methods. Find the value of the force per unit area when $E = 3 \times 10^6$ V/m, the breakdown strength of air.

b) Derive an expression for dynamical equations of electromechanical systems

4. **Attempt any *one* part of the following:** $7 \times 1 = 7$

a) The following test results were obtained while Hopkinson's test was performed on two similar DC shunt machines: supply voltage=250V, field current of motor=2A, field current of generator=2.5A, armature current of generator=60A, current taken by the two armatures from supply=15A. resistance of each armature circuit=0.2Ω, Calculate the efficiency of the motor and generator under these conditions of load.

b) Explain the efficiency and testing of DC machines in detail.

5. **Attempt any *one* part of the following:** $7 \times 1 = 7$

a) Explain the plugging, dynamic braking and regenerative braking of DC machines in detail.

b) A 400 V series motor has a total armature resistance of 0.25 Ω. When running at 1200 rpm it draws a current of 25 A. When a regulating resistance of 2.75 Ω is included in the armature circuit, it draws a current of 15 A. Find the speed and ratio of the two mechanical outputs. Assume that the flux with 15 A is 70% of that with 25 A.

6. **Attempt any *one* part of the following:** $7 \times 1 = 7$

a) Explain the potential transformer, current transformer, audio-frequency transformer and grounding transformer.

b) Two 1-phase furnaces A and B are supplied at 100V by means of a scott-connected transformer combination from a 3-phase 6600 V system. The voltage of furnace A is leading. Calculate the line currents on the 3-phase side, when the furnace A takes 400 kW at 0.707 pf lagging and B takes 800 kW at unity pf.

7. **Attempt any *one* part of the following:** $7 \times 1 = 7$

a) Explain the parallel operation of transformers in detail.

b) A 500 kVA transformer has an efficiency of 95% at full load and also at 60% of full load; both at upf (i) separate out the losses of the transformer (ii) determine the efficiency of the transformer at ¾ th full load.

Paper Id: | 120415 | Sub Code: REE405

Roll No. | | | | | | | | | |

B. Tech.
(SEM. IV) THEORY EXAMINATION 2017-18
NETWORK ANALYSIS AND SYNTHESIS

Time: 3 Hours

Total Marks: 70

Note: 1.   Attempt all Sections.

SECTION A

1.   Attempt *all* questions in brief. $2 \times 7 = 14$

a.   Write two properties of Complete Incidence matrix.
b.   Write Hybrid parameters in terms of Z parameters.
c.   State two properties of the R-L driving point ImpedanceFunction
d.   Describe the following: Tree, Co-Tree, Twig, Link, Cut-set and Tie set.
e.   State and describe the properties of RL and RC DPI Network.
f.   State and describe thevenin theorem with suitable example.
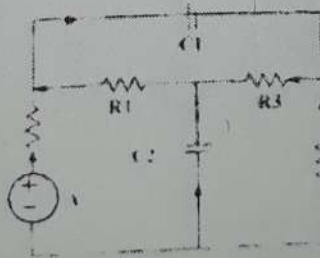g.   Describe complex frequency in brief.

SECTION B

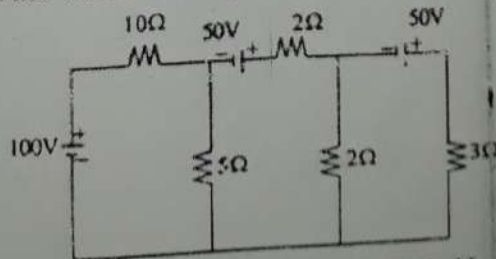2.   Attempt any *three* of the following: $7 \times 3 = 21$

a.   For the given reduced incidence matrix. Draw thegraph and hence obtain the f-cutset matrix

$$\begin{bmatrix} 0 & 0 & 1 & 1 & 1 & 0 & -1 \\ 0 & 1 & 0 & 0 & -1 & 1 & 1 \\ -1 & 0 & 1 & 0 & 0 & -1 & 0 \end{bmatrix}$$

