1. (i) Write a note on colours of thin films.
(ii) Describe the FCC sub lattice and calculate its atomic packing factor.
(iii) Discuss the temperature dependence of magnetic susceptibility in dia, para and ferromagnetic materials.
(iv) How will you measure absorption coefficient of a material?
(v) What are matter waves? Derive the expression for de Broglie’s wavelength.
(vi) What are direct and indirect band gap semiconductors?

2. (a) State and explain Brewster’s law.
(b) Define Drift & Diffusion currents and derive Einstein’s equation.
(c) For copper density \( d = 8.92 \times 10^3 \) Kg/m\(^3\), resistivity \( \rho = 1.73 \times 10^{-8} \) \( \Omega \)-m, atomic weight \( M = 63.5 \). Calculate the mobility of the electrons in copper, obeying classical laws.

3. (a) What is population inversion and how can it be achieved?
(b) Explain the Principle, construction and working of a Nicol prism with neat diagram.
(c) Draw the diagram to show the variation of the Fermi level with temperature and impurity concentration in case of n-type semiconductor.

4. (a) Differentiate between soft and hard superconductors.
(b) Explain the three level and four level laser systems. What are the advantages of four level laser system over three level laser system?
(c) In Newton’s rings experiment, diameter of the tenth dark ring due to wavelength 6000Å in air is 0.5 cm. Find the radius of curvature of the lens.

5. (a) Explain the polarization mechanism in dielectrics.
(b) Explain BCS theory with key note of cooper pairs.
(c) State few applications of laser.

6. (a) What are the draw backs of classical free electron theory?
(b) What are the polar and non-polar dielectrics? Derive Clausius-Mosotti equation.
(c) Mention the applications of Josephson’s effect.

7. (a) Distinguish between n-type and p-type semiconductors.
(b) Derive an expression for electrical conductivity of a conducting material based on quantum mechanical treatment.
(c) The penetration depths for lead at 3 K and 7.1 K are 39.6nm and 173nm respectively. Calculate the critical temperature for lead.
PART-A
1.(i) What are Newton’s rings? Why are they circular?
(ii) Describe the BCC sub lattice and calculate its atomic packing factor.
(iii) Define magnetic susceptibility. Why is it negative for diamagnetic materials?
(iv) What are the necessary conditions of physically acceptable wave function?
(v) Write the Maxwell’s electromagnetic equations in differential or integral form.
(vi) How does the Fermi level change with temperature in extrinsic semiconductors?

PART-B
2.(a) Distinguish between Fresnel and Fraunhoffer diffractions.
(b) Define Drift & Diffusion currents and derive the expressions for drift and diffusion current densities.
(c) Find the relaxation time of conduction electrons in a metal if its resistivity is $1.54 \times 10^{-8} \Omega m$ and it has $5.8 \times 10^{28}$ conduction electrons per cubic metre.

3.(a) Explain Step Index and Graded index optical fibers.
(b) Give the theory of plane diffraction grating. Obtain the condition for the formation of $n^{th}$ order maximum.
(c) In a Hall coefficient experiment, a current of 0.25A is sent through a metal strip having thickness 0.2mm and width 5mm. The Hall voltage is found to be 0.15mV when a magnetic field of 2000 gauss is used. What is the carrier concentration?

4.(a) Derive the relation between polarization vector $\vec{P}$, the electric field $\vec{E}$ and displacement vector $\vec{D}$.
(b) Derive an expression for acceptance angle of fiber in terms of the refractive indices of core and cladding of an optical fiber. What is meant by acceptance cone?
(c) Distinguish between the spectra formed by a prism and a grating.

5.(a) How matter waves are different from Electromagnetic waves?
(b) Explain the electronic polarisability and show that electronic polarisability for a monochromatic gas increases as the size of the atoms becomes larger.
(c) Find the numerical aperture and acceptance angle of a fiber for a central mode A and fractional order modes B, C, D, E.
Subject Code: R13203/R13
I B. Tech II Semester Regular Examinations August - 2014
ENGINEERING PHYSICS
(Common to CE, ME, CSE, PCE, IT, Chem E, Aero E, Auto E, Min E, Pet E, Metal E)

Time: 3 hours
Max. Marks: 70

Question Paper Consists of Part-A and Part-B
Answering the question in Part-A is Compulsory,
Three Questions should be answered from Part-B

PART-A

1.(i) Write a note on colours of thin films.
(ii) Describe the FCC sub lattice and calculate its atomic packing factor.
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(iv) What are the necessary conditions of physically acceptable wave function?
(v) What are matter waves? Derive the expression for de Broglie’s wavelength.
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[4+4+3+3+4+4]

PART-B

2.(a) Distinguish between Fresnel and Fraunhoffer diffractions.
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[4+8+4]

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[4+8+4]

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(b) Explain BCS theory with key note of cooper pairs.
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[4+8+4]
PART-A

1.(i) What are Newton’s rings? Why are they circular?
(ii) Describe the BCC sub lattice and calculate its atomic packing factor.
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(iv) How will you measure absorption coefficient of a material?
(v) Write the Maxwell’s electromagnetic equations in differential or integral form.
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[4+4+3+3+4+4]

PART-B

2.(a) State and explain Brewster’s law.
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5.(a) How matter waves are different from Electromagnetic waves?
(b) Explain the electronic polarisability and show that electronic polarisability for a monochromatic gas increases as the size of the atoms becomes larger.
(c) Find the numerical aperture and acceptance angle of a fiber of core index 1.4 and fractional Set No - 4
**PART-A**

1.(i) Write down the properties of orthogonal matrix.

(ii) Write the nature of 

\[ 2y_1^2 + 4y_2^2 + 5y_3^2. \]

(iii) If A and B are non-singular matrices of same order, show that AB and BA have same eigen values.

(iv) Find the area of loop of the curve 

\[ r^2 = a^2 \cos\,2\theta. \]

(v) Find the moment of inertia of a circle A of radius R relative to the centre O.

(vi) Evaluate 

\[ \int_0^\infty \frac{x^6(1-x^{10})dx}{(1+x)^24}. \]

(vii) If \( F \) is a conservative vector field show that \( \text{curl } F = 0. \)

(viii) Write down the physical interpretation of Green’s theorem.

**PART – B**

2.(a) Reduce the matrix 

\[
\begin{bmatrix}
1 & 0 & -3 & 2 \\
0 & 1 & 4 & 5 \\
1 & 3 & 2 & 0 \\
1 & 1 & -2 & 0
\end{bmatrix}
\]

to normal form and find its rank.

