Hall Ticket Number :										

R-15

Code: 5G272

IV B.Tech. I Semester Supplementary Examinations August 2020

Distribution of Electrical Power

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Define connected load, maximum demand, load factor, plant capacity factor, coincidence factor, contribution factor, loss factor. 7M

   b) A feeder supplies 2 MW to an area. The total losses at a peak load are 100Kw and units supplied to that area during a year are 5.61 million. Calculate the loss factor. 7M

OR

2. a) Explain about the load modeling and its characteristics? 7M

   b) Explain how load growth in distribution system can be determined and estimated? 7M

UNIT–II

3. a) Explain how the distribution substation is located. 7M

   b) An industrial area near a city was found to have a load density 0.5 MVA/ km^2 . The total area was to be located between a rectangular strip of 8km X 4km. Determine the suitable number of 33/11KV substations, their capacity and feeder length. The loads are served by 11KV feeders. 7M

OR

4. a) Derive the equation for load power factor for which voltage drop is minimum in terms of line parameters (Resistance and reactance). 7M

   b) A 11KV, 3-phase distribution lin has 37/2.59 ACSR conductor with conductor spacing of 0.8m in equilateral triangle form. The load supplied is at 0.85 pf lagging. Determine the constant K for % VD. Resistance of conductor per km is 0.180 ohms per km. 7M

UNIT–III

5. a) List out the differences between indoor and outdoor substations? 7M

   b) How is the design of distribution system done? Discuss the factors that contribute for design. 7M

OR

6. Explain with schematic diagrams, the substation equipment, components and layouts. 14M

UNIT–IV

7. a) Write the advantages and benefits of power factor improvement. 7M

   b) A 50- hp, 50-HZ, 415V delta connected induction motor has a full load efficiency of 85% and power factor 0.75. The power factor is to be improved to 0.9 using static capacitors. Determine

      i. Rating of capacitor bank KVAR
      ii. Capacitance of each unit, if they connected as
         A. Delta, and B. Star in micro farads 7M

OR

8. a) Explain the following :

      (i) Synchronous capacitors.
      (ii) Tap Changing and Booster Transformers. 7M

   b) Discuss how voltage profile of a long feeder can be improved by connecting shunt capacitors banks at the end of the feeders? 7M

UNIT–V

9. a) List out the objectives of distribution system protection? 7M

   b) Explain the principle of operation of fuse. Also mention its advantages and disadvantages. 7M

OR

10. Briefly explain the following :

      (a) Graded time-Lag systems.
      (b) Differential protection.
      (c) Circuit Breakers. 14M

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Hall Ticket Number :										

R-15

Code: 5G379

IV B.Tech. I Semester Supplementary Examinations August 2020

Digital Signal Processing

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Determine whether the following system is linear, stable, causal and time – invariant using appropriate tests:

$$y(n) = n\,x(n) + x(n+2) + y(n-2)$$ 7M

b) Determine the impulse response h(n) for the system described by the difference equation

$$y(n) + y(n-1) - 2\,y(n-2) = x(n-1) + 2\,x(n-2)$$ 7M

OR

2. a) State and prove the following DFS properties:

(i) Time shifting (ii) Periodic Convolution 7M

b) Evaluate the DFT of the 3-point sequence x(n) = {2, 1, 2}. Using the same sequence, compute the 6-point DFT and compare the two DFTs. 7M

UNIT–II

3. a) Develop the computational equations for the 8-point Radix-2 DIT-FFT algorithm. 7M

b) Develop the
Compute the 8-point DFT of the sequence

$$x(n) = \begin{cases} 1 & 0 \le n \le 7 \\ 0 & otherwise \end{cases}$$

by using radix-2 DIT-FFT algorithm. 7M

OR

4. a) Find the 8-point DFT of the following sequence using Radix-2 DIF-FFT algorithm

$$x(n) = \{2, 1, 2, 1\}$$ 10M

b) Outline the procedure to compute IDFT using radix-2 FFT. 4M

UNIT–III

5. a) Compare analog and digital filters. State the advantages of digital filters over analog filters. 4M