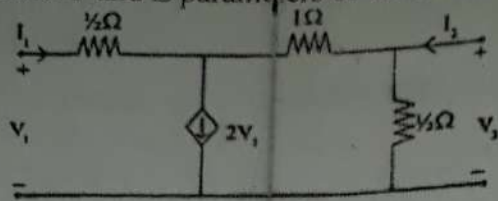b.   For the network shown in Fig below drawthe directed graph. And also find number possibletree.

c.   Find current through 50 resistor using Thevenin's theorem.

d.   Test whether the polynomial P(s) is Hurwitz or not.
      (i) $s5 + 3s2 + 2s$
      (ii) $s4 + 5s3 + 5s2 + 4s + 10$.

(54)

e. Find Y and Z parameters of the network.

SECTION C

3. **Attempt any *one/two* part of the following:**   7 x 1 = 7

    (a)   State the properties of RL driving point impedance function .Also realize the given network impedance function using Foster form I

$$Z(s)= (s+1)(s+3) / (s+2)(s-4)$$

    (b)   Explain the advantage of active filter in comparison to passive filter in detail.

4. **Attempt any *one/two* part of the following:**   7 x 1 = 7

   (a)   For the given network function, draw the pole zerodiagram and hence obtain the time response I(t)

$$I(s) = \frac{5s}{(s+1)(s^2 + 4s + 8)}$$

    (b)   Design constant K low pass T and πsectionfilters to be terminated in 600 Ω having cut-offfrequency 3 kHz.

5. **Attempt any *one/two* part of the following:**   7 x 1 = 7

    (a)   Determine the currents in all the branches of the network shown in fig. using node analysis methodof the graph theory.
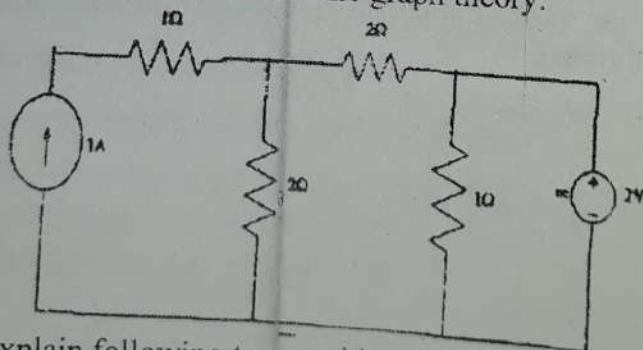
    (b)   Explain following terms with reference to network topology
        (i) Tree
        (ii) Co-tree
        (iii) Incidence matrix
        (iv) Oriented graph
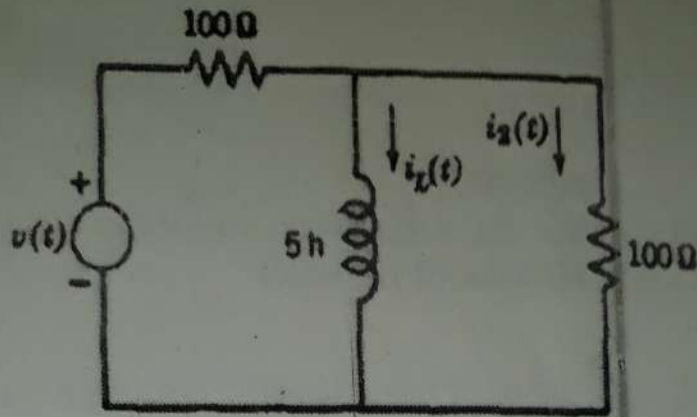   (v) Twig and link

