Code: 9ABS103

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING CHEMISTRY
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) What are the reactions takes place in the estimation of chlorine present in water?
   (b) Explain the procedure involved in the determination of chlorine present in water.

2 (a) Define corrosion and explain Pilling - Bedworth rule.
   (b) Explain the factors which affect the rate of corrosion.

3   What are silicones? How they are prepared? Give an account of the properties and uses of silicones.

4 (a) What is the effect of nanotechnology on food science?
   (b) What advancements of nanotechnology are referred to as nanomedicine?

5 (a) Explain the relationship between cell constant, conductivity and conductance.
   (b) Define the specific resistance of a solution. Explain the specific conductance with diagrammatic illustrate of specific conductivity. What are its units?

6 (a) Draw the phase diagram of Ag (m.p 961 ^{0}C) - Pb (m.p 327 ^{0}C) alloy system forming simple eutectic at 305 ^{0}C with 97.4% Pb. Mark the areas, lines and points.
   (b) Mention any three merits of phase rule.

7 (a) What is meant by synthetic petrol? How do you synthesize petrol by Fisher-Tropsch process.
   (b) What is a coal? Explain the significance of anthracite coal.

8 (a) Discuss the function of gypsum in cement.
   (b) Explain the various properties of refractories.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING CHEMISTRY
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
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*****

1   What is hardness of water? Explain the experimental determination of hardness of water.

2   (a)   Discuss the mechanism of wet corrosion.
    (b)   Write a note on corrosion prevention.

3   What is copolymerization? Write the preparation, properties and uses of Teflon and poly ethylene.

4   (a)   How are lubricants classified? Give example.
    (b)   Explain the boundary film lubrication theory and the mechanism of the lubricants.

5   (a)   What is a concentration cell? Explain its working with suitable example.
    (b)   Write short notes on EMF of a cell.

6   Draw the phase diagram of iron-carbon system and state the important reactions taking place in the system.

7   (a)   Explain higher calorific value and lower calorific value and distinguish between the HCV & LCV.
    (b)   What are the characteristics of a good fuel?

8   (a)   Discuss the four essential properties of a refractory.
    (b)   Explain:
          (i) Thermal spalling
          (ii) Refractoriness.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING CHEMISTRY
(Common to all branches)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   What are ionic exchange resins? How will you purify water by resins and explain the advantages over other methods?

2   (a)   Define corrosion and how it is prevented.
    (b)   Discuss the factors influencing corrosion.

3   Differentiate condensation and addition polymerization with suitable examples.

4   (a)   What are explosives? What are the uses of explosives?
    (b)   What are the characteristics of a good explosive? Explain.

5   (a)   Explain the differences between thermal and electrical insulators.
    (b)   Explain the use of silicone fluids as insulating materials.

6   (a)   What is a eutectic? Can it be called a compound? Why?
    (b)   Give the applications of phase rule by taking suitable examples.

7   (a)   Distinguish between solid, liquid and gaseous fuels
    (b)   0.834 g of a fuel on complete combustion in excess of oxygen in bomb calorimeter, the temperature increased from 14.36 ^{0}C to 18.10 ^{0}C. The weight of water is 1350 g. Water equivalent of calorimeter is 135 g. Calculate higher calorific value of a fuel.

8   What are refractories? Explain thermal spalling, strength and porosity of the refractories.

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Code: 9ABS103

4

ENGINEERING CHEMISTRY
(Common to all branches)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   Write the procedure to estimate the carbonates and sulphate of calcium present in water sample.

2 (a) Explain the differential aeration corrosion with suitable examples.
   (b) Write note on galvanic series.

3 (a) Why natural rubber needs compounding?
   (b) What are elastomers and how do they differ from natural rubber?

4   What are solid lubricants? Where can they be used? Give details about graphite.

5 (a) Write an essay on thermal insulators with special reference to its properties and engineering applications.
   (b) What are the solid insulators? Give suitable examples.

6 (a) Name the phase reactions occurring in $Fe-Fe_3C$ system. What are the temperatures and compositions at which they occur?
   (b) After annealing, what properties improve?

7 (a) What are the gaseous fuels? How they are advantageous over other fuels?
   (b) What are the different units expressed to know the efficiency of a fuel?

8   Explain the dry process for the manufacture of cement and chemical composition of cement.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
MATHEMATICS - I
(Common to all branches)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Solve : $\left(1+e^{x/y}\right)dx+\left(1-\dfrac{x}{y}\right)e^{\frac{x}{y}}dy=0$.