b) Design a digital Butterworth filter satisfying the following constraints:

$$0.8 \le |H(\omega)| \le 1; \qquad 0 \le \omega \le 0.2\pi.$$

$$|H(\omega)| \le 0.2; \qquad 0.32\pi \le \omega \le \pi$$

with T = 1s. Apply impulse invariant transformation. 10M

OR

6. Obtain the direct form - I, direct form – II, cascade form realization for the system

$$y(n) = -0.1\,y(n-1) + 0.2\,y(n-2) + 3\,x(n) + 3.6\,x(n-1) + 0.6\,x(n-2).$$ 14M

UNIT–IV

7. a) Show that the magnitude response |H(ω)| of FIR filter is antisymmetric when impulse response is symmetric and N is even. 7M

b) Design a Hanning window, design a filter with

$$Hd(e^{j\omega}) = \begin{cases} e^{-j3\omega}, & -\Pi/4 \le |\omega| \le \Pi/4 \\ 0, & \pi/4 \le |\omega| < \pi \end{cases}$$ 7M

OR

8. Determine the filter coefficients h(n) obtained by sampling

$$Hd(e^{j\omega}) = \begin{cases} e^{-j(N-1)\omega/2}, & 0 \le |\omega| \le \Pi/2 \\ 0, & \pi/2 \le |\omega| \le \pi \end{cases}$$ 14M

UNIT–V

9. a) How non-stationary signals are analyzed with the help of DFT? 7M

b) Describe about ‘musical sound processing’ used for musical programs. 7M

OR

10. a) Explain oversampling A/D converter. 7M

b) Explain oversampling D/A conversion in digital processing applications. 7M

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Hall Ticket Number :										

R-15

Code: 5G276

IV B.Tech. I Semester Supplementary Examinations August 2020

Principles of Power Quality

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the power quality evaluation procedure with model diagram. 7M

   b) Explain causes and mitigation methods for long-duration voltage variations and short-voltage variations. 7M

OR

2. a) Explain different problems in wave form distortion. 7M

   b) Explain CBEMA and ITI curves with neat diagram. 7M

UNIT–II

3. Define voltage sag and voltage interruption. Discuss the sources of sags and interruptions in brief 14M

OR

4. Explain the fundamental principles of protection and utility system fault clearing issues 14M

UNIT–III

5. Explain the following terms

   i) Harmonic distortion ii) Harmonic indices iii) Harmonic distortion evaluations 14M

OR

6. Discuss the harmonic sources from commercial loads, harmonic sources from industrial loads and principles of controlling harmonics 14M

UNIT–IV

7. a) Explain principles of over voltage protection. 7M

   b) What are the fundamental principles of over voltage protection of load equipment Explain them in brief? 7M

OR

8. a) Explain how capacitors are used for voltage regulation and discuss the utility voltage regulation. 7M

   b) Explain about the devices used for voltage regulation. 7M

UNIT–V

9. Describe the RMS voltage variation indices and harmonic indices 14M

OR

10. Explain the various power quality monitoring standards. 14M

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Hall Ticket Number :										

R-15

Code: 5G271

IV B.Tech. I Semester Supplementary Examinations August 2020

Power Semiconductor Drives

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the operation of a DC series motor fed by a single-phase full converter. Discuss the continues and discontinuous modes of operation with the help of their governing equations. 7M

   b) A separately excited DC motor running at 1200 rpm is operated from a single phase half controlled bridge with input voltage 320 sin 310t, emf 100V and armature resistance 5 ohms. SCRs are fired at $\alpha = 45^0$ for every half cycle. Calculate i) The armature current ii) The motor torque. 7M

OR

2. a) Explain the operation of a three-phase full converter when feeding Separately excited DC motor. with neat waveforms 7M

   b) For three-phase full converter controlling a 450V DC motor, find the firing angle if the voltage drop of motor is 30V and the ac input supply is 3-phase, 50Hz, 420V. 7M