6. **Attempt any *one/two* part of the following:**   7 x 1 = 7

    (a)   Sketch the following signals
        i). $t^2[U(t-1)-U(t-3)]$

        ii). $(t-4)[U(t-1)-U(t-4)]$
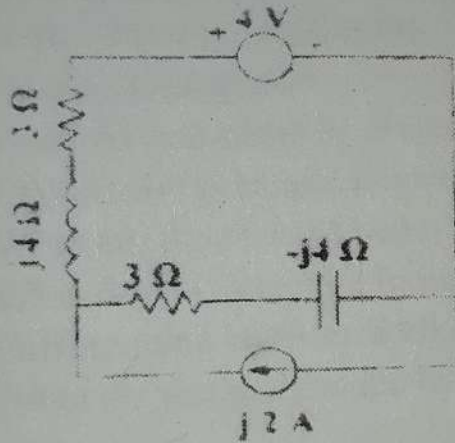
    (b)   In the circuit shown $v(t) = 2u(t)$ and $iL(O-) = 2$ amps. Find andsketch $i?(t)$.

7. **Attempt any *one/two* part of the following:**   **7 x 1 = 7**

   (a)   State and prove the maximum power transfertheorem applied to the AC
         circuits.

   (b)   Determine the current in capacitor C by the principleof superposition of the
         network shown below

B. TECH
(SEM IV) THEORY EXAMINATION 2017-18
INDUSTRIAL SOCIOLOGY

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.   2 x 10 = 20

   a. Define Manorial System.
   b. What is Scientific Management?
   c. Define Putting-out System.
   d. What is Discipline?
   e. What do you mean by Bureaucracy?
   f. Explain the principle objectives of Industrial Disputes Act.
   g. What are the reasons behind workers joining trade unions?
   h. What do you mean by Industrial Dispute?
   i. Differentiate between Strike and Lock-out.
   j. What do you understand by Navratana Public Sector Enterprises?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

   a. What is the contribution of Hawthorne Experiments in the development of Industrial Sociology?
   b. What do you mean by Guild System? Explain its features.
   c. Define Industrialization. What are the causes of Industrialization in India?
   d. Write a short note on Labour Courts in India.
   e. Discuss the ways to promote Industrial Peace.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

   (a) Examine the role of Emile Durkheim in the development of industrial sociology.
   (b) What are importance and Scope of Industrial Sociology?

4. Attempt any *one* part of the following: 10 x 1 = 10

   (a) Write down the effect of Industrialization on caste and class system.
   (b) What are the important features of the factory system?

5. Attempt any *one* part of the following: 10 x 1 = 10

   (a) What do you understand by Industrial Policy Resolution 1956? What are its main features?
   (b) Write a short note on Science, Technology & Innovation Policy of India 2013.

6.   **Attempt any *one* part of the following:**   10 x 1 = 10

    (a)   Define Strike. What are various types of strikes?

    (b)   Explain the model grievance handling procedure.

7.   **Attempt any *one* part of the following:**   10 x 1 = 10

    (a)   Discuss the importance of trade unions in India.

    (b)   Explain the provisions of industrial policy- 1991.

B TECH
(SEM IV) THEORY EXAMINATION 2017-18
UNIVERSAL HUMAN VALUES AND PROFESSIONAL ETHICS

Time: 3 Hours

Total Marks: 70

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. **Attempt *all* questions in brief.** 2 x 7 = 14

    a. What is method to fulfill basic aspiration of human-being? Is it same for everyone.
    b. Can $\sum$ D, T, E activities of self be definite? Give name to both *definite, indefinite* state of activities in self.
    c. You are having feeling of affection. What are two natural feelings as outcome of affection define them in brief.
    d. Fill in the blanks. The comprehensive human goal is Right Understanding _____, Prosperity in _____, _____ in Society, _____ in nature.
    e. Fill in the blanks. Co-existence in nature is visible due to _____ and _____.
    f. Which will be true testimony of ethical human conduct for an individual.
        (i)   Person holding certificate of value education.
        (ii) Person believe in value education.
        (iii) Person reflecting his or her behavior accordingly.
    g. Verify proposal, "*value education augment to utilize your professional competence*".

