2014-2015

B.Tech. Autumn (III SEMESTER) EXAMINATION
(ELECTRICAL ENGINEERING)
HIGHER MATHEMATICS-I
(AM-221)

Maximum Marks : 60
Duration: 3 Hours

1. (a) Find the directional derivative of \( \nabla (\phi) \) at the point \( P(1, -2, 1) \) in the direction of the normal to the surface \( xy^2z = 3x + 2x \) at \( P \), where \( \phi = 2x^2y^2z^2 \).
(b) Show that \( \text{div} (\text{grad} \phi) = n(n-1) r^{n-2} \).
(c) A vector field is given by \( \vec{A} = (x^2 - xy^2) \hat{i} + (y^2 + x^2y) \hat{j} \).
Show that the field is irrotational, and find the scalar potential.

OR

(c') Find the value of \( n \) for which the vector \( r \) is solenoidal, where \( \vec{r} = x \hat{i} + y \hat{j} + 2 \hat{k} \).

2. (a) Evaluate \( \int \int \vec{A} \cdot d\vec{s} \), where \( \vec{A} = 12x^2y \hat{i} - 3yz \hat{j} + 12z \hat{k} \), and \( S \) is the part of the plane \( x + y + z = 1 \) included in the first octant.

OR

(a') Use Green's theorem in a plane to evaluate the integral \( \int \int (2x^2 - y^2) dx + (x^2 + y^2) dy \), where \( C \) is the boundary in the \( xy \) plane of the area enclosed by \( x \)-axis and the semi-circle \( x^2 + y^2 = 1 \) in the upper half of the \( xy \) plane.

(b) Verify Stoke's theorem for the function \( \vec{F} = x^2 \hat{i} - xy \hat{j} \) integrated round the square in the plane \( z=0 \) and bounded by the lines \( x = 0, \ y = 0, \ x = a \) and \( y = a \).

3. (a) If \( f(z) \) is an analytic function of \( z \), prove that

\[
\left[ \frac{d^2}{dx^2} + \frac{d^2}{dy^2} \right] \Re f(z)^2 = 2 \left| f'(z)^2 \right|
\]

(b) If \( f(z) = u + i \ V \) is an analytic function of \( z = x + iy \) and

\[
U - V = \frac{\cos x + i \sin x}{\cos h y - \cos x},
\]

Find \( f(z) \) in terms of \( z \).

OR

Contd.....2
(b') If \( f(z) = \phi + i\psi \) represents the complex potential for an electric field and
\[
\psi = x^2 - y^2 + \frac{x}{x^2 + y^2},
\]
determine the conjugate function \( \phi \) and \( f(z) \) in terms of \( z \).

(c) Use Cauchy's integral formula to evaluate
\[
\int \frac{3z^2 + z}{z^2 - 1} \, dz,
\]
where \( C \) is the circle \( |z| = 2 \)

4. (a) Use residue theorem to evaluate
\[
\int \frac{z - 1}{(z + 1)^2 (z - 2)} \, dz,
\]
the integral being taken round the circle \( |z - 1| = 2 \)

(b) Evaluate by contour integration,
\[
\int \frac{\cos ax}{x^2 + 1} \, dx, \quad a > 0
\]
Maximum Marks: 60
Note: Answer all the questions.

1. (a) Examine the nature of the function

\[ f(z) = \frac{x^2 y^2 (x + iy)}{x^4 + y^4}, \quad z \neq 0 \]

\[ f(0) = 0 \]

in the region including the origin.

OR

(a) If \( f(z) \) is an analytic function of \( z \), prove that

\[ \left( \frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} \right) |f(z)|^2 = 4|f'(z)|^2. \]

(b) If \( f(z) = u + iv \) is an analytic function of \( z = x + iy \) and \( u - v = \frac{e^y - \cos x + \sin x}{\cosh y - \cos x} \)

find \( f(z) \) in terms of \( z \) subject to the condition \( f\left( \frac{\pi}{2} \right) = \frac{3 - i}{2} \).

(c) Evaluate the following by using Cauchy's integral formula:

\[ \oint_C \frac{\sin \pi z^2 + \cos \pi z^2}{(z - 1)(z - 2)} \, dz \]

where \( C \) is the circle \( |z| = 3 \).

2. (a) State Laurent's Series and use it to expand the function \( f(z) = \frac{(z - 1)}{z^2} \) for \( |z - 1| > 1 \).