(b) Solve, by Gauss-Seidal method, the equations

\[
\begin{align*}
9x - 2y + z - t &= 50 \\
x - 7y + 3z + t &= 20 \\
-2x + 2y + 7z + 2t &= 22 \\
x + y - 2z + 6t &= 18.
\end{align*}
\]

3. Diagonalise the matrix 

\[
A = \begin{bmatrix}
3 & -1 & 1 \\
-1 & 5 & -1 \\
1 & -1 & 3
\end{bmatrix}
\]

and hence find \( A^4. \)

4.(a) Find the volume of solid generated by the revolution of the cardioid 

\[ r = a (1 + \cos \theta) \]

about \( \theta = 0.\)

(b) Evaluate 

\[
\int_R (\sqrt{xy} - y^2)dx
dy
\]

where \( R \) is triangle with vertices at (0,0), (10,1), (1,1).

5.(a) Show that 

\[ \int_0^1 x^3 \left[ \log \left( \frac{1}{x} \right) \right]^4 dx = \frac{3}{128}. \]

(b) Prove that 

\[ \int_0^4 \sqrt{x} (4 - x)^\frac{3}{2} \ dx = \frac{64\beta(\frac{3}{2}, \frac{5}{2})}{5}. \]
6.(a) Find the angle between the surfaces \( x^2 + y^2 + z^2 = 9 \) and \( z = x^2 + y^2 - 3 \) at the point \((2, -1, 2)\)

(b) Prove that \( \nabla \left[ \nabla \cdot \frac{\vec{r}}{r} \right] = \frac{-2}{r^3} \frac{\vec{r}}{r} \) \[8+8\]

7.(a) Use Stokes theorem to evaluate the integral \( \int_C \mathbf{A} \cdot d\mathbf{r} \) where \( \mathbf{A} = 2y^2\mathbf{i} + 3x^2\mathbf{j} - (2x + z)\mathbf{k} \), and \( C \) is the boundary of the triangle whose vertices are \((0, 0, 0), (2, 0, 0), (2, 2, 0)\)

(b) Find the work done in moving a particle in the force field \( \mathbf{F} = 3x^2\mathbf{i} + \mathbf{j} + zk \) along the straight line from \((0, 0, 0)\) to \((2, 1, 3)\) \[8+8\]
Subject Code: R13202/R13
I B. Tech II Semester Regular Examinations August - 2014
MATHEMATICS-III
(Common to All Branches)

Time: 3 hours                                                                 Max. Marks: 70

Question Paper Consists of Part-A and Part-B
Answering the question in Part-A is Compulsory,
Three Questions should be answered from Part-B

PART-A

1.(i) Express \[
\begin{bmatrix}
3 & 7 \\
4 & 5
\end{bmatrix}
\] as sum of a symmetric and skew-symmetric matrices.
(ii) When does a non homogeneous system consistent?
(iii) Define the latent root and latent vector.
(iv) Find the volume of a sphere of radius ‘a’.
(v) Find the moment of inertia of a hollow sphere about a diameter. Its external and internal radii being 5 meters and 4 meters.
(vi) Evaluate \[\int_{0}^{\infty} \sqrt{x e^{-x^2}} \, dx\]
(vii) If \( A \) is a vector function, find \( \text{Div} (\text{Curl} \, A) \).
(viii) Write down the physical interpretation of Stoke’s theorem.

PART - B

2.(a) Reduce the matrix \[
\begin{bmatrix}
3 & 1 & 4 & 6 \\
2 & 1 & 2 & 4 \\
4 & 2 & 5 & 8 \\
1 & 1 & 2 & 2
\end{bmatrix}
\] to Echelon form and find its rank.
(b) Solve, by LU Decomposition method, the equations
\[
\begin{align*}
x + 2y + 3z &= 10 \\
3x + y + 2z &= 13 \\
2x + 3y + z &= 13.
\end{align*}
\]

3. Verify Cayley-Hamilton theorem for \( A = \begin{bmatrix} 2 & -1 & 0 \\ 3 & 1 & -1 \\ 2 & 0 & 3 \end{bmatrix} \) and hence find \( A^{-1} \).

4.(a) Find the length of the loop of the curve \( 3ay^2 = x(x - a) \)
(b) Find the volume of the solid generated by the revolution of the cardioid...
6. (a) Find the work done in moving a particle in the force field
   \( \mathbf{F} = 2x^2 \mathbf{i} + (2yz - x) \mathbf{j} + yk \) along the space curve \( x = 3t^2, y = t, z = 3t^2 - t \) from \( t=0 \) to \( t=1 \).

   (b) Prove that \( \text{curl} (a \times b) = a \cdot \text{div} b - b \cdot \text{div} a + (\mathbf{b} \cdot \nabla) a - (a \cdot \nabla) b \)

7. (a) Verify the divergence theorem for
   \( \mathbf{F} = 4xy \mathbf{i} - y^2 \mathbf{j} + xzk \), over the cube bounded by \( x = 0, \ x = 1, \ y = 0, \ y = 1, \ z = 0 \) and \( z = 1 \).

   (b) Evaluate \( \iint_S \mathbf{A} \cdot \mathbf{n} \, ds \) where \( \mathbf{A} = yzi + zxj + xyk \) and S is the part of the sphere \( x^2 + y^2 + z^2 = 9 \) which lies in the first octant.
PART-A

1.(i) Define rank of a matrix.
(ii) Write the nature of \(-3y_1^2 - 2y_2^2 - y_3^2\)
(iii) Find the matrix of the quadratic form \(q = x^2 - 6xy + 3y^2\).
(iv) Find the length of the arc \(ay^2 = x^3\) from the vertex to the ordinate \(x=5a\).
(v) Find the moment of inertia of a circle A of radius R relative to the centre O.
(vi) Define \(\beta\) and \(\Gamma\) functions and write the relation between them.
(vii) Show that \(V= 3y^4z^2i + 4xz^3j + 6x^2y^3k\) is solenoidal.
(viii) Write down the physical interpretation of Gauss’s divergence theorem.

3+3+3+3+2+3+2

PART – B

2.(a) Find the inverse of a matrix
\[
\begin{bmatrix}
-1 & -3 & 3 & -1 \\
1 & 1 & -1 & 0 \\
2 & -5 & 2 & -3 \\
-1 & 1 & 0 & 1
\end{bmatrix}
\]
using elementary operations.

