Code No. 2295 / A

FACULTY OF ENGINEERING

B.E. 4/4 (EE / Inst. / M/P) II – Semester (Main) Examination, April / May 2013

Subject: Intellectual Property Rights (Elective – II)

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part – A and any five questions from Part – B.

PART – A (25 Marks)

1.	Define intellectual property.	(2)
2.	Explain the meaning of industrial property.	(3)
3.	What is a product patent?	(2)
4.	Explain the contents of complete specification.	(3)
5.	What are the essential conditions for registration of an industrial design?	(2)
6.	What amounts to piracy of a registered design?	(3)
7.	What is the purpose of protecting trademarks?	(2)
8.	What is passing-off in relation to a trademark?	(3)
9.	Explain broadcast reproduction right.	(2)
10.	How can the intellectual property in a computer programme be protected?	(3)

PART – B (5x10 = 50 Marks)

11.	Explain the salient features of the TRIPS agreement.	(10)
12.	What are the essential conditions for patenting an invention?	(10)
13.	Explain the rights and duties of proprietors of a registered design.	(10)
14.	Discuss the procedure to register a trademark.	(10)
15.	Explain the subject matter of Copyright Protection in India.	(10)
16.	What amounts to infringement of a copyright? Are there any exceptions thereto?	(10)
17.	Write short notes on: a) Compulsory licensing b) WIPO.	(10)

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Code No. 2293

FACULTY OF ENGINEERING

B.E. 4/4 (EE / Inst.) II – Semester (Main) Examination, April / May 2013

Subject: Renewable Energy Sources (Elective – II)

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part – A and any five questions from Part – B.

PART – A (25 Marks)

1. What are the advantages of use of renewable sources of energy? (3)
2. Mention the problems associated with wind energy conversion. (2)
3. Give the reasons for low efficiency of solar cells. (3)
4. Define the following terms: (2)
   a) Beam radiation b) Diffuse radiation
5. Discuss the following terms associated with wind energy (3)
   a) Tip speed ratio b) Cut-in speed c) Cut-out speed
6. Discuss the favourable sites for installing windmills. (2)
7. What is plate tectonic theory and how is it related to geothermal energy? (3)
8. What do you mean by biogas? (2)
9. Discuss the relative advantages and limitations of tidal power projects. (3)
10. Describe the process of extracting energy from waves. (2)

PART – B (5x10 = 50 Marks)

11. Discuss renewable and conventional forms of energy. Highlight their merits and demerits. (10)

12.(a) Explain the working principle of Brayton engine with necessary diagrams. (5)
   (b) Discuss the working of flat plate collector. (5)

13.(a) Explain the current voltage characteristic of solar cell. Also define the fill factor. (5)
   (b) Explain the different types of solar cells based on the material used for their fabrication. (5)

14.(a) Explain the working of horizontal axis windmill with suitable diagram. (5)
   (b) Derive the equation for power available in wind. (5)

15.(a) Explain the binary cycle system for liquid dominated system. (7)
   (b) Explain the difference between a geothermal power plant and thermal power plant. (3)

16.(a) Explain the working of closed cycle Anderson OTEC plant. (7)
   (b) Discuss the impact of OTEC on environment. (3)

17. Write short notes on: (10)
   a) Induction generator
   b) Tidal energy

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Code No. 2292

FACULTY OF ENGINEERING

B.E. 4/4 (EE / Inst.) II-Semester (Main) Examination, April / May 2013

Subject : Advanced Control Systems
(Elective - II)

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1. What is the criterion to choose state variables in a system? (2)

2. $A=\begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix}$, what are the Eigen values of matrix A? (3)

3. Define observability and write condition for completely state observable. (3)

4. What is jump resonance? (3)

5. Define nodal point. (2)

6. Determine the sign definiteness of the following functions: (3)
   (i) $V(x)=(x_1^2+x_2^4+x_3^6)$
   (ii) $V(x)= -x_1^2-(x_1+x_2)^2$
   (iii) $V(x)=x_1^2+(x_2^2+x_3)^2$

7. Define admissible control and admissible trajectory. (2)

8. Determine the variation of the following functional. (3)
   $$J(x)=\int_{t_0}^{t_f} x^3(t)dt$$

9. Write the properties of state transition matrix. (2)

10. What is equilibrium point? (2)

PART – B (5x10=50 Marks)

11. Find $x_1(t)$ and $x_2(t)$ of the system described by (10)
    $$\begin{bmatrix} \dot{x}_1(t) \\ \dot{x}_2(t) \end{bmatrix}=\begin{bmatrix} 0 & -1 \\ 2 & 3 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}+\begin{bmatrix} 1 \\ 0 \end{bmatrix}u$$
    Where initial conditions are
    $$\begin{bmatrix} x_1(0) \\ x_2(0) \end{bmatrix}=\begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

12. Obtain three different state models for the system whose transfer function is given below:
    $$\frac{C(s)}{U(s)}=\frac{10(s+4)}{s(s+1)(s+3)}.$$ (10)