SECTION B

2. **Attempt any *three* of the following:** 7 x 3 = 21

    a. How you look at your basic aspirations. Is it *'To Be'*, *'To Get'*, *'To Become'*? Justify your right priority with examples.
    b. Explain the difference between needs of *Self(I)&Body*. Can it be fulfilled interchangeably? Verify on yourself, what is right priority.
    c. Care and Guidance contribute to excellence of whom you interact with. What are other feelings that can contribute to excellence generations after generations or indirectly to other?
    d. Explain following two dimensions in detail to achieve comprehensive human goal.
        (i). Education – Sanskar
        (ii). Health – Sanyam
    e. What are characteristics of people–friendly &Eco-friendly production system which is sustainable?

SECTION C

7 x 1 = 7

3. **Attempt any *one* part of the following:**

    (a) Explain Need, Basic guidelines of value education.
    (b) What is Self-Exploration, its content and process?

4. **Attempt any *one* part of the following:**   7 x 1 = 7

   (a) Explain body as an instrument of 'I'

   (b) Harmony in 'I' means understanding characteristics and activities of 'I'.
        Explain.

5. **Attempt any *one* part of the following:**   7 x 1 = 7

   (a) Comment, Human to Human relationship '*Is*' or being '*Created*'. Explain
        feeling of 'Love' in light of above statement.

   (b) For a fearlessness in society, what are minimum requirements? Where do you
        wish to live, fearful or fearless society? What is your participation towards
        ensuring fearless society, examine within yourself?

6. **Attempt any *one* part of the following:**   7 x 1 = 7

   (a) Explain following three realties *Units* (Material, Conscious), *Space, and Co-
        existence.*

   (b) Closely examine Four orders in Nature and their participation, Explain present
        state of participation of human order.

7. **Attempt any *one* part of the following:**   7 x 1 = 7

   (a) Which professional you will choose for his/her services, a person *with*
        understanding of value education and living accordingly or *without it*. What
        about you when you will offer a service to other.

   (b) What are strategies for transition from the present state to Universal Human
        Order?

Printed Pages: 02   Sub Code: RAS 402
Paper Id: | 1 | 9 | 9 | 4 | 2 | 2 | Roll No. | | | | | | | | | |

B TECH
(SEM IV) THEORY EXAMINATION 2017-18
ENVIRONMENT AND ECOLOGY

Time: 3 Hours   *Total Marks: 70*

Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   Attempt *all* questions in brief.   2 x 7 = 14

   (a). What do you understand by the term "Biotic and Abiotic" with examples.

   (b). Explain the term "Pollutant". Give examples.

   (c). What is biomagnification?

   (d). Define food chain with example?

   (e). Explain flood and its main causes?

   (f) Define urban sprawling?

   (g). Define the term ecology and ecosystem.

SECTION B

2.   Attempt any *three* of the following: 7 x 3 = 21

   (a). What is meant by environment? Enumerate and discuss its various components.

   (b). What is ecological pyramid. Explain different types of ecological pyramids for different ecosystem with suitable examples.

   (c). What is global warming? What are its causes & effects? Discuss the measures to control it.

   (d). What is water pollution? Explain the various causes, effects and controlling measures of water pollution.

   (e). Define biodiversity. Explain genetic diversity, species diversity and ecosystem diversity. Write the various importance of biodiversity.

SECTION C

3.   Attempt any *one* part of the following: 7 x 1 = 7

   a. (i). What do you mean by solid waste? Describe various methods of solid waste disposal?

   (ii). What is sustainable development. Describe the measures of sustainable development.

   b. (i). Define ecology and ecosystem. Explain the role of producers, consumers and decomposers in an ecosystem.

   (ii). Describe carbon cycle in detail.

4. **Attempt any *one* part of the following:**   7 x 1 = 7

a. (i). What do you mean by water borne disease? Discuss kinds of diseases, their cause and effect on human being.

(ii). Discuss the salient features of Environmental (Protection) Act, 1986.

b. (i). Explain the energy flow in the ecosystem.

(ii). Discuss the need for public awareness for the conservation and protection of the environment.

5. **Attempt any *one* part of the following:**   7 x 1 = 7

a. (i). "Hydrogen-the fuel of the future" explain it.

(ii). Explain the need and functions of NGO's for environmental conservation.