(b) Use residue theorem to evaluate

\[ \oint_C \frac{(z + 2)}{(z + 1)(z + 2)} \, dz \]

where \( C \) is the circle \( |z| = 3 \).

(c) Evaluate by contour integration:

\[ \int_0^{2\pi} \frac{\cos 3\theta}{(5 - 4\cos \theta)} \, d\theta. \]

OR

Conitd....2
(c') Show by contour integration that:
\[
\int_{-\infty}^{\infty} \frac{x^2 \, dx}{(x^2 + a^2)(x^2 + b^2)} = \frac{\pi}{(a+b)}
\]

3. (a) Establish an interactive formula for \(\sqrt{N}\) (where \(N\) is a positive number) and hence find the value of \(\sqrt{5}\) correct to four decimal places.

OR

(a') Use general iteration method to find a real root of the equation \(\sin^2 x = x^2 - 1\) correct to four decimal places.

(b) Solve the following system of linear equations by Gauss-elimination method:
\[
\begin{align*}
2x + 2y + z + 2u &= 7, \\
x - 2y - u &= 2, \\
3x - y - 2z - u &= 3, \\
x - 2u &= 0
\end{align*}
\]

(c) (i) Obtain the interpolating polynomial using the following data:
\[
\begin{array}{c|c|c|c|c}
  x & 1 & 2 & 3 & 4 \\
  y & 1 & -3 & -1 & 13
\end{array}
\]

(ii) Prove the following identities:
\[
\mu = \sqrt{1 + \frac{1}{4} \delta^2}, \quad hD - \log (1 + \Lambda) \text{ and } (1 + \Delta)(1 - \nu) = 1
\]

4. (a) Find Taylor's Series up to the term \(x^5\) for the initial value problem:
\[
\frac{dy}{dx} - y \sin x + \cos x, \quad y(0) = 0
\]
and approximate \(y(0.01)\).

OR

(a') Using modified Euler's method, find the value of \(y\) when \(x = 1.2\), given that:
\[
\frac{dy}{dx} = \sqrt{xy} - 2, \quad y(1) = 1.
\]
Take \(h = 0.1\). Use only two iterations at each stage.

(b) Apply fourth order Runge-Kutta method to find \(y(0.2)\), given that:
\[
\frac{dy}{dx} = x^2 + y, \quad y(0) = 1 \text{ and } h = 0.1
\]

(c) Solve the boundary value problem:
\[
y'' - 64y + 10 = 0
\]
with boundary conditions:
\[
y(0) = y(1) - 0 \text{ and } h = \frac{1}{4}
\]
by finite difference method.
Maximum Marks: 60
Credits: 04
Duration: Three Hours

Answer all the questions.
Assume suitable data if missing.
Notations used have their usual meaning.

Q.No. Question

1(a) Define voltage regulation of a single-phase transformer and hence obtain the condition for maximum and zero voltage regulation of a transformer. [4]

(b) A 100 kVA transformer has the maximum efficiency of 98% at full-load and unity power factor. During the day it is loaded as follows:
12 Hours: 20 kW at p.f. 0.5 lag
06 Hours: 20 kW at p.f. 0.9 lag
06 Hours: 20 kW at p.f. 0.8 lag
Find the "all day efficiency of the transformer". [8]

2(a) Explain that in an open delta three-phase transformer connections 58% of the rated load can be transferred. [4]

(b) Draw a circuit for Scott-connection. Two 110V, single phase furnaces take loads of 500 kW and 800 kW respectively at a p.f. of 0.71 lagging and are supplied from 6600V, 3-phase mains through a Scott-connected transformer combination. Calculate the currents in the 3-phase lines, neglecting transformer losses. Draw the phasor diagram. [8]

OR

2'(a) Draw the connections and phasor diagram of a Delta/Zig-Zag Star (180°) connected transformer. [4]

(b) A 2000/1000/500V, single-phase, three-winding transformer is to be used as an Auto-transformer with supply voltage of 3000V. Two loads, one of 1050kVA at
3500V and the other of 180kVA at 1000V are to be energized from this Auto-
transformer output. Draw a suitable diagram of connections and find the currents in
various parts of the circuits. Assume the loads to have the same power factor.