   (b) Solve : x dx + y dy = $\dfrac{xdy-ydx}{x^2+y^2}$.

2 (a) Solve : $(D^3-1)y=(e^x+1)^2$.
   (b) Solve : $(D^2-k^2)y=\cos h\ kx$.

3 (a) Find the points on the surface $z^2=xy+1$ that are nearest to the origin.
   (b) Find the stationary points of u(x, y) = sinx siny sin(x + y) where 0 < x < π, 0 < y < π and find the maximum u.

4 (a) Trace the curve $y=x^3$.
   (b) Trace the curve y = (x − 1) (x − 2) (x − 3).

5 (a) Evaluate: $\int_0^1\int_x^{\sqrt{x}}(x^2+y^2)dx\,dy$.

   (b) Evaluate the integral by changing the order of integration: $\int_0^1\int_x^{\sqrt{2-x^2}}\dfrac{x\,dy\,dx}{\sqrt{x^2+y^2}}$.

6 (a) Find the Laplace transform of $\left\{\left(\sqrt{t}-\dfrac{1}{\sqrt{t}}\right)^3\right\}$.

   (b) Find: $L^{-1}\left\{\dfrac{1}{2}\log\left(\dfrac{s^2+b^2}{s^2+a^2}\right)\right\}$.

7 (a) Solve the D.E. $y''+2y'+5y=8\sin t+4\cos t$, $y(0)=1$, $y(\frac{\pi}{4})=\sqrt{2}$. Using Laplace transform.

   (b) Using Laplace transform, evaluate $\int_0^\infty e^{-4t}sin^3t\,dt$.

8 (a) Use divergence theorem to evaluate $\int_s \overline{F}\cdot\overline{N}ds$, where $\overline{F}=x^3\boldsymbol{i}+y^3\boldsymbol{j}+z^3\boldsymbol{k}$, and S is the surface of the sphere $x^2+y^2+z^2=a^2$.

   (b) Evaluate: $\nabla\left[\nabla\cdot\left(\dfrac{\overline{R}}{r}\right)\right]$, where $\overline{R}$ = xi + yj + zk , r = $|\overline{r}|$.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
MATHEMATICS - I
(Common to all branches)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1　(a)　Solve : $\sec^2 y \dfrac{dy}{dx} + 2x \tan y = x^3$.

　(b)　Solve : $2y \cos y^2 \dfrac{dy}{dx} - \dfrac{2}{x+1} \sin y^2 = (x+1)^3$.

2　(a)　Solve : $(D^2 - 1)y = 2e^x + 3x$.
　(b)　Solve : $(D^2 + 1)y = \operatorname{cosec} x$.

3　(a)　Find the shortest and the longest distance from the point (1, 2, -1) to the sphere $x^2 + y^2 + z^2 = 24$.
　(b)　Find the volume of the largest rectangular parallelopiped that can be inscribed in the ellipsoid $4x^2 + 4y^2 + 9z^2 = 36$.

4　(a)　Trace the curve r = a(1 + cos θ).
　(b)　Trace the curve r = a + b cos θ, a > b.

5　(a)　Evaluate: $\int_0^5 \int_0^{x^2} x(x^2 + y^2)\,dx\,dy$.

　(b)　Evaluate the integral by changing the order of integration: $\int_0^a \int_{x/a}^{\sqrt{x/a}} (x^2 + y^2)\,dx\,dy$.

6　(a)　Find the Laplace transform of:　(i) $\left\{\dfrac{\sin^2 t}{t}\right\}$.　(ii) $\left\{\dfrac{1-\cos at}{t}\right\}$.

　(b)　Find: $L^{-1}\left\{\dfrac{s}{(s^2+a^2)^2}\right\}$ using convolution theorem.

7　(a)　Solve the D.E. $y'' + 4y' + 4y = 4e^{-2t}$, $y(0) = -1$, $y'(0) = 4$. Using Laplace transform.
　(b)　Solve the D.E $\dfrac{dy}{dt} + 2y + \int_0^t y\,dt = 2\cos t$, $y(0) = 1$. Using Laplace transform.

8　(a)　If $\overline{A}$ is a constant vector and $\overline{R} = x\overline{i} + y\overline{j} + z\overline{k}$, prove that $\nabla \times \left(\dfrac{\overline{A} \times \overline{r}}{r^n}\right) = \dfrac{(2-n)\overline{A}}{r^n} + \dfrac{n(\overline{r}\cdot\overline{A})\overline{r}}{r^{n+2}}$.