(b) If consistent, solve the system of equations
\[
\begin{align*}
x + y + z + t &= 4 \\
x - z + 2t &= 2 \\
y + z - 3t &= -1 \\
x + 2y - z + t &= 3.
\end{align*}
\]

8+8

3.(a) Find the latent values and latent roots of the matrix \(A = \begin{bmatrix} 2 & 1 & 1 \\ 2 & 3 & 4 \\ -1 & -1 & -2 \end{bmatrix}\).

(b) Verify Cayley-Hamilton theorem and hence find \(A^{-1}\) if \(A = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix}\).
6. (a) Find the directional derivative of \( \phi(x, y, z) = xy^2 + yz^2 \) at the point (2, -1, 1) in the direction of \( i + 2j + 2k \)
(b) Prove that \( \text{Div}(A \times B) = B \cdot \text{curl} A - A \cdot \text{curl} B \)

7. (a) Evaluate using the divergence theorem \( \iint_S (\mathbf{F} \cdot \mathbf{n}) \, d\mathbf{s} \) where \( S \) is the surface of the sphere \( x^2 + y^2 + z^2 = b^2 \) in the first octant and \( \mathbf{F} = yi + zj + xk \)
(b) If \( \mathbf{A} = (3xy - 2y^2)i + (x - y)j \), evaluate \( \int_C \mathbf{A} \cdot d\mathbf{r} \) along the curve \( C \) in \( xy \)-plane given by \( y = x^3 \) from the point (0, 0) to (2, 8)
Subject Code: R13202/R13  
I B. Tech II Semester Regular Examinations August - 2014  
MATHEMATICS-III  
(Common to All Branches)  

Time: 3 hours  
Max. Marks: 70  

Question Paper Consists of Part-A and Part-B  
Answering the question in Part-A is Compulsory,  
Three Questions should be answered from Part-B  

PART-A  

1.(i) Show that \[
\begin{bmatrix}
-1 & 1 & -1 \\
3 & -3 & 3 \\
5 & -5 & 5
\end{bmatrix}
\] is idempotent.  
(ii) When does the non homogeneous system consistent?  
(iii) Define positive definite, negative definite and indefinite.  
(iv) Find the volume of a sphere of radius ‘a’.  
(v) Find the surface area of the solid generated by the revolution about the x-axis of the area bounded by the curves \( y = f(x) \), the x-axis the ordinates \( x = a, x = b \).  
(vi) Define Gamma function and Beta function and write the relation between them.  
(vii) Find the normal to the surface \[
\frac{x^2}{2} + \frac{y^2}{2} + 2z^2 = 26
\] at the point \((2, 2, 3)\).  
(viii) Write the statement of Green’s theorem.  

PART - B  

2.(a) If \[
\begin{bmatrix}
1 & -1 & -1 & 2 \\
4 & 2 & 2 & 2 \\
2 & 2 & 0 & -2
\end{bmatrix}
\], find two non-singular matrices \( P \) and \( Q \) such that \( PAQ \) is in the normal form.  
(b) Test for consistency and solve \[
\begin{align*}
5x + 3y + 7z &= 4 \\
3x + 26y + 2z &= 9 \\
7x + 2y + 10z &= 5.
\end{align*}
\]  

3. Reduce the quadratic form \[ q = x_1^2 + 2x_2^2 + 3x_3^2 + 4x_1x_2 - 2x_2x_3 + 6x_3x_1 \] into a canonical form by diagonalising the matrix of the quadratic form.  

4.(a) Trace the curve \( y = \frac{x^2 + 2x}{x^2 + 1} \).  
(b) Find the volume of the solid generated by the revolution of the curve
6. (a) Show that the vector \[(x^2 - yz)i + (y^2 - zx)j + (z^2 - xy)k\] is irrotational and find the scalar potential.
   
   (b) Find the acute angle between the surface \(xy^2z = 2\) and \(x^2 + y^2 + z^2 = 6\) at the point \((2, 1, 1)\). \[8+8\]

7.(a) Verify the divergence theorem for \(\mathbf{F} = 4xyi - y^2j + xzk\), over the cube bounded by \(x = 0, x = 1, y = 0, y = 1, z=0\) and \(z = 1\).
   
   (b) Evaluate \(\iint_S (\text{curl} \mathbf{A}) \cdot \mathbf{n} \, ds\) where \(\mathbf{A} = yi + (x - 2z)j - xyk\) and \(S\) is the surface of the sphere \(x^2 + y^2 + z^2 = 4\) above the \(xy\)-plane. \[8+8\]
PART-A

1.(i) Write iterative scheme to find the $n^{th}$ root of a real number $K(>0)$.
(ii) Find $\Delta \log f(x)$.
(iii) Find half range Fourier sine series of $f(x) = e^x$ in $(0, 1)$.
(iv) Prove that $Z(\sinh nt) = \frac{z \sinh t}{z^2 - 2z \cosh t + 1}$.
(v) Using Euler’s method, find the value of $y(0.5)$ (take $h = 0.25$) and compare with the exact solution of the equation $y' = x + y, \ y(0) = 1$
(vi) If $F_n$ is complex Fourier transform of $f(x)$, then find the complex Fourier transform of $f(x) \sin ax$.

[3+3+3+3+5+5]

PART – B

2.(a) Using Newton-Raphson method find the root of the equation $x + \log_{10} x = 3.375$ correct to four decimal places.
(b) The population of a town in the decimal census is given below. Estimate the population of a town for the year 1895

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Y</td>
<td>146</td>
<td>166</td>
<td>181</td>
<td>193</td>
<td>201</td>
</tr>
</tbody>
</table>

[8+8]

3.(a) Find positive root of $x^3 - 5x + 3 = 0$ using Regula falsi method up to 4 steps.
(b) Using Lagrange’s interpolation formulae find the value of $y(12)$ from the data

<table>
<thead>
<tr>
<th>X</th>
<th>5</th>
<th>7</th>
<th>9</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>11</td>
<td>13</td>
<td>18</td>
<td>27</td>
</tr>
</tbody>
</table>

[8+8]

4.(a) Solve $y' = x^2 y + 1, \ y(0) = 1$ using Taylors method up to $3^{rd}$ degree term and compute $y(0.1)$.
(b) Find the fourier series of $f(x) = x \sin x$ in $(-\pi, \pi)$.

[8+8]
5. (a) Find half range cosine series of \( f(x) = \begin{cases} 1, & 0 < x < \frac{\pi}{2} \\ -1, & \frac{\pi}{2} < x < \pi \end{cases} \).