(b). (i). Explain the principle and working of solar cell with diagram.

(ii). Explain the water (prevention and control of pollution) Act.

6. **Attempt any *one* part of the following:**   7 x 1 = 7

a. What is biomass energy? Explain the different methods of biogas production in India.

b. Discuss population explosion in Indian context. What are the major cause and effects of population explosion?

7. **Attempt any *one* part of the following:**   7 x 1 = 7

a. (i). What is noise pollution? Explain the different sources and effects of noise pollution.

(ii). Write a short note on nuclear energy.

b. (i). With the help of flow chart, describe the Environment Impact Assessment process.

(ii). Briefly discuss the fluoride problem in drinking water.

B. TECH.
(SEM III/IV) THEORY EXAMINATION 2017-18
LASER SYSTEMS AND APPLICATIONS

Time: 3 Hours   *Total Marks: 70*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. **Attempt *all* questions in brief.**   **2 x 7 = 14**

    a. What is Quantum tunneling effect?

    b. Why the spectrum of black body could not be explained by the concept of classical mechanics?

    c. What is the role of reflectors in resonant cavity?

    d. What are characteristics properties of Copper Vapour lasers?

    e. Find the maximum power of the pulse if the measured pulse duration of a laser is 80ns and its energy is 1.8J.

    f. Why dye lasers are tunable?

    g. What do you mean by photocoagulation?

SECTION B

2. **Attempt any *three* of the following:**   **7 x 3 = 21**

    a. What is meant by black body? Discuss Planck's hypothesis of a quantum theory of radiation and obtain and expression for the distribution of energy with wavelength in a black body radiation.

    b. Give physical significance of wave function? Derive Schrodinger time-dependent and time-independent wave equations.

    c. What do you understand by optical cavity? Explain various types of optical cavities with suitable diagram.

    d. Explain the construction and working of Argon ion laser with applications.

    e. What is dye laser? Discuss advantages, drawbacks and applications of dye lasers?

SECTION C

7 x 1 = 7

3. **Attempt any *one* part of the following:**

    (a) What is tunnel Effect? Explain it with suitable diagram for the case E< Vo and get the transmission Coefficient

    (b) What is Normalized wave function? A particle is moving in one dimensional potential box (of infinite height) of width 25Å. Calculate the probability of finding the particle within an interval of 5 Å at the centre of the box when it is in its state of least energy.

4.   **Attempt any *one* part of the following:**   7 x 1 = 7

   (a)   What is a Q-switched laser? Explain various techniques used in Q- switching.

   (b)   What do you understand by population inversion? Find the temperature at which the population ratio of the two levels will be 2/4 when an atom has atomic levels separated by 1.62 eV.

5.   **Attempt any *one* part of the following:**   7 x 1 = 7

   (a)   Describe alexandrite laser and its characteristics. How tuning of laser wavelengths can be done in this laser?

   (b)   Why is four level laser more efficient than three level laser? Calculate the Fermi temperature of iron and Fermi velocity of its electrons if its Fermi energy is 11.1 eV

6.   **Attempt any *one* part of the following:**   7 x 1 = 7

   (a)   Explain four level laser with suitable diagram and derive rate equation for four level laser.

   (b)   What do you understand by homo junction semiconductor laser? Discuss its construction and working mechanism with diagram.

7.   **Attempt any *one* part of the following:**   7 x 1 = 7

   (a)   What are the various kinds of losses that can take place in an optical fibre?
   (b)   Discuss advantages and disadvantages of cutting and drilling of lasers.

   Physical Constants

Rest mass of electron	m_o	$= 9.1 \times 10^{-31}$ kg
Rest mass of Proton	m_p	$= 1.67 \times 10^{-27}$ kg
Speed of light	c	$= 3 \times 10^{8}$ m/s
Planck Constant	h	$= 6.63 \times 10^{-34}$ J-s
Charge on electron	e	$= 1.6 \times 10^{-19}$ C
Boltzmann Constant	k	$= 1.38 \times 10^{-23}$ J K^{-1}