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

G.R. No.	

U118 – 104B (BE-FF)

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) **Use suitable data wherever required**

Q.1) a) A 4 pole dc generator has 600 conductors on its armature. Flux per pole is 0.02 Wb and the generator is running at 1000 rpm. Calculate the generated emf if the generator is i) lap wound ii) wave wound. **[6]**

b) State any two applications of: - i) dc shunt motor ii) dc series motor **[4]**

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

OR

Q.2) a) Derive torque equation in case of dc motor **[6]**

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

c) A 220 V shunt motor takes a current of 82 A. If the field winding resistance is 110 Ω and the armature resistance is 0.5 Ω, determine (a) the current in the armature, and (b) the back e.m.f. **[4]**

Q.3) a) State any two advantages and disadvantages of capacitor start single phase induction motor **[4]**

b) State any two applications of: - i) squirrel cage and ii) slip ring type of induction motor. **[4]**

c) A 6 pole, 3-phase squirrel cage induction motor operates from a 415 V three phase ac supply whose frequency is 50 Hz. Calculate:-

i. Synchronous speed of the motor
ii. Speed of the motor when the slip is 0.06
iii. Frequency of the rotor current when the slip is 0.06
iv. Frequency of the rotor current at standstill
v. Speed of the motor when the slip is 0
vi. Speed of the motor when the slip is 1 **[6]**

OR

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

b) State any two advantages of: - i) squirrel cage ii) slip ring type three 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 delta connected balanced load is 100 W, then the power in the same load connected in star is _____ . **[2]**

i. 100 W
ii. 300 W
iii. 33.33 W
iv. 200 W

b) For a series R-L circuit if R is 10 Ω, L is 0.2 H and supply frequency is 50Hz then total impedance Z in Ω will be: **[2]**

i. 10 + j 0.6284
ii. 10 + j 62.84

iii. 10 - j 0.6284

iv. 10 - j 62.84

c) If two resistances each of 20 Ω are connected in parallel across a voltage source of 40 V, then the total current supplied by the voltage source is **[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 $\Phi = 0^0$ 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 27 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 230/115 V, 1KVA transformer is _____ **[2]**

i. 1

ii. 1.15

iii. 4

iv. 0.5

g) The peak value of an ac sinusoidal current is $20\sqrt{2}$ A. Its rms value is: **[2]**

i. $20\sqrt{2}$ A

ii. 20 A

iii. 10 A

iv. Data not sufficient

h) The reading of wattmeters connected on supply side and load side are 100 W and 90 W respectively during a direct loading test of a 110 V /220 V transformers having a capacity of 2 KVA. The efficiency of the transformer will be **[2]**

i. 90%
ii. 100%
iii. 86.6%
iv. None of the above

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

i. shell
ii. core
iii. berry
iv. none of the above

j) If equivalent resistance as seen from the open terminals, R_{eq} is 3 Ω and Thevenin's voltage V_{Th} across the same open terminals is 18 V then load current I_L flowing through load resistance R_L of 15 Ω is **[2]**

i. 10 A
ii. 6 A
iii. 1 A
iv. 2 A