　(b)　If $\overline{F} = (5xy - 6x^2)\boldsymbol{i} + (2y - 4x)\boldsymbol{j}$, evaluate $\int_c \overline{F} \cdot d\overline{R}$, where C is the curve in the xy-plane $y = x^3$ from (1, 1) to (2, 8).

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
MATHEMATICS - I
(Common to all branches)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Solve : $x\dfrac{dy}{dx} + y = x^3 y^6$.

(b) Solve : $\dfrac{dy}{dx} + \dfrac{y}{x} = y^2 x \sin x.$

2 (a) Solve : $(D^2 - 3D + 2)y = \cos hx.$
(b) Solve : $(D + 2)(D - 1)^2 \, 4 = e^{-2x} + 2 \sin hx.$

3 (a) Prove that the maximum value of $x^m \, y^n \, z^p$ under the condition x + y + z = a is $m^m \, n^n \, p^p \, a^{m+n+p}$ / $(m + n + p)^{m+n+p}$.
(b) Find the maximum and minimum distance from the origin to the curve $5x^2 + 6xy + 5y^2 - 8 = 0$.

4 (a) Trace the curve x = a(θ + sinθ), y = a(1 + cos θ).
(b) Trace the curve x = a(θ - sinθ), y = a(1 − cos θ).

5 (a) Evaluate: $\int_0^2 \int_0^x e^{x+y} \, dy \, dx.$
(b) Change the order of integration in $\int_0^a \int_y^a \dfrac{x \, dx \, dy}{x^2+y^2}$ and hence evaluate the same.

6 (a) Find the Laplace transform of $\left\{ e^{-4t} \int_0^t \dfrac{\sin 3t}{t} \, dt \right\}.$
(b) Find $L^{-1} \left\{ \dfrac{1}{(s^2+a^2)^2} \right\}$. Using convolution theorem.

7 (a) Solve the D.E. $y'' + 2y' + y = t$, $y(0) = -3,\ y(1) = -1$. Using Laplace transform.
(b) Solve the integral equation $y(t) = t^2 + \int_0^t y(u) \sin(t - u) \, du$, using Laplace transform.

8 (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) Apply Greens theorem to evaluate $\int_c [(2x^2 - y^2) \, dx + (x^2 + y^2) \, dy]$, where C is the boundary of the area enclosed by the x-axis and upper half of the circle $x^2 + y^2 = a^2$.

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Code: 9ABS104

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
MATHEMATICS - I
(Common to all branches)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Solve : $\dfrac{dy}{dx} + yx = y^2 e^{x^2/2} \sin x.$

   (b) Solve : $x\dfrac{dy}{dx} + y = y^2 x^3 \cos x.$

2 (a) Solve : $(D^2 – 5D + 6)\, y = xe^{4x}.$
   (b) Solve : $(D^2 + a^2)\, y = \text{Sec } ax.$

3 (a) Find a point on the plane 3x + 2y + z - 12 = 0, which is nearest to the origin.
   (b) Prove that it the perimeter of triangle is constant there its area is maximum when the triangle is equilateral.

4 (a) Prove that the volume of revolution of $r^2 = a^2 \cos2\theta$ about the initial line is

$$\dfrac{\pi a^3}{6\sqrt{2}}\left[3\log\left(\sqrt{2}+1\right)-\sqrt{2}\right].$$

   (b) Determine the volume of the solid generated by revolving the lemicon r = a + b cosθ (a > b) about the initial line.

5 (a) Evaluate: $\int_0^1 \int_y^1 \dfrac{dx\,dy}{\sqrt{(1-x^2)(1-y^2)}}.$

   (b) Change the order of integration in $\int_0^1 \int_0^{\sqrt{1-x^2}} y^2\ dy\,dx$ and evaluate.

6 (a) Find the Laplace transform of $\left\{ 2^t + \dfrac{\cos 2t - \cos 3t}{t} + t \sin t \right\}.$

   (b) Apply convolution theorem to find $L^{-1}\left\{\dfrac{s}{(s^2+a^2)^2}\right\}.$

7 (a) Solve the D.E. $y'' + 9y = cos2t$, $y(0) = 1,\ y(\tfrac{\pi}{2}) = -1.$ Using Laplace transform.