13. Explain the procedure of how to draw phase trajectories using delta method and draw the phase trajectories of the following system: (10)
    $$\ddot{x}+4\,|\,\dot{x}\,|\,\dot{x}+4x=0$$

..2

14. Consider the non linear system described by equation

$$\dot{x}_1 = -3x_1 + x_2$$
$$\dot{x}_2 = x_1 - x_2 - x_2^3$$

Investigate the stability using Krasovskii's method (P is identify matrix). (10)

15.(a) Find the extremal for the following functional (6)

$$J(x) = \int_{t_0}^{t_f} [x^2(t) + \dot{x}^2(t)]dt \quad ; \text{x(0)=1, x(1) is free}$$

(b) State and prove fundamental theorem of calculus of variations. (4)

16.(a) Explain common physical non linearities. (5)
(b) Write Liapunov stability theorems. (5)

17. Consider the system defined by (10)

$$\begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} u$$

By using sate feedback gain matrix u=-Kx, it is desired to have the closed loop poles at s=-2+2j, -2-2j, -10. Determine state feedback gain matrix K.

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Code No. 2294

FACULTY OF ENGINEERING

B.E. 4/4 (EEE) II-Semester (Main) Examination, April / May 2013

Subject : High Voltage Engineering
(Elective - II)

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1. What is Penning effect? (2)
2. Define Townsend's ionization coefficients. (2)
3. Give the expression of voltage ripple in Cockroff Walton voltage multiplier circuit. (2)
4. Write short notes on rod gaps. (3)
5. What is the effect of humidity on the breakdown voltage of a sphere gap? (3)
6. List the advantages of Hall effect generator. (2)
7. List the tests conducted on the circuit breakers. (2)
8. What is the principle of operation of generating voltmeter? (3)
9. Write short notes on time lags associated with breakdown of gaseous dielectrics. (3)
10. Write short notes on pollution testing of insulators. (3)

PART – B (5x10=50 Marks)

11. (a) Explain the testing of transformer oil. (7)
    (b) What is electrochemical breakdown in solid dielectrics? (3)

12. Explain the various rectifier circuits employed for generation of high D.C. voltages. (10)

13. With a neat sketch, explain the Cockroff-Walton voltage multiplier circuit. (10)

14. What are the various resistive shunts used for measurement of high currents? Explain in detail. (10)

15. How are high impulse voltages generated? Analyze any two circuits with neat sketches and derive the expressions for output voltages. (10)

16. Explain the various tests conducted on power transformers. (10)

17. Write short notes on the following: (10)
    (a) Chubb-Fortescue method
    (b) Lightening phenomenon
    (c) Uniform field spark gaps

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Code No. 2295

FACULTY OF ENGINEERING

B.E. 4/4 (EE / Inst.) II – Semester (Main) Examination, April / May 2013

Subject : **Optimization Methods (Elective – II)**

Time : 3 hours Max. Marks : 75

Note: Answer all questions from Part–A and answer any **FIVE** questions from Part–B.

PART – A (25 Marks)

1. Define optimization. 2

2. State five engineering applications of optimization. 3

3. Define saddle point. 2

4. Prove that the dual of dual is primal. 3

5. Why is Powell's method called a pattern search method? 2

6. Explain the method of computation of $[B_i]$ in Quasi Newton method. 3

7. What is an one dimensional minimization problem? 2

8. What is a unimodal function? Explain in brief. 3

9. Define the following :
   a) Principal of optimality b) Monotonic function 2

10. State two engineering examples of serial system that can be solved by dynamic programming. 3

PART – B (50 Marks)

11. Find the dimensions of a cylindrical tin with top and bottom made up of sheet metal to maximize its volume such that the total surface area is equal to $A_0 = 24\ \pi$. Use Lagrange multiplier method. 10

12.a) Explain the computational procedure of simplex method with the flow chart. 7

b) What are the advantages and disadvantages of revised simplex method over the original simplex method? 3

13.a) Explain the procedure for Fibonacci method with the flow chart. 7

b) What is the difference between Fibonacci method and Golden section method? 3

14. Minimize $f(x_1, x_2) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ starting from the point $x_1 = \begin{Bmatrix} 0 \\ 0 \end{Bmatrix}$ using Fletcher – Reeves method. 10

..2

15.a) With an example explain how a final value problem is converted into an initial value problem. 6

b) Explain different types of multistage decision problem. 4

16. Minimize $f = 4x_1^2 + 3x_2^2 - 5x_1x_2 - 8x_1$ starting from the point $x_1 = \begin{Bmatrix} 0 \\ 0 \end{Bmatrix}$ using Powell's method. 10

17.a) Explain the procedure for univariate method. 4

b) Minimize $Z = x_1 + x_2$, subject to the constraints $2x_1 + x_2 \geq 4$, $x_1 + 7x_2 \geq 7$ and $x_1, x_2 \geq 0$ using two phase simplex method. 6

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