Hall Ticket Number :										

Code: 5G272

R-15

IV B.Tech. I Semester Regular Examinations November 2018

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) Derive the relation between load factor and loss factor? 7M
   b) Explain load modeling and its characteristics? 7M

OR

2. Define the following terms
   a) Maximum demand b) coincident factor c) Plant factor d) contribution factor e) diversity factor 14M

UNIT–II

3. a) What are the types of basic distribution systems and explain? 7M
   b) Draw the single line diagram of radial type primary feeder and mention the factors that influence the primary feeder loading? 7M

OR

4. A 1-Φ distributor 2Km long supplies a load of 120A at 0.8pf lag at its far end and a load of 80A at 0.9pf lag at its midpoint. Both the power factors are referred to the voltage at the far end. The impedance per Km for go & return is (0.05+j0.1)Ω/Km. If the voltage at the far end is maintained at 230V then determine the following
   (i) Voltage at the sending end
   (ii) Phase angle difference between the voltages at both the ends 14M

UNIT–III

5. a) How do you find the rating of a distribution substation and explain? 7M
   b) Write the differences between indoor and outdoor substations? 7M

OR

6. a) How do you analyze a substation service area with 'n' primary feeders? 7M
   b) Write the benefits derived through optimal location of substations? 7M

UNIT–IV

7. a) Compare and explain the role of shunt and series capacitors in power factor correction? 7M
   b) Write short notes on any two methods of voltage control? 7M

OR

8. Explain the following
   a) Synchronous capacitors b) tap changing and booster transformers 14M

UNIT–V

9. Explain the concept of coordination of protective devices and also give the general procedure for coordination? 14M

OR

10. Write briefly about the principle operation of
    a) Fuse b) Circuit reclosures c) line sectionalizer? 14M

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Hall Ticket Number :										

R-15

Code: 5G379

IV B.Tech. I Semester Regular Examinations November 2018

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) Obtain the DTFS coefficients of x(n) = $\cos\left(\frac{16\pi}{13}n + \frac{\pi}{6}\right)$. Plot its magnitude and phase. 6M

   b) Find the N point DFT of the sequence.
   x(n) = 4 + $\cos^2(\frac{2\pi n}{N})$; n = 0,1,2,…….N-1. For N=8 8M

OR

2. a) Evaluate linear convolution of the following sequences using DFT and IDFT x(n) = {2,1} and h(n) = {1,2} 8M

   b) Prove the following properties:
   i) Convolution periodic discrete time sequences.
   ii) Time shift property of discrete time aperiodic sequence. 6M

UNIT–II

3. a) Find the Eight point DFT of the sequence, x(n) = {1,1,0,-1,-1,-1,0,1} by Decimation in frequency FFT algorithm. Use the Eight point radix-2 DIT–FFT algorithm to find the DFT of the sequence
   x(n) = {$\frac{1}{\sqrt{2}}$, 1, $\frac{1}{\sqrt{2}}$, 0, -$\frac{1}{\sqrt{2}}$, -1, -$\frac{1}{\sqrt{2}}$, 0 } 7M

   b) The DFT X(K) of sequence is given as
   X(K) = {0, $2\sqrt{2}$ (1-j),0,0,0,0,0,$2\sqrt{2}$ (1+j)}
   Determine the corresponding time sequence x(n) using DIF-FFT and draw its flow graph. 7M

OR

4. a) What are the differences and similarities between DIT and DIF – FFT algorithm? Discuss in-place computation in the case of decimation in frequency algorithm. 6M

   b) Let x(n) = $\left(1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}\right)$ and h(n) = (1, 1, 1, 1). Compute the DFTs of x(n) and h(n)by the decimation in frequency algorithm. Using the above results, evaluate the circular convolution of x(n) and h(n). 8M

UNIT–III

5. a) Design an analog Butterworth filter that has a gain of -2dB at 20rad/sec. and attenuation in excess of 10dB beyond 30 rad/sec. 7M

   b) Find H(z) using impulse invariance method for the following transfer function.
   $H_a(s) = \frac{(s+a)}{(s+a)^2 + b^2}$ 7M

OR

6. a) Design a Butterworth low pass digital filter using bilinear transformation to meet the following specification.

i) An acceptable pass band ripple of 1db

ii) A pass band edge of 0.3π rad. &

iii) Stop band attenuation of 40db or greater beyond 0.6 π rad. 8M

b) The transfer function of a system is given by

$$H(z) = \frac{\frac{1}{4}z^{-1}}{1 - \frac{3}{4}z^{-1} + \frac{1}{8}z^{-2}}$$

Realize the above using direct form I, direct form II. 6M

UNIT–IV

7. a) Explain the frequency sampling method of designing FIR filters and draw the corresponding block diagram. 7M

b) The frequency response of an FIR filter is given by

$H(\omega) = e\text{-}j3\omega(1 + 1.8\cos 3\omega + 1.2\cos 2\omega + 0.5\cos\omega)$