(b) Use Runge-Kutta 4th to compute \( y(1.25) \) given that \( \frac{dy}{dx} = \frac{x^2 + y}{x} \), \( y(1) = 2 \).

6. (a) Find Fourier transform \( f(x) = \begin{cases} x, & |x| \leq 1 \\ 0, & |x| > 1 \end{cases} \).

(b) Find Z-transform of \( n a^n \).

7. (a) Find Fourier sine transform of \( e^{-x} \) and hence deduce the inversion formula.

(b) Solve the difference equation \( u_{n+2} - u_n = 2^n \), \( u_0 = 0 \), \( u_1 = 1 \), using Z-transforms.
Subject Code: R13207/R13  
I B. Tech II Semester Regular Examinations August - 2014  
MATHEMATICS-II (MATHEMATICAL METHODS)  
(Common to CE, ME, CSE, PCE, IT, Chem E, Aero E, Auto E, Min E, Pet E, Metal E)  

**PART-A**

1. (i) Using bisection method find the first four approximations to the real root of $3^x = e^x$.

(ii) Prove that $\Delta \frac{1}{f(x)} = -\Delta f(x) \frac{1}{f(x)f(x+1)}$.

(iii) If $Z(n^2) = \frac{z^2 + z}{(z-1)^2}$ find $Z(n^3)$.

(iv) Find the Half range Fourier sine series of $f(x) = |x|$ in $(0, 1)$.

(v) If $y' = 2x - y$, $y(0) = 3$, find the solution, up to third degree term, using Picard’s method.

(vi) Prove $F[x^n f(x)] = (-i)^n \frac{d^n}{dp^n} [F(p)]$.

**PART – B**

2. (a) Using Newton – Raphson method, find a root of the equation $2x - 3\sin x = 5$ near $x = 5$ correct to three decimal places.

(b) Given that $f(6500) = 80.8084$, $f(6510) = 80.6846$, $f(6520) = 80.7456$, $f(6530) = 80.8084$, find $f(6526)$ using Gauss backward interpolation formula.

3. (a) Find a positive root of $2x^3 + \cos x$ by using Newton-Raphson method correct to three decimal places. (Use Bisection method for the first approximation).

(b) Using Lagrange’s Interpolation formula for the value of $y(6)$ given the following table

<table>
<thead>
<tr>
<th>X</th>
<th>1</th>
<th>2.5</th>
<th>5</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>2.25</td>
<td>4.13</td>
<td>7.25</td>
<td>9.0</td>
</tr>
</tbody>
</table>

4. (a) Solve $y' = y + x$, $y(0) = 1$ using Picard’s method up to third approximation and hence
6. (a) Find the Fourier transform of \( \frac{1}{\sqrt{|x|}} \).

(b) Find Z-transform of \( n^2 e^{\alpha n} \).

[8+8]

7. (a) Find Fourier cosine transform of \( \frac{1}{1 + x^2} \) and hence find Fourier sine transform of \( \frac{x}{1 + x^2} \).

(b) Solve \( y(n + 2) + 3y(n + 1) + 2y(n) = 0, \ y(0) = 0, \ y(1) = 1 \) using Z-Transform.

[8+8]
1. (i) Find reciprocal of a real number 19 using Regula falsi method.
(ii) Expand the shift operator $E$ in terms of exponential function.
(iii) Employ Taylor’s method to obtain the values of $y(1.1)$ for the differential equation
$y' = xy^{1/3}$, $y(1) = 1$.
(iv) A sinusoidal voltage $E \cos \omega t$ is passed through a half wave rectifier which clips the negative portion of the wave. Develop the resulting periodic function
$u(t) = \begin{cases} 0, & -\frac{T}{2} < t < 0 \\ E \cos \omega t, & 0 < t < \frac{T}{2} \end{cases}$, $T = \frac{2\pi}{\omega}$ as Fourier series.
(v) Prove that $F \left[ \frac{d}{dx} F(x) \right] = -pF'(p)$
(vi) Find the Z-transform of $\sin((n+1)t)$.

2. (a) By using Regula-Falsi method for a real root of $xe^x = 2$ up to 4 stages.
(b) Using a forward difference formula, find $y(11)$ from the given table

<table>
<thead>
<tr>
<th>X</th>
<th>1</th>
<th>6</th>
<th>11</th>
<th>16</th>
<th>21</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>5</td>
<td>10</td>
<td>14</td>
<td>18</td>
<td>24</td>
<td>32</td>
</tr>
</tbody>
</table>

3. (a) Using Newton-Raphson formula, find the root of $e^x - x^3 + \cos 25x = 0$ around $x = 4.5$ correct to 3 decimal places.
4. (a) Using Euler’s method, solve for \( y(0.6) \) from \( y' = -2xy, \ y(0) = 1 \) using step size 0.2.

(b) Find the Fourier series of \( f(x) = \begin{cases} 
0, & -\pi < x < 0 \\
\frac{\pi}{4}, & 0 < x < \pi
\end{cases} \) .

5. (a) Represent the function as Fourier cosine series \( f(x) = \begin{cases} 
\frac{\pi}{2}, & 0 < x < \frac{\pi}{2} \\
\pi - x, & \frac{\pi}{2} < x < \pi
\end{cases} \) .

(b) Use Runge-Kutta 4th order to compute \( y(1.2) \) for the equation \( y' = \frac{x^2 + y}{x}, \ y(1) = 2 \) .

6. (a) Find the Fourier cosine transform of \( e^{-ax}/x \) .

(b) Find \( Z^{-1}\left[\frac{8z-z^3}{(4-z)}\right] \) .

7. (a) Find Fourier cosine transform of \( f(x) = \begin{cases} 
x, & 0 < x \leq a \\
0, & 0 > x \geq a
\end{cases} \) .

(b) Solve \( u_{n+2} - 6u_{n+1} + 9u_n = 0 \) using Z-transform.
1. (i) Evaluate $\sqrt{29}$ to four decimal places by Newton-Raphson method.

(ii) If the interval of differencing is unity, find $\Delta^2 \sin(px + q)$.

(iii) Using Taylor’s series method obtain $y(0.2)$ for the differential equation

$$y' + 2y = 3e^{2x}, y(0) = 0.$$  

(iv) Find the Fourier series of $f(x) = |\cos x|$ in $(-\pi, \pi)$.

(v) Find Fourier transform of $f(x) = \begin{cases} 1, & 0 < x < a \\ 0, & x < 0 or x > a \end{cases}$.

