Code: 9A02701

R09

B.Tech IV Year I Semester (R09) Supplementary Examinations, May 2013

DISTRIBUTION OF ELECTRIC POWER

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Discuss the characteristics of the following categories of loads:
   (i) Residential (iii) Agriculture
   (ii) Commercial (iv) Industrial

(b) Assume that the annual peak load of a primary feeder is 2000 KW, at which the power is 80 KW per three phases. Assuming an annual loss factor of 0.15. Determine:
   (i) The average annual power loss.
   (ii) The total annual energy loss due to the copper losses of the feeder.

2 (a) Compare the radial and loop type primary feeders.

(b) Discuss the various loading and voltage level factors that influence the design and operation of primary feeders.

3 (a) Discuss the factors influencing the substation location.

(b) Show that if the voltage drops are limited, six feeders can carry only 1.25 times as much load as the four feeders.

4 (a) Discuss importance of voltage drop and power loss calculations in distribution system.

(b) Derive the voltage drop and power loss of non three phase distribution systems and compare with the three phase balanced system.

5 Briefly discuss the various faults that occurs in distribution system and their protective schemes employed.

6 (a) Explain the salient points in general co-ordination procedure.

(b) Discuss the co-ordination procedure between fuse and a circuit breaker.

7 (a) Explain the effect of shunt compensation of distribution system.

(b) A $3\text{-}\emptyset$: $500\ \mathrm{H.P}, 50\ \mathrm{Hz}, 11\ \mathrm{KV}$ star connected induction motor has a full load efficiency of 85% at a lagging p.f of 0.75 and connected to a feeder. If it is desired to correct it to a p.f of 0.9 lagging load. Determine the following"
   (i) The size of the capacitor bank in KVAR.
   (ii) The capacitance of each unit if the capacitors are connected in star as well as delta.

8 (a) How an AVB can control voltage? With the aid of suitable diagram explain its function.

(b) Explain the effect of line drop compensation on voltage control.

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Code: 9A02702

R09

B.Tech IV Year I Semester (R09) Supplementary Examinations, May 2013

FUNDAMENTAL OF HVDC & FACTS DEVICES

(Electrical and Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

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1. (a) With neat sketches explain the different kinds of D.C links available.
   (b) What are the demerits of HVDC power transmission?

2. (a) Discuss about pulse frequency control scheme.
   (b) With the help of a block diagram explain the hierarchical control structure for a D.C link.

3. (a) What are the various types of filters that are employed in HVDC converter station? Discuss them in detail.
   (b) What are the adverse affects of harmonics produced by the HVDC converters?

4. (a) Explain the sequential method for AC-DC power flow.
   (b) Draw the flow chart for AC/DC load flow.

5. (a) Explain power flow in parallel paths.
   (b) What are the basic types of FACTS controllers explain each?

6. (a) What are objectives of shunt compensation? Explain.
   (b) Explain TCR and TSR

7. Explain the following:
   (a) TCSC (b) SSSC

8. (a) Explain operating principle of UPFC.
   (b) Explain control structure of UPFC.

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Code: 9A02703

R09

B.Tech IV Year I Semester (R09) Supplementary Examinations, May 2013

SWITCH GEAR AND PROTECTION

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

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1. (a) Explain the various methods of arc extinction in a circuit breaker.
   (b) In a short circuit test on a 3-pole, 132 KV circuit breaker the following observations are made p.f of fault 0.4 the recovery voltage 0.9 times full line value, the breaking current symmetrical, the frequency of oscillation of restriking voltage 16 KHz. Assume that the neutral is grounded and fault does not involve ground, determine the average rate of rise of restriking voltage.

2. (a) Describe with a neat sketch the working of cross-jet explosion pot in bulk oil circuit breaker.
   (b) Discuss the principle of arc interruption in an
   (i) Oil circuit breaker (ii) Air blast circuit breaker.

3. (a) Explain briefly the role of protection in a power system.
   (b) Draw and explain the principle of operation of an induction type over current relay.

4. (a) What do you understand by amplitude comparator and phase comparator? Prove the duality between them with the help of phasor diagram.
   (b) Show that the polar curve of a beased differential relay using a static comparator is a circle.

5. (a) What are the abnormal conditions in a large alternator against which protection is necessary? Discuss them briefly.
   (b) Describe protection scheme of an alternator against inter-turn fault.

6. (a) Explain with a neat circuit diagram the differential protection scheme used to protect Y-A transformers.
   (b) Describe with a neat sketch the operation of Buchholz relay.

7. (a) Describe in detail the protection of parallel feeder and ring mains.
   (b) Explain carrier current protection scheme.

8. (a) What area the causes of over voltages in power systems? Discuss. Bring out the functions of ground wire in lines.
   (b) Describe the construction principle of operation of value type lighting arrestor.

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Code: 9A02706

R09

B.Tech IV Year I Semester (R09) Supplementary Examinations, May 2013

RENEWABLE ENERGY SOURCES

(Electrical and Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

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1. (a) Explain the spectral irradiance of solar radiation.
   (b) With the aid of a sketch explain the working of a pyrheliometer.

