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

G.R. No.	174670

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

MARCH /APRIL - 2018 BACKLOG 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) In a D.C. machine, explain function and state material used of i) Yoke ii) armature winding iii) Commutator **[6]**

b) Calculate power output of a 12 pole, separately excited, D.C. generator with 12000 lap connected conductors with armature current of 180 A. The armature is driven at 300 rpm. The flux per pole is 60 mWb. Resistance of armature circuit is 0.1 Ω. **[6]**

c) Explain function of No Volt Coil and Overload Release in three point starter. **[4]**

OR

Q.2) a) 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]**

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

c) A 6 pole, lap connected dc generator has a total of 650 conductors. The flux per pole is 0.05 Wb. Calculate the speed at which the armature is to be driven to generate an EMF of 220 V. **[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) In a 3 phase induction motor, what is the value of slip at start and at synchronous speed? Explain why slip is always positive for motoring. **[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) Applications **[6]**

OR

Q4) a) A three phase slip ring induction motor is wound for four poles and is supplied from 410 V, 50 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 1440 rpm **[4]**

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

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

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

a) Three resistances of 100 Ω each are connected in delta and supplied from 400 V, 50 Hz supply. The line current drawn will be **[2]**

i. 4 A
ii. 0.25 A
iii. 6.92 A
iv. 2.5 A

b) For a series R-C circuit if R is 5 Ω, C is 0.1 F and supply frequency is 50 Hz then total impedance Z of series R-C circuit in Ω will be: **[2]**

i. 5 + j 0.3142
ii. 5 - j 31.42
iii. 5 - j 0.3142
iv. 5 + j 31.42

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

i. 1.5 A
ii. 4.5 A
iii. 2 A
iv. 1 A

d) For a series circuit if the supply voltage is 230 V, current is 4 A and phase angle $\Phi = 90^0$ then the reactive power will be: [2]

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

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 110/220 V, 1KVA transformer is _____. [2]

i. 1
ii. 2
iii. 4
iv. 0.86

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 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}.