(vi) Prove that $Z(\cos nt) = \frac{z(z - \cos t)}{z^2 - 2z \cos t + 1}$.

PART – B

2. (a) Find a real root of $x^3 - 4x - 9 = 0$ using Bisection method up to 4 stages.

(b) Using Gauss Backward difference polynomial, find $y(5)$ given that

<table>
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<td>5</td>
<td>11</td>
<td>13</td>
<td>15</td>
<td>17</td>
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3. (a) Using Newton-Raphson method, find a positive root of $\cos x - xe^x = 0$ up to four decimal places.

(b) Using Lagrange’s Interpolation, find $f(12)$, given that

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<td>Y</td>
<td>5</td>
<td>12</td>
<td>13</td>
<td>21</td>
</tr>
</tbody>
</table>
5. (a) Represent the function as Fourier sine series \( f(x) = \begin{cases} \frac{\pi}{2}, & 0 < x < \frac{\pi}{2} \\ \pi - x, & \frac{\pi}{2} < x < \pi \end{cases} \).

(b) Estimate \( y(0.2) \), given \( y' = 3x + y, y(0) = 1 \) using Runge-Kutta 4th order. \([8+8]\)

6. (a) Find Fourier cosine transform of \( \frac{e^{-ax}}{x} \).

(b) Find the Z-transform of \( \{x(n)\} = n z^n \) \([8+8]\)

7. (a) Find Fourier transform of \( f(x) = \begin{cases} \frac{1}{2a}, & |x| \leq a \\ 0, & |x| > a \end{cases} \).

(b) Solve \( u_{n+2} - u_n = 2^n, u_0 = 0, u_1 = 1 \) using Z-transform. \([8+8]\)
PART-A

1. (i) Explain the meaning of accountability.
(ii) What are values? Explain how values have degenerated.
(iii) Explain the meaning of moral leadership.
(iv) Discuss the aim of engineering ethics.
(v) Discuss the need to focus on professional ethics.
(vi) Write a short note on industrial standards.
(vii) Write about ‘employee rights’.

[3+3+3+3+3+3+4]

PART-B

2. Discuss the relationship between professional responsibility and loyalty to company?

[16]

3. What are the aspects of engineering that make it appropriate to view engineering projects as experiments?

[16]

4. Write briefly on
   (a) honesty
   (b) living peacefully
   (c) civic virtue
   (d) integrity.

[4+4+4+4]

5. What is Indian scenario in accordance with ‘Intellectual Property Rights, IPR’?

[16]

6. Write short notes on
   (a) Types of inquiry
   (b) HEINZ’s Dilemma

[8+8]

7. Write about safety and engineer and risk benefit analysis.

[16]
PART-A

1. (i) What are threshold levels for risk?  
(ii) Write about human values.  
(iii) Give an account of History of Ethics.  
(iv) What is contextualism?  
(v) What are the limitations of code of ethics?  
(vi) What is meant by loyalty and collegiality?  
(vii) What are the responsibilities of engineers to society?  

[3+3+3+3+3+3+4]

PART-B

2. Explain in detail about the effect of information on risk assessments.  

[16]

3. Define and explain personal ethics and professional ethics.  

[16]

4. What do you understand by environmental ethics?  

[16]

5. Write a short note on  
   (a) Industrial standards  
   (b) Regulated society.  

[8+8]

6. Explain the levels of moral development suggested by Kohlberg.  

[16]

7. ‘Professional rights can lead to conflicts of interest’. Explain.  

[16]
I B. Tech II Semester Regular Examinations August - 2014
PROFESSIONAL ETHICS & HUMAN VALUES
(Common to CE, ME, CSE, PCE, IT, Chem E, Aero E, Auto E, Min E, Pet E, Metal E)

Time: 3 hours
Max. Marks: 70

Question Paper Consists of Part-A and Part-B
Answering the question in Part-A is Compulsory,
Three Questions should be answered from Part-B

PART-A

1. (i) What are the three senses of relative values?
   (ii) How courage is considered to be a virtue?
   (iii) What are the uses of ethical theories?
   (iv) Write short notes on concept of safety.
   (v) What is Integrity?
   (vi) What do you understand by experimental control?
   (vii) What are the responsibilities of engineers to society?

   [3+3+3+3+3+3+4]

PART-B

2. Explain in detail the effect of information on risk assessments.
   (a) Designing for Safety.
   (b) Types of Risks.

   [8+8]

3. Explain in detail
   (a) Peace
   (b) Non violence
   (c) Right conduct
   (d) Respect for others

   [4+4+4+4]

4. Write about the standards to the maintained by an Engineer in order to make a successful project, within the limitations of norms and ethics.

   [16]

5. (a) What conclusions were made by Gilligan about men and women?
    (b) Bring out the differences between profession and professionalism.

   [8+8]
1. (i) Write a brief account on ‘utilitarianism’.
 (ii) ‘Conscientiousness is blind without relevant information’. Justify.
 (iii) How courage is considered as virtue?
 (iv) What is meant by globalization?
 (v) Explain types of inquiry.
 (vi) What degree of risk is acceptable in an experiment to make a new product?
 (vii) Discuss in detail about the employee rights.

PART-B

2. Explain in detail about the Intellectual Property Rights.

3. Analyze the attitude of different types of consumers with regard to safety. Discuss

4. Write about
   (a) Kohlberg’s theory
   (b) Professional Ethics.

5. Explain the relationship between professional responsibility and loyalty to company.

6. What are the general features of morally responsible engineers? Explain each feature with appropriate examples.

7. (a) How character is formed?
     (b) Explain the essence of Indian spirituality.
PART A

1.(i) Define ‘Climate’ in terms of E.R. Federov.
(ii) How has technology affected us negatively according to Schumancher?
(iii) What are the two kinds of technologies currently used to generate solar power on a large scale?
(iv) How is the idea of Samskara explained by Swami Vivekananda?
(v) How does Abdul Kalam describe the state of being in the “flow” of work?
(vi) Give an account of Bose’s experiments relating to plant responses.
(vii) Describe India’s journey towards space with Sarabhai’s initiation and intervention.

PART B

2.(a) Do you think technology has brought good changes in our lifestyle? Support your answer with the argument presented by E.F. Schumancher.
(b) Describe the beginning of the age of nuclear energy and India’s approach to it with Bhabha’s initiation.