   (b) Solve the integral equation $y(t) = 1 + \int_0^t y(u)\sin(t-u)\,du$, using Laplace transform.

8 (a) A vector field is given by $\vec{A} = (x^2 + xy^2)\bar{i} + (y^2 + x^2y)\bar{j}$. Show that the field is irrotational and find the scalar potential.

   (b) Use the divergence theorem to show that $\int_s \nabla r^2 . d\bar{s}$ = 6V, where S is any closed surface enclosing a volume V and $\bar{r}$ = xi + yj + zk.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
MATHEMATICAL METHODS
(Common to EEE, ECE, CSE, EIE, E.Con.E, ECM, IT & CSS)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Reduce the $\begin{bmatrix} 1 & -2 & 1 & 2 \\ 2 & -2 & 0 & 6 \\ 4 & 2 & 0 & 2 \\ 1 & -1 & 0 & 3 \end{bmatrix}$ matrix into the normal form and hence find its rank.

   (b) Test the system of equations 2x + y + 5z = 4; 3x - 2y + 2z = 2; 5x - 8y - 4z = 1 consistency. If consistent solve them.

2   Diagonalize the following matrix by an orthogonal transformation and also find the matrix of transformation. $\begin{bmatrix} 2 & 1 & -1 \\ 1 & 1 & -2 \\ -1 & -2 & 1 \end{bmatrix}$

3 (a) Using the Newton – Raphson method find the root of the equation $f(x) = e^x - 3x$ that lies between 0 and 1.

   (b) State appropriate interpolation formula which is to be used to calculate the value of exp (1.75) from the following data and hence evaluate it from the given data.

x	1.7	1.8	1.9	2.0
$y = e^x$	5.474	6.050	6.686	7.389

4   Determine the constants a and b by the method of least squares such that $y = ae^{bx}$.

x:	2	4	6	8	10
y :	4.077	11.084	30.128	81.897	222.62

5   Given $\frac{dy}{dx} - \sqrt{xy} = 2, y(1) = 1$ find the value of $y(2)$ in steps of 0.2 using modified Euler's method.

6 (a) Obtain the Fourier series for the function $f(x)$ is given by $f(x) = \begin{cases} 0, & -\pi < x < 0, \\ \sin x, & 0 < x < \pi. \end{cases}$ Deduce that $\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \frac{1}{7.9} \cdots = \frac{1}{4}(\pi - 2)$.

   (b) Find the Fourier cosine transform of $f(x) = e^{-ax} \cos ax, a > 0$.

7   Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$, which satisfies the conditions $u(0, y) = 0, u(L, y) = 0, u(x, 0) = 0$ and $u(x, a) = f(x)$.

8 (a) Find $Z\left\{\cos\left(\frac{n\pi}{2}\right)\right\}$ and $Z\left\{\sin\left(\frac{n\pi}{2}\right)\right\}$.

   (b) State and prove convolution theorem for Z-transform.
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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
MATHEMATICAL METHODS
(Common to EEE, ECE, CSE, EIE, E.Con.E, ECM, IT & CSS)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Reduce the $\begin{bmatrix} 1 & 0 & -3 & 2 \\ 0 & 1 & 4 & 5 \\ 1 & 3 & 2 & 0 \\ 1 & 1 & -2 & 0 \end{bmatrix}$ matrix, to normal form and find its rank.

   (b) Solve the system 2x - y + 4z = 12; 3x + 2y + z = 10; x + y + z = 6; if it is consistent.

2 Diagonalize the following matrix by an orthogonal transformation and also find the matrix of transformation. $\begin{bmatrix} 7 & 0 & -2 \\ 0 & 5 & -2 \\ -2 & -2 & 6 \end{bmatrix}$

3 (a) Evaluate $\sqrt{28}$ to four decimal places by Newton's iterative method.
   (b) Using Newton's forward interpolation formula, and the given table of values.

x	1.1	1.3	1.5	1.7	1.9
f(x)	0.21	0.69	1.25	1.89	2.61

   Obtain the value of f(x) when x = 1.4.

4 Find the curve of best fit of the type y = ae^{bx} to the following data by the method of least squares.

x:	1	5	7	9	12
y:	10	15	12	15	21

5 Determine $y(0.8)$ and $y(1.0)$ by Milne's predictor-corrector method when $\frac{dy}{dx} = x - y^2, y(0) = 0$.

6 (a) Obtain a half-range cosine series for $f(x)$ is given by $f(x) = \begin{cases} kx & , 0 \le x \le \frac{L}{2}, \\ k(L-x), & \frac{L}{2} \le x \le L. \end{cases}$ Deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots = \frac{\pi^2}{8}$.