2. (a) Describe the functioning of a flat plate collector with a line diagram.
   (b) Explain the advantages and disadvantages of concentrating collectors over flat plate type collectors.

3. Explain the principle, construction and working of non convective solar pond.

4. (a) What are the different wet processes used in bio mass conversion? Explain.
   (b) What are the different dry processes used in bio mass conversion? Explain.

5. (a) Estimate the energy potential in hot dry rock geothermal resource. What are the difficulties in extraction for power production?
   (b) What are the main applications of geothermal energy?

6. (a) How do you classify wind mills? Explain about any one type with neat sketches.
   (b) Describe with a neat sketch the components of a horizontal axis type aero generator.

7. (a) Discuss the various equipment for the establishment of an off shore OTEC system.
   (b) The efficiency of power plant working on OTEC system is very less. However, the secondary advantages make it commercially attractive. Discuss.

8. What is the basic principle of direct energy conversion system? Describe briefly the working of a thermo electric generator. Explain Seebeck, Peltier, Joule and Thomson effects.

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Code: 9A02709

R09

B.Tech IV Year I Semester (R09) Supplementary Examinations, May 2013

OPTIMIZATION TECHNIQUES

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain the difference between constraint surface and a composite constraint surface.

(b) State and explain the linear programming problem in a standard form.

2 Solve the following problem using Kuhn-tucker conditions:

$$\text{Maximize } f(x_1, x_2) = 2x_1 + x_2 - x_1^2$$

$$\text{Subject to } 2x_1 + 3x_2 \leq 6$$

$$2x_1 + x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

3 Solve the following L.P. problem using simplex method:

$$\text{Maximize } Z = 3x_1 + 5x_2 + 4x_3$$

$$\text{Subject to } 2x_1 + x_2 \leq 8$$

$$2x_2 + 5x_3 \leq 10$$

$$3x_1 + 2x_2 + 4x_3 \leq 15$$

$$x_1, x_2, x_3 \geq 0$$

4 Determine the optimal solution for the following transportation problem:

		To			**Supply**
	5	2	4	3	**22**
From	4	8	1	6	**15**
	4	6	7	5	**8**
Demand	**7**	**12**	**17**	**9**	

5 Find the minimum of the function $f = \lambda^5 - 5\lambda^3 - 20\lambda + 5$ by the Fibonacci method in the interval (0, 5).

6 Minimize $f = 2x_1^2 + x_2^2$ from the starting point (1, 2) using the univariate method (two iterations only).

7 Consider the problem:

$$\text{Maximize } f(x_1, x_2) = \frac{1}{3}(x_1 + 1)^3 + x_2$$

$$\text{Subject to } g_1(x_1, x_2) = 1 - x_1 \leq 0$$

$$g_2(x_1, x_2) = -x_2 \leq 0$$

Construct the Φ_k function according to the interior penalty function approach and complete the minimization of Φ_k.

8 Explain the computational procedure used in dynamic programming.

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Code: 9A04603

R9

B.Tech IV Year I Semester (R09) Supplementary Examinations, May 2013

DIGITAL SIGNAL PROCESSING

(Electrical and Electronics Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 Check for causality and stability of following systems:

(i) $y(n) = x(n) + x(n - 1) + x(n - 2)$.

(ii) $y(n) – 2y(n - 1) = x(n)$.

2 Determine the circular convolution of the following sequences and compare the results with linear convolution.

$x(n)= \{ 1, 1, 1, 1, -1, -1, -1, -1\}$.

$h(n) = \{ 0, 1, 2, 3, 4, 3, 2, 1\}$.

3 Given the sequences $x_1(n)$ and $x_2(n)$ below, compute the circular convolution using DIF-FFT algorithm.

$x_1(n) = \{2, 1, 1, 2\}$ $x_2(n) = \{1, -1, -1, 3\}$

4 State and prove following properties of z-transform:

(i) Time reversal.

(ii) Time convolution.

(iii) Differentiation in z-domain.

5 Convert the following analog filter transfer function using backward difference method and impulse invariant method.

$H(s) = 1/(s + 2)(s + 4)$

6 A low pass filter has the desired frequency response as given by:

$H_d(e^{j\omega}) = e^{-j\omega}$ $-\pi/4 \le \omega \le \pi/4$

$=1$ $\pi/4 \le |\omega| \le \pi$

Determine the filter coefficients hd(n) if the window function is used is

$w(n) = 1$ $0 \le \omega \le 5$

$= 0$ otherwise

Also determine the frequency response $H(e^{j\omega})$ of the designed filter.

7 The spectrum of a signal x(n) is symmetrical triangular pulse with amplitude of ‘2’ and frequency boundaries are -0.25 to 0.25. Sketch the spectrum and sketch spectrums of:

(i) The zero interpolated signal $y(n) = x(n/2)$.

(ii) The decimated signal $d(n) = x(2n)$.

(iii) The signal g(n) that equals to x(n) for even n, and zero for odd n.

8 With the help of block diagram, explain about signal compression system

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