3.(a) What makes water one of the most powerful and wonderful things on the earth according to C.V.Raman?
(b) Compare and contrast the reaction of Sambu and his mother to the film enacted by his father in the story “A Shadow”.

4.(a) What kind of work according to Abdul Kalam brings solace to man?
(b) Imagine that you are Mary Joseph of #32, Moonlight Apartments, Gikwada, Nagpur-440027. Your family is planning a holiday to Darjeeling. Write a letter to the Public Relations Officer, West Bengal Tourism Development Corporation, Netaji Indoor Stadium, Lee Road, Kolkata-700021, to enquire about the best time of the year to visit the town, how to get there, places of interest and hotel tariffs.

5.(a) Why in the present world we are showing great concern towards climatic changes? What could be the possible remedies for the problems caused due to climatic changes?
(b) Imagine that you are Divisional Engineer, Irrigation Projects. The new Minister of Irrigation has asked you to give a report on the steps taken to conserve water and make best use of water for irrigation canals in Andhra Pradesh.
6.(a) What kind of work are we doing in the present days and how different is it from the nature of work Swami Vivekananda proposed?

(b) Imagine that you are an engineering graduate from JNTU Kakinada. Write an e-mail to your Placement officer seeking his permission to attend an interview along with your juniors.

(c) Write a paragraph describing your college campus.

7.(a) Write the Synonyms for the following words.
  (i) inevitable
  (ii) infrastructure
  (iii) boundless
  (iv) visionary

(b) Write the Antonyms for the following words.
  (i) productive
  (ii) genius
  (iii) potent
  (iv) facilitate

(c) Rewrite the sentences as directed.
  (i) The scientist proved that the new virus is drug resistant. (change to passive voice)
  (ii) Was the lesson understood by you? (change to active voice)
  (iii) “Where are my glasses?”, Sheela asked Rachel. (change to indirect speech)
  (iv) The woman asked the tailor to make a skirt for her daughter. (change to direct speech).

(d) Fill in the blanks with the right word from the brackets.
  (i) There was a look of ___________on her face. (concern, worry)
  (ii) My aunt put her ___________arms around me. (fat, plump)
  (iii) Dictionaries also give us the right ___________ of the words. (pronunciation)
  (iv) The ___________ cleaner can also be used as sprayer. (vaccum, vacuum)
Subject Code: R13201/R13

I B. Tech II Semester Regular Examinations August-2014
ENGLISH-II
(Common to All Branches)

Time: 3 hours                                                                                   Max. Marks: 70

Question Paper Consists of Part-A and Part-B
Answering the question in Part-A is Compulsory.
Three Questions should be answered from Part-B

*****

PART-A

1.(i) What are the three crises modern world is facing due to technology?
(ii) How is technological advancement responsible for climatic changes in different regions of
the world?
(iii) Why does Spain figure among the top countries that are using solar power?
(iv) How does water help in the formation of fertile soil?
(v) What are the two ways in which we can work without expecting anything in return
according to Swami Vivekananda?
(vi) What was Bhabha’s view of nuclear physics?
(vii) Trace Sarabhai’s work relating to atomic energy.

3+3+3+3+3+3+4

PART-B

2.(a) In what ways can emerging technologies help humanity? What are their disadvantages?
(b) Give an account of Bose’s efforts to set up research institutes in India. Why did he feel the
need to do so?

8+8

3.(a) What is the main idea of the passage, “Work Brings Solace” by APJ Abdul Kalam?
(b) Give a brief account of the story “A Shadow” by R.K. Narayan.

8+8

4.(a) What according to Swami Vivekananda brings misery to life and when can people be free of
it completely?
(b) Imagine that you are Sumanth Roy, D. No: 12-156/4, Monsoon Street, Hazal Bagh, New
Delhi-110047. You bought a refrigerator from Rajkamal Electronics Private Limited,
14/276, South Extension-2, New Delhi-110049 on 5th July, 2014. You realized that the
refrigerator is defective. Write a letter to Mr. Subratha Sen, Customer Service Manager of
that company asking for a replacement.

8+8

5.(a) What is the alternative technology suggested by E.F. Schumancher and how would it make
the present world better?
(b) You are the Joint Director of Technical Education for JNTU Hyderabad. You are asked by
the Director, Department of Technical Education, Telangana state to study and evaluate the
infrastructure qualified teaching staff, furniture, equipment, classrooms, workshops, labs,
computer centres, hostels and libraries available in private engineering colleges affiliated to
JNTU Kakinada. The information you give can be fictitious.

8+8
6.(a) Why is water called the “Elixir of Life”? What are the ways of preventing its wastage?
(b) Write paragraph describing a student event at your college.
(c) Write an e-mail to your principal with a copy to Dean, Students Affairs requesting him to provide a regular doctor for the health center in your college. Give the list of other requirements like increasing the beds, separate room for girls etc.

7.(a) Write the Synonyms for the following words.
   (i) skeptical
   (ii) immortality
   (iii) disbursed
   (iv) consent
(b) Write the Antonyms for the following words.
   (i) confident
   (ii) impartial
   (iii) natural
   (iv) elaborate
(c) Fill in the blanks choosing the appropriate word from the brackets.
   (i) The young man who attended the interview seemed ________________, very innocent and humble. (childish, childlike)
   (ii) Gandhiji led a ________________ life in London. (frugal, miserly)
   (iii) When his son was talking about an Adroid phone, Ravi said, “I didn’t ___________ what you are saying”. (get, comprehend)
   (iv) The principal called the teachers who were irregular and told them that he cannot ___________ employees with that attitude. (tolerate, put up with)

(d) Rewrite the following sentences as directed.
   (i) Is the building material sold by them? (change to active voice)
   (ii) We know that many species of plants and animals are in danger of extinction. (change to passive voice)
   (iii) “I am reading an interesting story”, said Rahim. (change to indirect speech)
   (iv) You said that you wanted to get your sister a book. (change to direct speech)
Subject Code: R13201/R13

I B. Tech II Semester Regular Examinations August-2014
ENGLISH-II
(Common to All Branches)

Time: 3 hours                        Max. Marks: 70

Question Paper Consists of Part-A and Part-B
Answering the question in Part-A is Compulsory,
Three Questions should be answered from Part-B

PART-A

1. (i) What are the three main strategies suggested by E.K. Federov to face the inevitable climatic changes?
(ii) What is the main difference between the systems of mass production and production by the masses as indicated by E.F. Schumancher?
(iii) Mention two current and two long term applications of nanotechnology.
(iv) Compare and contrast human beings with tortoise as presented by Swami Vivekananda.
(v) How does water help in the formation of fertile land?
(vi) Describe how space research took off in India despite the setback that Rohini II faced.
(vii) “Bhabha had a passion for order”. Support this statement with examples.