   (b) Prove that Fourier cosine and sine transforms are linear.

7 Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ which satisfies the conditions $u(0,y) = 0$, $u(L,y) = 0$, $u(x,0) = 0$ and $u(x,a) = \sin\left(\frac{n\pi x}{L}\right)$.

8 (a) Prove that $Z(n^p) = -z\frac{d}{dz}Z(n^{p-1}), p$ being a +ve integer. Hence evaluate $Z(n)$ and $Z(n^2)$.

   (b) Find: $Z^{-1}\left\{\frac{2z}{(z-1)(z^2+1)}\right\}$.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
MATHEMATICAL METHODS
(Common to EEE, ECE, CSE, EIE, E.Con.E, ECM, IT & CSS)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Determine the rank of the matrix $A = \begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$

 (b) Test the following system for consistency and if consistent solve it.
      u + 2v + 2w =1, 2u + v + w = 2, 3u + 2v + 2w = 3, v + w = 0.

2 Diagonalize the following matrix by an orthogonal transformation and also find the matrix

 of transformation. $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & -1 \\ 1 & -1 & 0 \end{bmatrix}$

3 (a) Find the root between 0 and 1 of the equation x^3 - 6x + 4 = 0 correct to five decimal places.
 (b) Find the values of cos 1.747 using the values given in the table below:

x:	1.70	1.74	1.78	1.82	1.86
sin x:	0.9916	0.9857	0.9781	0.9691	0.9584

4 Obtain a relation of the form y = ae^{bx} for the following data by the method of least squares.

x:	2	3	4	5	6
y :	8.3	15.4	33.1	65.2	127.4

5 Find $y(0.8)$ by Milne's method for $\frac{dy}{dx} = y - x^2$, $y(0) = 1$. Obtaining the starting values by Taylor's series method.

6 (a) Obtain the Fourier series for the function $f(x)$ is given by $f(x) = \begin{cases} x & , \ 0 \leq x \leq \pi, \\ 2\pi - x, & \pi \leq x \leq 2\pi. \end{cases}$ and

 Deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots = \frac{\pi^2}{8}$.

 (b) Find the Fourier transform of $f(x) = e^{-\frac{x^2}{2}}, -\infty < x < \infty$.

7 Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ within the rectangle $0 \leq x \leq$ a, $0 \leq y \leq$ b, given that $u(0,y) = u(0,y) =$ $u(0,y) = 0 \ and \ u(0,y) = x(a-x)$.

8 (a) Find $Z\{(\cos\theta + i\sin\theta)^n\}$. Hence evaluate $Z(\cos n\theta)$ and $Z(\sin n\theta)$.
 (b) Find $Z^{-1}\left\{\frac{3z^2+z}{(5z-1)(5z+2)}\right\}$.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
MATHEMATICAL METHODS
(Common to EEE, ECE, CSE, EIE, E.Con.E, ECM, IT & CSS)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   Reduce the matrix A = $\begin{bmatrix} 1 & 2 & 1 & 0 \\ -2 & 4 & 3 & 0 \\ 1 & 0 & 2 & -8 \end{bmatrix}$ to canonical form (normal) and hence find its rank.

   (b)   Solve the system of homogeneous equations given by 2x + y + 2z = 0, x + y + 3z = 0, 4x + 3y + 8z = 0.

2   Diagonalize the following matrix by an orthogonal transformation and also find the matrix of transformation. $\begin{bmatrix} 1 & 2 & 0 \\ 2 & 2 & 2 \\ 0 & 2 & 3 \end{bmatrix}$

3   (a)   Find the root for the following equation using bisection method correct to two decimal places: e^x - x + 2 = 0 in 1, 1.4

   (b)   Find $f(2.5)$ using the following table:

x	1	2	3	4
f(x)	1	8	27	64

4   Fit the curve y = ae^{bx} for the following data.

x:	0	1	2	3	4	5	6	7	8
y :	20	30	52	77	135	211	326	550	1052

5   Using Runge-Kutta method of 4th order ,find the solution of $\frac{dy}{dx} = x^2 + 0.25y^2, y(0) = -1$ on$[0,0.5]$ with $h = 0.1$.

