply frequency is 50 Hz then total impedance Z of series R-L circuit in Ω will be: **[2]**

i. 6 + j 0.3142
ii. 6- j 31.42

iii. 6 - j 0.3142

iv. 6 + j 31.42

c) If two resistances each of 10 Ω are connected in parallel across a voltage source of 20 V, then total current supplied by source 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 3 Ω are connected in delta then their equivalent resistance in star connection is _____ **[2]**

i. 9 Ω

ii. 1 Ω

iii. 27 Ω

iv. 18 Ω

f) The primary and secondary voltages for a single phase transformer are 110V and 220V respectively, if full load primary current is 9.09 A, power rating of transformer is _____KVA. **[2]**

i. 1

ii. 1.15

iii. 4

iv. 0.5

g) The peak value of an ac sinusoidal current is 10 A. Its average value is: **[2]**

i. 7.07 A

ii. 10 A

iii. 6.37 A

iv. 6.73 A

h) Full load copper loss of a transformer is 1000 W. At half load, the copper loss will be **[2]**

i. 500 W

ii. 1000 W

iii. 250 W

iv. 4000 W

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

i. core

ii. shell

iii. berry

iv. none of the above

j) The two wattmeter method is applicable for measurement of power in **[2]**

i. Both star connected and delta connected balanced load

ii. Only delta connected unbalanced load

iii. Both star connected and delta connected balanced and unbalanced load

iv. None of these