3(a) Find the expression for short pitch factor and distribution factor in an ac winding.  [6]  
3(b) Prove that single phase ac winding produces stationary and pulsating field whereas
three phase ac winding produces moving and fixed magnitude field.  [6]

4(a) Draw a complete torque-slip characteristic of an induction machine. Also explain
the phenomenon of cogging and crawling in an induction machine.  [6]

4(b) An 8 pole, 3-phase, 50Hz induction motor runs at a speed of 710 rpm with an input
power of 35 kW. The stator copper loss at this operating condition is 1200W while
the rotational losses are 600W. Find: rotor copper loss, gross torque developed,
gross mechanical power developed, net torque and mechanical power output.

OR

4' Construct the circle diagram of a three-phase squirrel-cage induction motor (7.5 hp,
1000 rpm, 220 volts, 50 cycle) on the basis of the following data:
  (i) Temperature of room, 22 °C. Temperature of motor, 62 °C.
  (ii) I = 26.5 amp, V = 22.1 volts by dc test between terminals.
  (iii) I = 28.0 amp, V = 109 volts, P = 4066 watts with rotor locked.
  (iv) I = 7.2 amp, V = 224 volts, P = 400 watts at no load.

Determine the starting torque, max. torque, max. power output, slip, full-load power
factor and slip for max. torque.

5(a) Explain why a single-phase single-winding induction motor produces no starting
  torque?  [4]

5(b) Draw the equivalent circuit of a single phase induction motor. A 2-pole, 240V, 50
  Hz, single phase induction motor has the following constants referred to the stator:
  R1 = 2.2Ω, X1 = 3.8Ω, R2 = 3.8Ω, X2 = 2.1Ω and Xm = 86Ω. Find the stator current and
  input power when the motor is operating at a full-load speed of 2820 rpm.
Q1(a) Derive an expression for inductance of a 3 phase transmission line \((6)\) whose conductors are placed at the corners of a scalene triangle, also mention the assumptions made.

(b) A 3-phase double circuit line has the configuration as shown in fig1. The radius of each conductor is 0.9 cm. Find the inductance and capacitance per phase per Km length of the line.

![Diagram of a 3-phase double circuit line]

Q2(a) Derive an expression to show that the active power transferred over a transmission line is proportional to \(\sin \delta\) and reactive power is proportional to voltage drop over the line. Also mention the...
assumptions made.

(b) A 350 Km long line has total series impedance of \( 180 \angle 75^\circ \) ohms per phase, a total shunt admittance to neutral per phase of \( 1 \times 10^{-3} \angle 90^\circ \) Siemens. Find the constant of equivalent \( \pi \) circuit.

OR

2'(a) What do you mean by corona? What are its ill effects? Discuss the factors on which corona power loss depends.

(b) A 3-ph transmission line has the following circuit constants:
\[ A_1 = 0.97 \angle 0^\circ, B_1 = 60 \angle 70^\circ \text{ Ohms/phase}. \]
If a second line having constants
\[ A_2 = 0.97 \angle 0^\circ, B_2 = 50 \angle 76^\circ \text{ Ohms/phase}, \]
is connected in parallel with the first line, determine the sending-end voltage when delivering 50 MW at 132 KV at 0.8 lagging power factor at the receiving-end.

Q3(a) Explain clearly:

(I) Why the voltage distribution across the units of a string insulator is not uniform?

(II) Why it is necessary to test the insulators under power frequency and impulse voltages?

(b) The following data refer to a transmission line supported on level supports:

- Span length: \(-220\) m
- Conductor X sectional area: \(120 \text{ mm}^2\)
- Conductor weight: \(1.2 \text{ kg/m}\)
- Conductor configuration: \(37/2.11 \text{ mm}\)
- Ultimate tensile stress of conductor: \(42.2 \text{ Kg/mm}^2\)
- Factor of safety: \(4\)
- Wind pressure: \(55 \text{ Kg/m}^2\)
- Thickness of ice coating: \(12 \text{ mm}\)
- Density of ice: \(913 \text{ kg/m}^3\)

Find vertical and deflected sags.
Q3'(a) (I) What is sag template? How are they prepared? What is its utility? (6)

(II) Write a short note on conductor vibrations.

(b) A string of five suspension insulators is to be fitted with a guard ring. If the pin to earth capacitances are equal to C, find the values of line to pin capacitances that would give a uniform distribution across the various units of the string.

Q4(a) Enumerate the advantages of pressurized cables over the solid cables. With the help of a neat diagram discuss the constructional details of sheath channel oil filled cable.