6   (a)   Express $f(x) = x$ as a half-range sine series in the interval 0< x < 2.

   (b)   Find the Fourier cosine transform of $f(x) = \begin{cases} x & , for\ 0 < x < 1 \\ 2 - x, for\ 1 < x < 2 \\ 0 & , for\ x > 2 \end{cases}$

7   Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ for $0 \le x \le \pi$, $0 \le y \le \pi$ which satisfies the conditions $u(0,y) = 0,\ u(\pi, y) = 0, u(x, \pi) = 0\ and\ u(x, a) = \sin^2 x$.

8   (a)   If $Z(u_n) = \bar{u}(z)$ prove that $Z(a^n u_n) = \bar{u}\left(\frac{z}{a}\right)$.

   (b)   Using Z- transform, solve $4u_n - u_{n+2} = 0$, given that $u_0 = 0,\ u_1 = 2$.
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Code: 9A01101

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING MECHANICS
(Common to AE, CE, ME and BT)

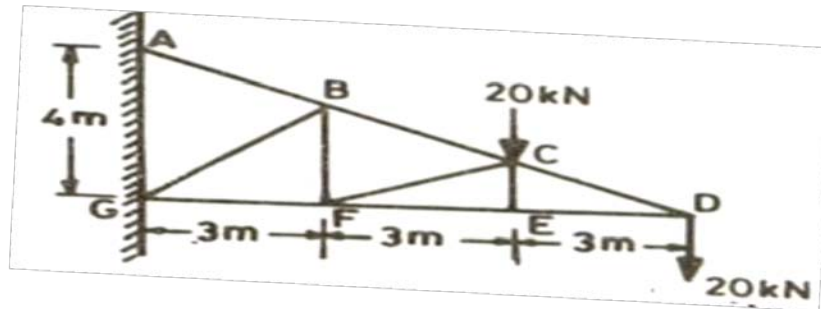Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   Define the following terms:
   (a)   Rigid body.
   (b)   Principle of transmissibility.
   (c)   Triangle law of forces.
   (d)   Deformable body.

2   Determine the forces in all the members of the frame shown in below figure. Indicate the
        nature of forces also (Tension as +ve and Compression as -ve).

3   (a)   Explain the difference between angle of frication and angle of repose.
    (b)   State coulomb friction.
    (c)   Differentiate between static and dynamic friction.

4   Locate the center of gravity of wire shown in figure. Portion BC is in X-Y plane and semi
        circle CD is parallel to X-Z plane. All the dimensions are shown in mm.
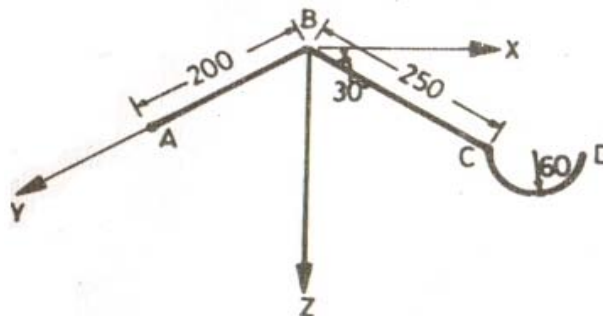
5   Determine the moment of inertia of a triangle above x-x axis as shown in figure.
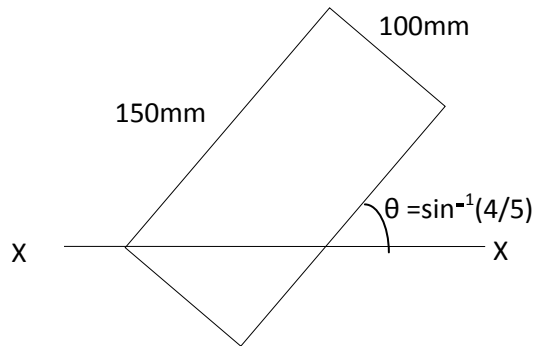
6 (a) Ram and Rahim are sitting in cars A and B respectively. The cars are 300 m apart and at rest. Ram starts the car and moves towards B with an acceleration of 0.5 m/sec^2. After 3 seconds, Rahim starts his car towards A with an acceleration of 1 m/sec^2. Calculate the time and the point at which two cars meet with respect to A.
   (b) A projectile is fired at a speed of 800 m/sec at an angle of elevation of 50^0 from the horizontal. Neglecting the resistance of air, calculate the distance of the point along the inclined surface at which the projectile will strike the inclined surface which makes an angle of 15^0 with the horizontal.