Determine the coefficients of the impulse response h(n) of the FIR filter 7M

OR

8. a) Design a FIR low pass filter with the frequency response, using rectangular window.

$$h_d(\omega) = e^{\frac{-j\omega_c(N-1)}{2}} \quad -\frac{\pi}{2} \leq \omega \leq \frac{\pi}{2}$$

$= 0$; elsewhere

For N=7 7M

b) A filter is to be designed with the following desired frequency response

$$H_d(\omega) = 0 \; ; \; -\frac{\pi}{4} < \omega < \frac{\pi}{4}$$

$$= e^{-j2\omega}; \quad \frac{\pi}{4} < |\omega| < \pi$$

Find the frequency response of the FIR filter designed using rectangular window defined as given below: $w_R(n) = 1$; $-5 \leq n \leq 5$ 7M

UNIT–V

9. a) Analyse the basic concepts of spectral analysis of non-stationary signals. Explain how short-time Fourier transform used in the analysis. 7M

b) With the diagram, explain the oversampling sigma-delta A/D converter structure. 7M

OR

10. a) Why signal compression is required? With the relevant block diagram discuss the functioning of signal compression system. 7M

b) Explain the concept of single echo filter and multiple echo filter of time domain operations in musical sound processing. 7M

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Hall Ticket Number :										

R-15

Code: 5G276

IV B.Tech. I Semester Regular Examinations November 2018

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. a) Explain different sources of voltage sags and interruptions. 7M
   b) Explain different sources of transient over voltages. 7M

OR

4. a) Explain the devices used for overvoltage protection. 7M
   b) Briefly explain influence of voltage sags with motor starting. 7M

UNIT–III

5. a) Explain the phenomena of Harmonics versus transients in detail. 7M
   b) Explain different harmonic sources from Industrial loads. 7M

OR

6. a) Explain procedure to evaluate harmonic indices. 7M
   b) Explain different devices used for controlling harmonic distortion. 7M

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 briefly about long duration and short duration voltage variations. 7M
   b) Explain how capacitors are used for voltage regulation and discuss the utility voltage regulation. 7M

UNIT–V

9. a) Explain objectives of bench marking and explain bench marking process in detail. 7M
   b) Explain history of power quality monitoring standards. 7M

OR

10. a) Explain about permanent power quality monitoring equipment. 7M
    b) Write selection procedure for selecting power quality measuring instrument. 7M

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Hall Ticket Number :										

R-15

Code: 5G271

IV B.Tech. I Semester Regular Examinations November 2018

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 with neat block diagram about Electric Drive? 7M

   b) Discuss the Advantages of Electrical Drive over Mechanical Drives? 7M

OR

2. a) Derive Expressions for armature Voltage & Speed-Torque relation of DC Separately Excited motor fed from a three phase fully controlled Rectifier? 7M

   b) The speed of a separately excited dc motor is controlled by means of a 3 phase semi converter from a 3 phase 415V 50Hz supply. The motor constants are inductance 10 mH, resistance 0.9 ohm and armature constant 1.5 v-s/rad. calculate speed of the motor at a torque of 50 Nm when the converter is fired at 45^0. Neglect losses in the converter. 7M

UNIT–II

3. a) Explain Braking methods for DC Separately Excited Motor? 5M

   b) A 220V, 1000rpm, 60A separately excited motor with armature resistance of 0.6Ω fed from a Circulating current dual converter with AC source voltage line voltage=165V. determine converter firing angles for the following operating points:

      i. Motoring operation at rated motor torque and 900rpm

      ii. Braking operation at rated motor torque at 900 rpm

      iii. Motoring operation at rated motor torque and –900rpm

      iv. Braking operation at rated motor torque at –900rpm 9M

OR

4. a) A single phase, 230V, 50Hz supply-feeds a separately excited DC motor through two single phase semi converters, one for the end one for the armature. The firing angle for the semi converters fields is zero, the field resistance is 200Ω and armature resistance R_a=0.3Ω. The load torque is 50 N-m at 900 r.p.m, the voltage constant is 0.8 V/A – rad / sec and the torque constants is 0.8 N-m/A^2. Assume that armature and field currents are continuous and constant. And neglect the losses. Find the following

      i. Field current,

      ii. Firing angle of converts in the armature circuit and

      iii. Power factor of convert in the armature circuit. 10M

   b) Comment on Regenerative Braking method of DC Series Motors? 4M

UNIT–III

5. a) Draw and Explain First Quadrant and Second Quadrant operation of SEDCM when it is fed from a chopper? 5M

   b) A 230V separately excited dc motor takes 50A at a speed of 800rpm. It has armature resistance of 0.4. This motor is controlled by a chopper with an input voltage of 230V and frequency of 500Hz. Assuming continuous conduction through-out, calculate and plot speed- torque characteristics for:

      i. Motoring operation at duty ratios of 0.3 and 0.6.