PART-B

2. (a) What is the argument that E.K. Federov presented in the passage, “Climatic Changes and Human Strategy”?
(b) Give an account of achievements of J. C. Bose. [8+8]

3. (a) Do you think technology has brought good changes in our life style? Support your answer with the argument presented by E.F. Schumancher.
(b) Describe Sambu’s reactions to the film in which his father had acted from the time of it’s released to the last show he saw. [8+8]

4. (a) What kind of attachment and detachment do we need to have towards work as per Swami Vivekananda?
(b) Imagine you are Vijay Dany, Manager, Jyothi Book Depot, Near RTC Complext, M.G. Road, Visakhapatnam-520003. You have several orders from schools for children’s books. So you would like to get the titles of the books from PHI Learning Private Limited, Rimjhim House, 111, Patparjang, Industrial Estate, New Delhi-110092. Write a letter to the Publishing House Manager, Mr. Ajay Bharadwaj asking to the details of the same. [8+8]

5. (a) What is the difference between being a workaholic and being committed to work according to Abdul Kalam? Present his other ideas on work.
(b) You are the Joint Director of Technical Education for JNTU Kakinada. You are asked by the Director, Department of Technical Education, Andhra Pradesh to study and evaluate the infrastructure qualified teaching staff, furniture, equipment, classrooms, workshops, labs, computer centres, hostels and libraries available in the private engineering colleges affiliated to JNTU Kakinada. The information you give can be fictitious. [8+8]
6. (a) Why is water called the “Elixir of Life” and what are the ways of preventing its wastage?
   (b) Write an e-mail to your head of the department along with a copy to your principal seeking their permission on behalf of your class to go on an industrial tour for about 5 days.
   (c) Write a paragraph describing the celebration of a festival of your choice.

7. (a) Write the Synonyms for the following words.
   (i) enhanced
   (ii) moderate
   (iii) resilient
   (iv) stalwart

(b) Write the Antonyms for the following words.
   (i) enabled
   (ii) inexhaustible
   (iii) desirable
   (iv) avoidable

(c) Fill in the blanks choosing the appropriate word from the brackets.
   (i) Harish is very dynamic and has become a good __________________ (entrepreneur, enterpreneur)
   (ii) Dr. Latha is an eye specialist. She is an _____________ (optician, ophthalmologist)
   (iii) The yoga teacher _____________ the asanas to his students. (showed, demonstrated)
   (iv) The Tatas were the first to ________________ a steel factory in Jamshedpur. (set up, establish)

(d) Rewrite the following sentences as directed.
   (i) When did the management shut down the factory? (Change to passive voice)
   (ii) Let him be given some money. (Change to active voice)
   (iii) I told myself that I must be brave. (Change to direct speech)
   (iv) She said, “Ranjan takes the 7 o’clock train everyday”. (Change to indirect speech)
PART-A

1. (i) What are the three crises modern world is facing due to technology?
   (ii) How is technological advancement responsible for climatic changes in different regions of the world?
   (iii) How does solar thermal power work differently from photovoltaic panels?
   (iv) How does soil erosion take place and what are its main causes?
   (v) What kind of a person was Wernher von Braun according to Abdul Kalam?
   (vi) What were Bhabha’s efforts to set up research institutes in India?
   (vii) Why does the author say, “Bose was ahead of his time”? 

PART-B

2. (a) What are the natural and human made changes that affected the climate according to E.K.Federov?
   (b) Give an account of achievements of Sarabhai in Indian space technology.

3. (a) What kind of life style should people adopt in order to have a check on technological growth going beyond human control? Do you think that is practical? Give reasons.
   (b) Write the story of the film in which Sambu’s father enacted. Which are the scenes Sambu likes most and why?

4. (a) What brings misery into life and when can people be free of it completely according to Swami Vivekananda?
   (b) Imagine that you are Pankaj Kanth, a third year B.Tech (ME) student of SNKR Engineering College, South Chennai-3. You would like to go on an industrial tour with all your classmates. Write a letter to the Public Relations Officer, Industrial area, Coimbatore, TN-670007 asking for the details of the industries that student can visit in that area, the process of getting permission for students’ visit along with boarding and lodging facilities.

5. (a) What is Abdul Kalam’s attitude towards work? What according to him gives best results in work?
   (b) Imagine that you are an officer in Andhra Pradesh Forest Department. The Secretary of the department has asked you to report on the steps taken by the department to conserve the forests in Chittoor district that includes Tirupathi. Write a report presenting facts and making recommendations.

Page 1 of 2
6. (a) In what ways can emerging technologies help humanity? What are their disadvantages?

(b) Write a descriptive paragraph on any of the experiments you have done in your physics lab.

(c) Write an e-mail to the Principal of your college along with a copy to the Head of your department proposing to start a technical club in your college.

7. (a) Write the Synonyms for the following words.

   (i) stubborn
   (ii) exponentially
   (iii) overwhelming
   (iv) vulnerable

(b) Write the Antonyms for the following words.

   (i) unfamiliar
   (ii) deceptive
   (iii) markedly
   (iv) homogeneous

(c) Fill in the blanks with suitable words.

   (i) The professor asked his scholar to work for longer hours to ____________ his two weeks absence. (make up, compensate)

   (ii) The customer ________________ and quality of the sample material. (examine, look at)

   (iii) They grant leaves as per the ________________ year. (calander, calendar)

   (iv) There should be a ________________ employee to check these rules. (permanent, permenant)

(d) Rewrite the following sentences as directed.

   (i) Will the farm be sold by the family? (Change to active voice)

   (ii) The news editor briefed the young reporter. (change to passive voice)

   (iii) Mary said to her husband, “When are you leaving for the camp tomorrow?” (Change to indirect speech)

   (iv) They said that if it rained for three months in the desert, farming would be possible there. (Change to direct speech)
PART-A

1. (a) Draw (i) Front view (ii) Top view (iii) Right side view of the following pictorial projection.

(b) The projections of a line AB are on the same projector. A is 10mm above the HP and 20mm in front of the VP. B is 35mm below the HP and 25 mm behind the VP. Draw the projections of the line AB and determine its true length, inclinations with the HP and the VP.

PART-B

2. (a) Construct an ellipse of 120 mm major axis and 80 mm minor axis using concentric circle methods?