OR

(a') Derive an expression to determine the current carrying capacity of a cable, also mention the assumption made.

(b) Find the maximum working voltage of single core cable having two insulating materials A and B and following data.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor radius</td>
<td>0.5cm</td>
</tr>
<tr>
<td>Overall radius of cable under sheath</td>
<td>2.5cm</td>
</tr>
<tr>
<td>Maximum working potential gradient of A</td>
<td>60 KV/cm</td>
</tr>
<tr>
<td>Maximum working potential gradient of B</td>
<td>50 KV/cm</td>
</tr>
<tr>
<td>Relative permittivity of A</td>
<td>4</td>
</tr>
<tr>
<td>Relative permittivity of B</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Q5(a) What is the necessity of earthing of electrical installations? Define and obtain expressions for step and touch potentials.

(b) Define a “Sub-station”. How are they classified? Draw a single line diagram of an indoor sub-station also discuss the various factors to be considered while deciding the site for it.
2014-2015
B. TECH. III SEMESTER EXAMINATION
Electrical Engineering
Circuit Theory
EF-276

Maximum Marks: 60
Credits: 04
Duration: Three Hours

Answer any FIVE questions.
Assume suitable data, if missing.
Notations used have their usual meaning.
All the resistances, reactances, and impedances are in Ohms.

Q.No.  Question  M.M.
1(a)  Determine the value of $Z_L$ for maximum power absorbed in the network shown in Fig. 1. Also calculate the amount of maximum power. [06]

(b)  A resistance $R$ and a capacitor of 2 µF are connected in series across a 200 V dc supply. Across the capacitor there is a neon lamp that strikes at 120 Volts. Calculate the value of $R$ to make the lamp strike 5 seconds after the switch has been closed.

OR

1'(a)  Find total sinusoidal response of a series $R$-$C$ circuit using phasor transform method. [08]

(b)  State and explain Thevenin’s Theorem. Verify this theorem for the circuit shown in Fig. 2. [06]

2(a)  Two two-port networks are to be connected in series. Draw the connection diagram and show that the open circuit impedance parameter matrix of the resultant network is the sum of open circuit impedance matrices of the individual networks. [06]

(b)  Determine the ‘y’ parameters of the circuit shown in Fig. 3. Check the conditions for symmetry and reciprocity. [06]

Contd...
2' (a) Two two-port networks are to be connected in parallel. Draw the connection diagram and show that the short circuit admittance parameter matrix of the resultant network is the sum of short circuit admittance matrices of the individual networks.

(b) Determine the 'Z' parameters of the circuit shown in Fig. 3. Check the conditions for symmetry and reciprocity.

3(a) Mention necessary conditions for a network function to be the driving-point function with same common factors in numerator and denominator polynomials.

(b) Draw the pole-zero diagram for impedance function $Z(s)$ of the circuit shown in Fig. 4. Draw also the magnitude and phase angle characteristics of $Z(s)$ as a function of frequency.

OR

3' (a) Mention necessary conditions for a network function to be the transfer function with same common factors in numerator and denominator polynomials.

(b) Determine $Z_{11}(s)$ and $C_{21}(s)$ for the network shown in Fig. 5.

4(a) Draw all possible Trees and corresponding Co-Trees for the graph of network shown Fig. 6.

(b) The oriented graph of a network has been shown in Fig. 7. If element numbers 1, 3, 4, 5 and 6 are considered as twigs of the tree, and the rest elements as links, determine the fundamental loop matrix of the tree.

5(a) Write the state equation in matrix form for the network shown in Fig. 8.

(b) Differentiate between low pass and high pass filters. Design a high pass filter having a cut-off frequency of $2 \text{ KHz}$ with a load resistance of $500 \Omega$.

contd...
Q.No. | Question | M.M.
--- | --- | ---
1(a) | What is Meissner effect. Also show that superconducting material is a perfect diamagnetic. | [06]
1(b) | What is the process of direct emission of electrons from metals. Discuss any three types of electron emission in brief. | [06]
1(b') | The following data is known for copper:
Density=8.92 g/cc, Resistivity=1.73×10⁻⁸ Ωm, Atomic weight=63.5 g
Calculate the mobility and the average time of collision of the electrons in copper. | [06]
2(a) | Explain the following group of solids in connection with their dielectric behavior:
(a) Ionic dielectrics without permanent dipoles
(b) Solids containing permanent dipole moments. | [06]
2(b) | Why in solids and liquids internal field is not equal to external field. Also drive the following relationship:
\[ \bar{E}_i = \bar{E} + \frac{\mu}{\varepsilon} \bar{F} \] | [06]
2(b') | Drive the relation:
\[ P = \varepsilon_0 \chi_e E \]
where: P=Polarization, \( \chi_e \)=Electric Susceptibility, E=Electric Field | [06]
3(a) | Discuss the dipole theory of ferroelectricity. Also draw the hysteresis curve for both the conditions when the temperature less than and greater than the Curie temperature. | [05]
3(b) Explain different mechanism related to the breakdown in liquid dielectrics. [06]