      ii. Regenerative braking operation at duty ratios of 0.7 and 0.4. 9M

OR

6. a) A 230V, 1000rpm, 30A separately excited motor has armature resistance and inductance of 0.7Ω and 50mH. Motor is controlled in regenerative braking by a chopper operating at 800Hz from a dc source of 230V assuming a continuous conduction.
   i. Calculate duty ratio of chopper by rated torque and the speed of 800rpm
   ii. What will be the motor speed for duty ratio of 0.6 and rated motor torque
   iii. What will be the maximum allowable speed of motor. If a chopper has a maximum duty ratio of 0.9 and maximum allowable motor current is twice rated current.
   iv. Calculate the power fed to source for operating condition in (iii). 10M

   b) Draw the Speed Torque relation and Characteristics of a chopper fed DC Series motor? 4M

UNIT–IV

7. a) A Y-connected SCIM has the following ratings and parameters: 400V, 50 Hz, 4-pole, 1370 rpm, Rs= 2 Ω , Rr'= 3 Ω, Xs=Xr'= 3.5 Ω Motor is controlled by a voltage source Inverter at constant v/f ratio. Inverter allows frequency variation from 10 to 50 Hz.
   i) Calculate starting torque and current of this drive as a ratio of their values when motor is started at rated voltage and frequency?
   ii) Speed for a frequency of 30Hz and 80% of full load torque with only variable method 8M

   b) List out differences between VSI and CSI fed drives? 6M

OR

8. A 3-phase, 415V, 50Hz, 4-pole, star connected induction motor has the following equivalent circuit parameters: R1 = 1.01 Ohms, R2'= 0.69 Ω, X1=1.08 Ω, X2=1.60 Ω , Xm = 36 Ω. The no load loss is negligible. The rated torque, proportional to square of the speed, is 42 N-m, at full load speed of 1450 rpm for a motor speed of 1290 rpm, determine (a) load torque, (b) rotor current (c) The stator supply voltage d) the motor input current I e) the motor input power Pi f) the slip for maximum current (g) the maximum rotor current I2' 14M

UNIT–V

9. a) Discuss about Speed control methods of Slip ring Induction Motor? 5M

   b) A Y-connected SRIM has the following ratings and parameters: 440V, 50 Hz, 6-pole Rs= 0.5 Ω , Rr'= 0.4 Ω, Xs=Xr'= 1.2 Ω, X_m = 50 Ω, stator to rotor turns ratio is 3.5 motor is controlled by a static rotor resistance control. External resistance is chosen such that the breakdown torque is produced at stand still for a duty ratio of zero. Calculate the value of the external resistance. How duty ratio should varied with speed so that the motor accelerates at maximum torque. 9M

OR

10. a) Briefly explain about the speed control methods for Squirrel Cage Induction motor? 4M

    b) Derive the Detailed Expressions for Static Scherbius Drive? 10M

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Hall Ticket Number :										

R-15

Code: 5G275

IV B.Tech. I Semester Regular Examinations November 2018

Renewable Energy Sources

(Electrical & 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) Compare the advantages and disadvantages between Conventional with Non-conventional energy sources. 7M

   b) Explain about the solar radiation and its measuring instruments. 7M

OR

2. a) Briefly describe the impact of solar power on environment. 7M

   b) With neat sketches, explain briefly about different measuring instruments and their applications. 7M

UNIT–II

3. a) Briefly explain about the various types of Solar Collectors with their collector efficiency. 7M

   b) With a neat sketch, explain the working of solar pond. 7M

OR

4. a) Name the various types of Solar water heating systems and explain briefly about each of them. 7M

   b) Compare different types of solar collectors. 7M

UNIT–III

5. a) List out the various factors considered for the site selection of wind energy extraction through wind turbine. 7M

   b) Describe the various methods of ocean thermal electric power generation. 7M

OR

6. Briefly explain the applications of Wind Energy and also derive the expression for power for WECS. 14M

UNIT–IV

7. a) What are the Advantages and Disadvantages of biogas generation? 7M

   b) Describe the characteristics of the materials used for different components of a power plant using geothermal energy. 7M

OR

8. a) With a neat sketch, explain the working principle and operation of geothermal generation. 7M

   b) Explain the difference between fixed dome type and floating drum type biogas plant. 7M

UNIT–V

9. a) Explain the need of Direct Energy Conversion. 7M

   b) Compare Thermo-electric generators with MHD generators. 7M

OR

10. With a neat sketch, explain the principle of operation of MHD generators. 14M

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