(b) Draw an octagon given the length of side 25 mm. using general method?

3. (a) A line EF 40mm long is in the VP and inclined to the HP. The top view measures 30mm. The end E is 10mm above the HP. Draw the projections of the line. Determine its inclination with the HP?

(b) A line RS 40mm long is parallel to both the planes. It is 20 mm above the HP and 15mm in front of the VP. Draw the projections of the line?
4. The front view of a line AB is 50mm long and it makes an angle of $35^0$ with xy. The point A lies 10mm above the HP and 25mm behind the VP. The difference between the distance of A and B from the VP is 25mm. The line AB is in second quadrant. Draw the projections of the line; determine its true length and inclinations with the HP and the VP?

5. An equilateral triangle ABC having side length as 50 mm is suspended from a point O on the side AB 15mm from A in such a way that the plane of the triangle makes an angle of $60^0$ with the VP. The point O is 20 mm below the HP and 40 mm behind the VP. Draw the projections of the triangle?

6. Draw the top and front view of the cone of base diameter 46mm and height 65mm lying with one of its generators on the HP. The axis is parallel to the VP?

7. Draw the isometric view of orthographic drawing shown below?
PART-A

1. (a) Draw the isometric view of the following orthographic views?

(b) A square prism of side of base 30 mm and axis 55 mm long lies on one of its generator in the HP and its faces equally inclined to the HP. Draw its projections when its axis is inclined at an angle of $60^0$ to the VP?

[16+6]

PART-B

2. (a) Construct a regular hexagonal of side 25mm when one of its side is horizontal?

(b) A truck is moving at the rate of 1.2 km per min. Construct a diagonal scale with RF value of 1/25000, showing minutes and seconds. Mark the distance moved by the truck in 4 minutes and 27 seconds?

[6+10]

3. (a) Draw the projections of the following, keeping the distance between the projectors as 25mm on the same reference line:

(i) A- 25mm above HP and 50mm behind the VP
(ii) B- 40 mm below HP and 45mm in front of the VP
(iii) C- on HP and 25mm behind VP

(b) A line CD is parallel to the VP and inclined at $45^0$ to the HP. C is in the HP and 25 mm in front of the VP. Top view is 50mm long. Find its true length?

[8+8]
4. A line AB inclined $30^0$ to the VP, has its ends 50mm and 20mm above the HP. The length of its front view is 65mm and its VT is 10 mm above the HP. Determine the true length of AB, its inclination with the HP and its HT? [16]

5. The circular plate of negligible thickness and 50 mm diameter appears as an ellipse in the front view, having its major axis 50mm long and minor axis 30 mm long. Draw its top view when the major axis of the ellipse is horizontal? [16]

6. A equilateral triangle of 60mm side represents the front view of a cone standing on its base. It is tilted until its axis makes $30^0$ with the HP and top view of the axis is parallel to the VP in this position. Draw the projections of cone? [16]

7. Draw (i) Front view (ii) Top view (iii) Side view of the following pictorial projection?

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Page 2 of 2
1.(a) Draw the isometric view of the following orthographic projections?

(b) A point A is 15mm above the HP and 20mm in front of the VP. Another point B is 25mm behind the VP and 40mm below the HP. Draw the projections of A and B, keeping the distance between the projectors equal to 90mm. Draw straight lines joining (i) the top views (ii) the front views.

PART-B

2.(a) Inscribe a regular hexagon in a circle of diameter 80 mm.?
(b) Construct an ellipse of 120 mm major axis and 80 mm minor axis using arcs of circle method?

3.(a) A point A is 20mm above the HP and in the first quadrant. Its shortest distance from the reference line XY is 40mm. Draw the projections of the point and determine its distance from the VP.
(b) Draw the projections of line LM 40 mm long, parallel to the HP and inclined at 30° to the VP. The L is 20 mm above the HP and 15 mm in front of the VP. Find its traces.
Subject Code: R13209/R13

4. A line AB, 65mm long, has its end A 20 mm above the HP and 25 mm in front of the VP. The end B is 40mm above the HP and 65mm in front of the VP. Draw the projections of AB and show its inclinations with the HP and the VP?

5. A 30°-60° set square has its shortest side 50 mm long and is in the HP. The top view of the setsquare is an isosceles triangle. The hypotenuse of the set-square is inclined at an angle of 45° with the VP. Draw its projections Determine its inclination with the HP?

6. Draw the projections of a cylinder, base 30mm diameter and axis 50mm long, resting with a point on the periphery of its base circle on the HP such that the axis is making an angle of 30° with the HP and parallel to the VP?

7. Draw (i) Front view (ii) Top view of the following pictorial view?
1.(a) Draw (i) Front view (ii) Top view (iii) Right side view of the pictorial view shown below?

(b) A mirror of size 560mm× 320 mm is fixed on a wall on one of its shorter edges. The mirror is so fixed that it appears as a square in the front view. Draw the projections of the mirror. Find its inclinations with the wall and the ground?

[16+6]

2.(a) Construct a Vernier scale of RF= 1: 25 to show decimeters, centimeters and millimeters. The scale should be capable of reading up to 4 decimeters. Mark on your scale the following distances: (a) 3.23 dm?
(b) Construct a hexagon of side 30 mm when one side is vertical?

[10+6]
3.(a) The top view of a 75mm long line measures 55 mm. The line is in the VP, its one end being 25 mm above the HP. Draw its projections.
(b) Mark the projections of the following points on a common reference line, keeping the projectors 35 mm apart.
   (i) 25 mm above the HP and 40 mm behind the VP
   (ii) 20 mm above the HP and on the VP
   (iii) 30 mm below the HP and 45 mm in front of the VP

4. A line PQ 100mm long is inclined at 30° to the HP and at 45° to the VP. Its midpoint is in the VP and 20mm above the HP. Draw its projections, if its end P is in the third quadrant and Q is in the first quadrant.

5. ABCD is a symmetrical trapezium with AB= 40mm and CD=64mm as its parallel sides are 50 mm height. The plane has its side AB in the VP and CD 25 mm away from it. The front view of BC makes an angle of 30° with the HP. Obtain the projections of the plane. Find its angle with the VP?

6. Draw the projections of a pentagonal prism of base side 30mm and axis length 60mm rests on the HP on one of the base corners with the base edges containing it being equally inclined to the HP. The axis is inclined at 45° to the HP and parallel to the VP?

7. Draw the isometric view of the following orthographic views?