Set I

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

G.R. No.	

Paper Code :- U117-104B (FS & F)

DECEMBER 2017 / ~~ENDSEM~~ RE-EXAM

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

COURSE NAME: BASIC ELECTRICAL ENGINEERING

COURSE CODE: 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 6 pole lap wound dc generator has 600 conductors on its armature. Flux per pole is 0.02 Wb. Calculate i) the speed at which the generator must be run to generate an emf of 300 V. ii) What would be the speed if the generator is wave wound? **[6]**

b) Derive the torque equation of a dc motor with usual notations. **[6]**

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

OR

Q.2) a) A 4 pole lap connected DC shunt motor has 576 conductors and draws a line current of 11 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 230.4 V. **[6]**

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

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

Q.3) a) 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]**

b) State any two advantages of squirrel cage and slip ring type of rotor used in three phase induction motor. **[4]**

c) A 4 pole, 3-phase squirrel cage induction motor operates from a 440 V three phase ac supply whose frequency is 50 Hz. Calculate:-

i. Speed at which the magnetic field of the stator is rotating.

ii. Speed of the rotor when the slip is 0.04

iii. Frequency of the rotor current when the slip is 0.03

iv. Frequency of the rotor current at standstill **[4]**

OR

Q4) a) Differentiate between slip ring and squirrel cage type of an induction motor (any 6 significant points). **[6]**

b) Draw and explain in brief torque-slip characteristics of a three phase induction motor. **[4]**

c) A three phase slip ring induction motor is wound for 6 poles and is supplied from 440 V, 60 Hz three phase ac supply. Calculate

i. Synchronous speed

ii. Rotor speed, when slip is 4%

iii. Rotor frequency and percentage slip when rotor runs at 1100 rpm **[4]**

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

a) If two resistances each of 15 Ω are connected in parallel across a voltage source of 30 V, then the current in each resistance will be **[2]**

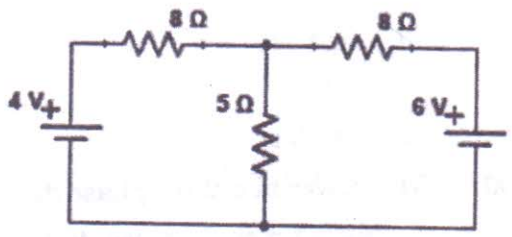
i. 2 A

ii. 4.5 A

iii. 1.5 A

iv. 4 A

b) For a given network as shown below, considering 5 Ω as a load resistance, the value of R_{eq} using Thevenin's theorem is **[2]**



i. 2 Ω

ii. 4.5 Ω

iii. 1.5 Ω

iv. 4 Ω

c) For a series R-L circuit if R is 10 Ω, L is 0.3 H and supply frequency is 50 Hz then total impedance Z in Ω will be: **[2]**

i. 10 + j 0.3

ii. 10 - j 94.25

iii. 10 - j 0.1

iv. 10 + j 94.25

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

i. 1.414 A

ii. 14.14 A

iii. 41.41 A

iv. 10 A

e) For series R-C circuit if total applied voltage is 230V, current is 3.88 A and phase angle $\Phi=32.48^0$ then active power will be: **[2]**

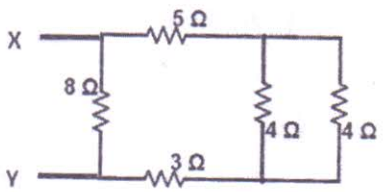
i. 780.26 W

ii. 752.8 W

iii. Zero

iv. 75.28 W

f) The equivalent resistance between terminals X and Y for the network shown in fig. below is **[2]**



i. 2 Ω

ii. 4.44 Ω

iii. 18 Ω

iv. 4.55 Ω

g) The power in a three phase delta connected balanced load is _____ times the power in the same load connected in star. **[2]**

i. two

ii. three

iii. one third

iv. one half

h) In the phasor diagram drawn in case of a three phase star connected balanced load, the angle between V_L and V_{ph} is **[2]**

i. 0^0

ii. 60^0

iii. 30^0

iv. 120^0

i) The reading of wattmeters connected on supply side and load side are 100 W and 80 W respectively during a direct loading test of a 110 V/220 V transformers having a capacity of 1 KVA. The efficiency will be **[2]**

i. 80%

ii. 100%

iii. 86.6%

iv. Data insufficient

j) A transformer has 70 turns on secondary and maximum flux in core is 0.06 Wb. If it is working on a 60 Hz frequency, induced emf in secondary will be **[2]**

i. 932.4 V

ii. 1118.88 V

iii. 1776 V

iv. 1276 V