

# JK LAKSHMIPAT UNIVERSITY, JAIPUR

## INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Backlog), Nov 2017

B. Tech in CHE, CE, ME, CSE (CC/IS/MC) Engineering, Semester - 1

Roll No.....

EE101: Electrical and Electronics Engg.

Time: 3 hours

Max. Marks: 100

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### Instructions to students:

1. Do not write anything other than your roll number on question paper.
  2. Assume suitable data wherever required and mention it clearly.
  3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
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Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. The relation between  $\beta$  and  $\alpha$  is .....  
(a)  $\beta = 1 / (1 - \alpha)$  (b)  $\beta = (1 - \alpha) / \alpha$   
(c)  $\beta = \alpha / (1 - \alpha)$  (d)  $\beta = \alpha / (1 + \alpha)$
- ii. In a pnp transistor, the current carriers are .....  
(a) Acceptor ions (b) Donor ions  
(c) Free electrons (d) Holes
- iii.  $I_C = \beta I_B + \dots\dots\dots$   
(a)  $I_{CBO}$  (b)  $I_C$   
(c)  $I_{CEO}$  (d)  $\alpha I_E$
- iv. Which of the following transistor configuration circuit is much less temperature dependent  
(a) Common base (b) Common emitter  
(c) Common collector (d) None of the above
- v. In a full wave rectifier, if the input frequency is 50 Hz, then output frequency will be  
(a) 50 Hz (b) 75 Hz  
(c) 100 Hz (d) 200 Hz
- vi. The power factor of RC series circuit lies between.  
(a) -1 and 1 (b) 0 and 1  
(c) -1 and 0 (d) None of these
- vii. If  $v_1 = 30\sin(\omega t - 10^\circ)$  V and  $v_2 = 20\sin(\omega t - 50^\circ)$  V, which of these statement is true?  
(a)  $v_1$  and  $v_2$  are in phase (b)  $v_1$  leads  $v_2$   
(c)  $v_2$  leads  $v_1$  (d) None of these

- viii. A step-up transformer increases  
 (a) Voltage (b) Current  
 (c) Frequency (d) Power
- ix. The moving system of an indicating type of electrical instrument is subjected to  
 (a) A deflecting torque (b) A controlling torque  
 (c) A damping torque (d) All of the above
- x. KCL is applicable to only  
 (a) Closed loop in a network (b) Electronic circuits  
 (c) Junctions in a network (d) Electric circuits

Q.2 Short answer type questions (4 questions @ 2.5 marks) 10

- (a) Write the difference between normal PN diode and zener diode?  
 (b) Write the difference between Analog and Digital Signals?  
 (c) What is ripple factor? Calculate the ripple factor for both half and full wave rectifier?  
 (d) Explain different parts of optical fiber with diagram?

Q.3A Draw diagram of CB, CE, CC circuits and their characteristics? 05

Q.3B Draw the block diagram of optical fiber communication and explain its three main basic elements? 05

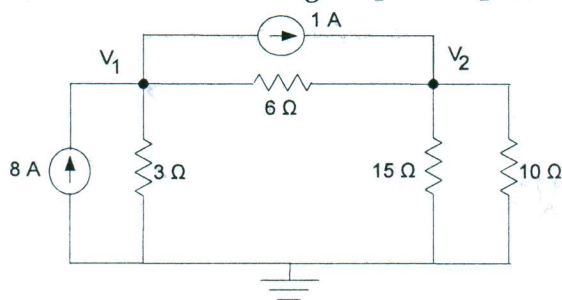
Q.4A What is rectifier and explain the working principle of half wave and full wave rectifier with diagram? 05

Q.4B Explain Satellite Communication systems and also mention its advantages, disadvantages and applications? 05

Q.5A Write short note on Ground waves, Sky waves and Space Waves in radio wave propagation; also mention the factors which affect signal strength for transmission? 05

Q.5B Explain Radio and TV communication system with block diagram? 05

Q.6A Using nodal analysis, find the node voltages  $V_1$  and  $V_2$  in the following circuit. 05



Q.6B A 4-pole, 3-phase induction motor operates from a supply whose frequency is 50Hz, Calculate: 05

- (i) The speed at which the magnetic field of the stator is rotating.  
 (ii) The speed of the rotor when the slip is 0.04.  
 (iii) The frequency of the rotor currents when the slip is 0.03.

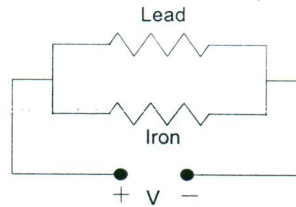
(iv) The frequency of the rotor currents at standstill.

OR

Q.6B What is phase sequence? At any instant, the sum of three phase voltages are zero, if the statement is correct, then prove. 05

Q.7A Draw voltage and impedance triangles when RL series circuit is supplied by sinusoidal supply. Drive mathematical relation of instantaneous power and plot suitable waveform for voltage, current and power. 05

Q.7B A lead wire and an iron wire are connected in parallel. Their respective specific resistances are in ratio 49:24. The former carries 80% more current than the latter and the latter is 47% longer than former. Determine the ratio of their cross sectional areas. 05



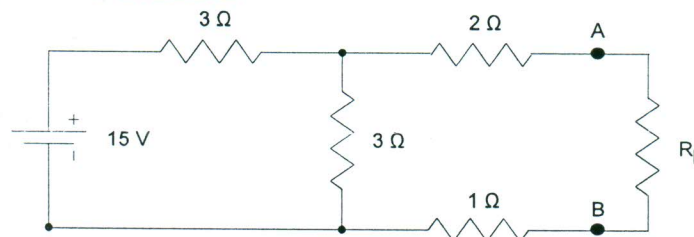
OR

Q.7B What are the main parts of DC machine? Explain with diagram. 05

Q.8A Explain the working operation of Induction Motor. Based on the rotor structure differentiate the construction of induction Motor. Enumerate the major industrial application also. 10

Q.9A Explain the transformer operation from No-Load to Load condition. Also draw the phasor diagrams for (a) Pure resistive load (b) Inductive load. 10

Q.9B State and prove Maximum Power Transfer theorem. In the following circuit, find the value of  $R_L$  such that maximum possible power will be transferred to  $R_L$ . Also find the value of the maximum power and the power supplied by source under these conditions. 10



OR

Q.9B It is desired to operate a 110-W, 120V electric lamp at its current rating from a 240V, 50Hz supply. Give details of the simplest manner in which this could be done using (a) a non-inductive resistor (b) pure inductance (c) a capacitance (d) an inductor having resistance of 10Ω. 10  
What power factor would be presented to the supply in each case and which method is the most economical of power.