4(a) Drive the relationship for the magnetic dipole moment of current loop. [04]

4(b) Show that there is no spontaneous magnetization above Neel temperature for antiferromagnetic materials. [08]

OR

4(a') Explain different magnetic materials which have permanent magnetic dipole moment. [04]

4(b') Prove the following relationship for the ferromagnetic material:

\[
\frac{M}{H} = \frac{C}{T-O}
\]

Where: \(M\) = magnetization, \(H\) = magnetic field, \(C\) = Curie constant, \(O\) = Curie temperature, \(T\) = Temperature. Also explain the second hypothesis of Weiss. [08]

5(a) What are the properties and types of insulating materials used in the construction of power and distribution transformers? [06]

5(b) What is Ferrite? What are the different applications of Ferrites? [06]
2014-15
B.TECH. (AUTUMN SEMESTER) EXAMINATION
ELECTRICAL ENGINEERING
ELECTRONIC DEVICES AND CIRCUITS
EL-201

Maximum Marks: 60
Credits: 04
Duration: Three Hours

Answer all the questions.
Assume suitable data if missing.
Notations used have their usual meaning.

Q.No.  Question                                      M.M.

1(a)   Derive an expression for a.c. or small-signal resistance \( r_0 \) of a diode. Find \( r_0 \) at bias current of 0.1 mA, 1 mA, and 10 mA. Assume \( n = 1 \). [06]

1(b)   Discuss the operation and application of schottky barrier diode. [06]

OR

1'(a)  For a pn junction with \( N_A = 10^{17}/\text{cm}^3 \) and \( N_D = 10^{16}/\text{cm}^3 \), operating at \( T = 300 \text{K} \), a junction area of 2500 \( \mu \text{m}^2 \), \( n_i = 1.5 \times 10^{10}/\text{cm}^3 \), \( m = \frac{1}{2} \), and the value of \( V_0 = 0.723 \text{V} \), find:

(a) the value of \( C_{j0} \) per unit junction area. [8]

(b) the capacitance \( C_j \) at a reverse-bias voltage of 2V.

1'(b)  Explain the construction and working of a photodiode. [4]

2(a)   For the circuit shown in Fig. 2(a), assume that \( \beta \) and all the capacitances are very large and \( V_T = 25 \text{mV} \). Find the following quantities for the amplifier: (neglect the early effect)

1. DC collector current \( (I_C) \)
2. Input resistance
3. Voltage gain
4. Output resistance [12]

contd-2
OR

2'(b) For the circuit shown in Fig. 2'(b), $I = 4mA$, $k_e(W/L) = 0.5mA/V^2$, $V_{DD} = V_{SS} = 12V$, $V_A = 100V$, $R_g = 10K\Omega$ and $R_L = 2K\Omega$. Find the following quantities for the amplifier: (assume that all capacitances are very large)

1. Transconductance ($g_{m}$)
2. Input resistance
3. Voltage gain
4. Output resistance

Fig. 2'(b)
3(a) For the circuits shown in Fig. 3(a) with $V_{cc} = 10V$, $I = 1mA$, $\beta = 100$, $R_B = 100\,K\Omega$, and $R_C = 7.5K\Omega$, find the d.c. voltage at the base, the emitter, and the collector. For $V_{bb} = 10V$, find the required value of $R$ in order for the circuit of Fig. (b), to implement the current-source $I$.

![Circuit Diagram](image)

(a) Fig. 3(a)

(b) Fig. 3(b)

3(b) For the circuit of an output stage of a power amplifier shown in Fig. 3(b),

(a) Identify the class to which the output stage belongs.

(b) Explain the circuit operation with the help of transfer characteristics and input/output signal waveforms.

(c) Derive an expression for the Power-Conversion Efficiency.