UNIT–II

3. a) Describe how a four-quadrant drive can be obtained from a chopper-fed separately excited dc motor. 7M

   b) Define braking. Describe Electric braking in detail. 7M

OR

4. What is a dual converter? Explain the principle of operation of a dual converter in circulating current mode. How is the same used for speed control of dc drive? 14M

UNIT–III

5. a) Distinguish between class A & class B choppers with suitable examples of speed control of Motor. 7M

   b) Discuss with suitable diagrams the first quadrant and second quadrant chopper operation when feeding dc series motors 7M

OR

6. a) Explain the principle of speed control of a DC motor and show how it can be achieved by a chopper 7M

   b) Derive expression for average motor current, current I_{max} & I_{min} & average torque for chopper fed DC separately excited Motor. 7M

UNIT–IV

7. a) Explain the operation of voltage source inverter (180^o conduction mode) used for induction motor speed control. Draw neat waveforms of line voltages and hence show that the phase voltage is a six-step voltage waveform. 7M

   b) Draw a neat circuit diagram for speed control of 3-phase IM using AC voltage controller. 7M

OR

8. a) With a block schematic diagram, explain how the speed of the induction motor can be controlled automatically using closed loop scheme, with voltage source inverter. 7M

   b) A 3-phase, 50 kW, 1470 rpm, 400V, 50Hz, 4-pole star-connected induction motor has the following data: Rs=0.42 ohms, Rr=0.23 ohms, Xr = 0.85 ohms and Xm= 28 ohms, all quantities being referred to the stator side. The motor is operated with frequency control. If the slip for maximum torque at the given supply frequency is 0.12, determine i) The supply frequency, ii) The breakdown torque, iii) The speed at maximum torque. 7M

UNIT–V

9. a) Draw and Explain a closed-loop operation for a static Kramer controlled drive. 7M

   b) An 8-pole, 50Hz, 380 V, star-connected induction motor has a star-connected slip ring rotor. The stator rotor turns ratio is 1.25, and the speed of the motor is controlled by a converter cascade in the rotor circuit. Determine the firing angle of the inverter to get 600 rpm and 400 rpm at no load. The inverter is connected to a 380 V, 3-phase system. Assume no overlap in the rectifier as well as in the inverter. What is the minimum possible speed? 7M

OR

10. a) Describe the separate controlled and self-controlled modes of operation of a synchronous motor drive in detail and compare them. 7M

    b) A 5MW, 3-phase, 11kV, star-connected, 6-pole, 50Hz, 0.9 leading pf synchronous motor has Xs =10 ohms and Rs=0 ohms. The rate field current is 50A. Assume that stator resistance is to be neglected. The machine is controlled by variable frequency control at constant v/f ratio up to base speed and constant V above base speed. Determine the torque and the field current for the rated armature current of 750rpm and 0.8 pf leading 7M

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Hall Ticket Number :										

R-15

Code: 5G275

IV B.Tech. I Semester Supplementary Examinations August 2020

Renewable Energy Sources

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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			Marks	CO	Blooms Level
		UNIT–I			
1.		Examine the Environmental impact of solar power generation.	14M		II
		OR			
2.		Explain the difference in the working of Pyrheliometer and pyranometer.	14M		VI
		UNIT–II			
3.		Explain the principle of operation of Fresnel lens collector.	14M		IV
		OR			
4.		Express about the heat transport system used in liquid collectors.	14M		VI
		UNIT–III			
5.	a)	Explain Vertical Axis Wind Turbine (VAWT).	7M		IV
	b)	With a neat sketch illustrate about Horizontal axis wind mills	7M		IV
		OR			
6.		Highlight the difference between single Basin and double basin arrangements.	14M		VI
		UNIT–IV			
7.		Discuss about the modification of IC engines to use biogas.	14M		VI
		OR			
8.	a)	What are the classifications of geo thermal sources?	7M		I
	b)	Hot Dry rocks (petro thermal) resources of geothermal energy Justify and also discuss about it as a source of energy.	7M		I
		UNIT–V			
9.		Principles of DEC and Need for DEC-Examine	14M		V
		OR			
10.	a)	What are MHD generators? Explain its principal and working	9M		I
	b)	Sort out the advantages of MHD generation	5M		III

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