7   A solid cylinder of weight 'w' and radius 'r' rolls, down an inclined plane which makes an angle θ with the horizontal axis. Determine the minimum coefficient of friction and the acceleration of the mass center for rolling, without slipping.

8 (a) The amplitude and maximum velocity of a particle is 40 cm and 2 m/s. A particle moves in SHM. Determine the maximum acceleration of the particle and the period of its motion.
   (b) The particle which moves in SHM has maximum velocity of 100 mm/sec. and maximum acceleration of 2 m/s^2. Determine the amplitude and frequency of the motion.

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Code: 9A01101

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING MECHANICS
(Common to AE, CE, ME & BT)

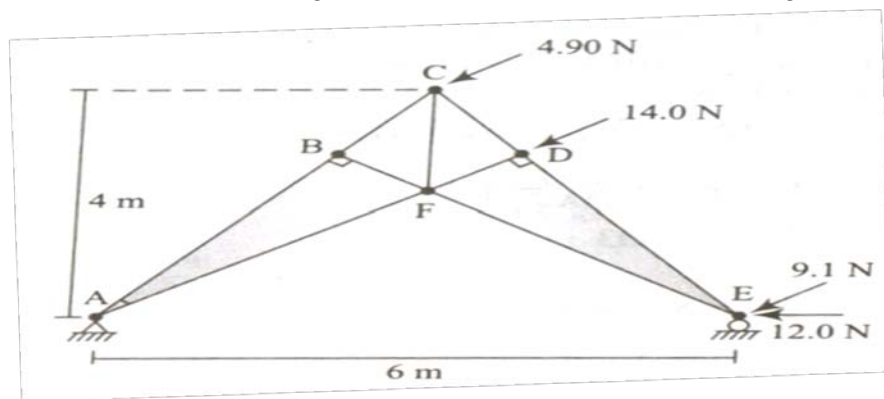Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) State and prove Lami's theorem.
   (b) State and prove theorem of Varignon.

2   Neglecting the horizontal components of forces in support A. determine the axial forces
       induced in all the members of the given frame as shown in the below figure.


3   With neat sketch explain the frictional phenomena associated with working principle of
       screw jack and also derive the equation for its maximum efficiency.

4   Locate the centroid of the wire as shown in the below figure. Portion AB is in x-z plane,
       BC in y-z plane and CD in x-y plane. AB and BC are semicircular in shape. All the
       dimensions are shown in mm.
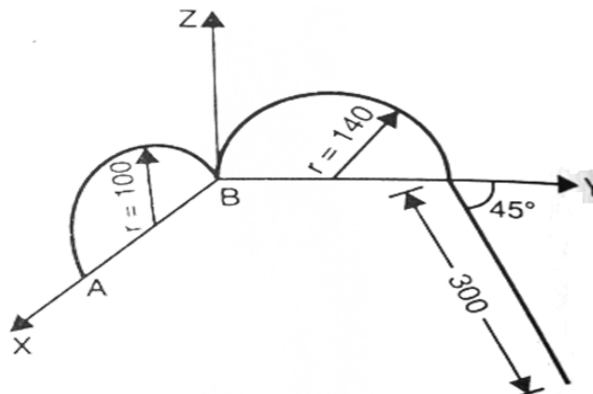
5   A brass cone with base diameter of 400 mm and height of 225 mm is placed on a vertical aluminium cylinder of height 300 mm and diameter 400 mm. density of brass = 85 kN/m^3 and density of aluminium = 25.6 kN/m^3. Determine the mass moment of the inertia of the composite body about the vertical geometrical axis.

6 (a) The distance covered by a freely falling body in the last one second of its motion and that covered in the last but one second are in the ratio 5:4. Calculate the height from which the body was dropped and the velocity with which it strikes the ground.

   (b) A ball projected vertically upward attains a maximum height of 400 m. Calculate the velocity of projection and compute the time of flight in air. At what altitude will this ball meet a second ball projected vertically upward 4 seconds later with a speed of 120 m/sec.