(d) Estimate the maximum attainable efficiency.
4(a) Explain the concept of negative feedback. How the introduction of negative feedback increases bandwidth of an amplifier? [05]

4(b) Derive the frequency and condition of oscillation for the Hartley oscillator circuit using BJT. [07]

5(a) Find the output voltage of the circuit shown in Fig. 5(a). [06]

5(b) How can the opamp be employed to yield logarithmic and anti-logarithmic amplifier? [06]
1. a. What is monopoly? Give examples of some situations where it would be beneficial. 04
   Also explain how the price of a product may be determined in a monopoly. 04
   b. Explain the Law of Diminishing returns with suitable examples. 04
   c. A company 3 years ago borrowed Rs. 40,000 to pay for a new machine tool agreeing to repay the loan in 100 monthly instalments at an annual nominal interest rate of 12% compounded monthly. The company now wants to pay off the loan. How much would this payment be, assuming no penalty cost for early payment? 04

OR

1. a. What is inflation? What are its causes? How does it affect the economy of a nation? 06
   b. Machines that have the following costs are under consideration for a robotized welding process. Using an interest rate of 10% per year, determine which alternative should be selected:

<table>
<thead>
<tr>
<th>Machine X</th>
<th>Machine Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Cost (Rs)</td>
<td>250,000</td>
</tr>
<tr>
<td>Annual operating cost (Rs/year)</td>
<td>60,000</td>
</tr>
<tr>
<td>Salvage Value (Rs)</td>
<td>70,000</td>
</tr>
<tr>
<td>Life (Years)</td>
<td>2</td>
</tr>
</tbody>
</table>

2. a. What is depreciation? What is the need for calculating it? 06
   b. Differentiate between defender and challenger.

   It is proposed to replace a two-year-old precision measuring instrument immediately. The expected costs and lives of the two instruments are as follows:

<table>
<thead>
<tr>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original purchase price (Rs.)</td>
<td>30,000</td>
</tr>
<tr>
<td>Current market value (Rs.)</td>
<td>17,000</td>
</tr>
<tr>
<td>Remaining life (years)</td>
<td>5</td>
</tr>
<tr>
<td>Estimated value in 3 years (Rs.)</td>
<td>9,000</td>
</tr>
<tr>
<td>Annual operating cost (Rs.)</td>
<td>8,000</td>
</tr>
</tbody>
</table>

   Perform the replacement study for a 3-year replacement period.

   c. Five interdependent proposals are under consideration for a particular project. The present worth of capital requirement and benefits for each proposal are as follows:

<table>
<thead>
<tr>
<th>Alternative</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>PW of Capital (Rs.)</td>
<td>80,000</td>
<td>50,000</td>
<td>72,000</td>
<td>43,000</td>
<td>81,000</td>
</tr>
<tr>
<td>PW of Benefits (Rs.)</td>
<td>70,000</td>
<td>55,000</td>
<td>76,000</td>
<td>52,000</td>
<td>84,000</td>
</tr>
</tbody>
</table>

   Select the best proposal on the basis of an incremental B/C analysis.
3. a. What is the significance of decision making tools? Discuss any one decision making tool with suitable examples.
   b. What are the major areas of social responsibility of corporate sector? Discuss the implications of corporate involvement in social causes.

OR

3'. a. Discuss the role of information in the manager's job. Also, state the characteristics of useful information.
   b. Discuss the Administrative model of decision making.

4. a. Why are organisational goals important? How are they classified? What are the differences between strategic goals and tactical goals?
   b. Differentiate between:
      i. Job enlargement and Job enrichment
      ii. Functional departmentalization and Product departmentalization

OR

4'. a. Discuss how control helps the organization. What are the steps involved in the control process?
   b. How is authority different from power? Differentiate between line and staff authority with suitable examples.

5. a. Explain the Q/R inventory system.
   A company needs 24,000 units/year of a certain component which will be used in its main product. The ordering cost is $150 per order and the carrying cost per unit per year is 18% of the purchase price per unit. The purchase price per unit is $75. Find the economic order quantity.
   b. Demand for part number 1012 was 210 in January, 100 in February and 150 in March. The forecast for January was 140 units. With a smoothing constant of 0.30 and using first order exponential smoothing, what is the April forecast? Is 0.30 a good choice as a smoothing constant?
   c. Define Quality. Discuss the two aspects of quality. Name some quality control tools and explain any one of them.