7   Determine the velocity of body A in the figure. After it has moved 12 m starting from rest. Assume the pulleys to be frictionless and of negligible weight.
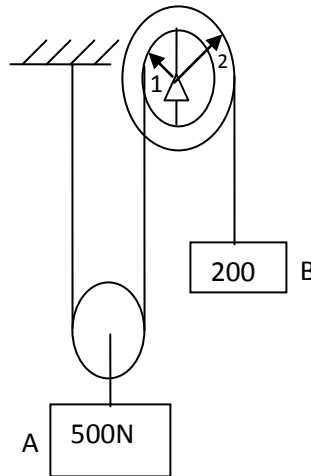
8   The weight of 10 N attached to a spring oscillates at a frequency of 60 oscillations per minute. If the maximum amplitude is 30 mm. Find the tension induced in the spring. Also find the spring constant and maximum velocity in the spring.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
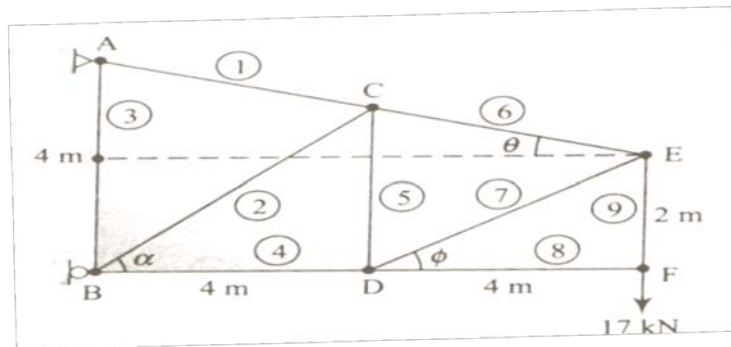**ENGINEERING MECHANICS**
(Common to AE, CE, ME & BT)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Show how force acting on a body can be replaced by an equivalent force couple system.
   (b) Define moment and couple and differentiate them.

2   Find the forces in the members of loaded frame as shown in the below figure

3 (a) A body weighting 200 N is at rest on a rough horizontal plane. If a horizontal force of is just cause to slide. Find the co-efficient of friction.
   (b) Explain the difference between simple and differential screw jacks.

4   Determine the distance $\overline{x}$ to the center of gravity of the homogenous rod bent into parabolic shape. If the rod has weight per unit length of 5 N/m, determine the reactions at fixed support O.
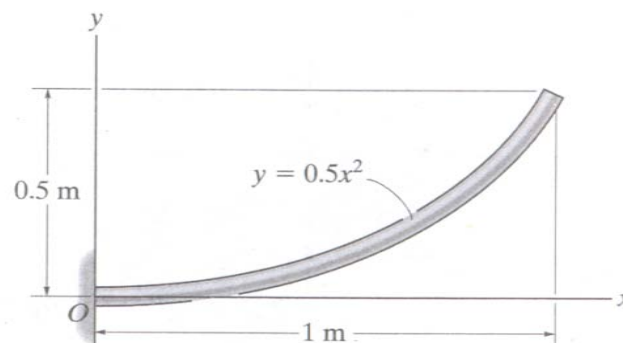
5 (a) Differentiate between polar moment of inertia and product of inertia.
   (b) Find the moment of inertia and radius of gyration about the horizontal centroidal axis.

6 (a) A balloon is ascending with a velocity of 20 m/sec above a like a stone is dropped to fall from the balloon and the sound of the splash is heard 6 seconds later. Find the height of the balloon when the stone was dropped. Velocity of sound is 340 m/sec.
   (b) The acceleration of a particle in rectilinear motion is defined by the relation $a = 25 - 4S^2$. Where 'a' is expressed in m/sec^2 and 'S' is position coordinate in meters. The particle starts with no initial velocity at the position S = 0. Determine:
       (i) The velocity when S = 3 m
       (ii) The position where the velocity is again zero
       The position where the velocity is maximum.

7 (a) What is the energy of the motion for a rigid body rotating about a fixed axis?
   (b) A 70 kg sprinter starts from rest and accelerate uniformly for 5.8 s over a distance of 34.5 m. Neglecting air resistance, determine the average power developed by the sprinter.

8   The central deflection of a simply supported beam with a central point load is given by $\delta = WL^3/48EI$. Where L = 5 m, $E = 2 \times 10^5$ N/mm^2, $I = 1.73 \times 10^{-5}$ m^4. The beam is of uniform cross section with a static load 'W'. Determine equivalent spring constant of the beam. The frequency of vibration of a 60 kg block attached to the center of the beam. Neglect the mass of the beam and assume that the load remaining in contact with the beam.

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Code: 9A01101

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING MECHANICS
(Common to AE, CE, ME & BT)

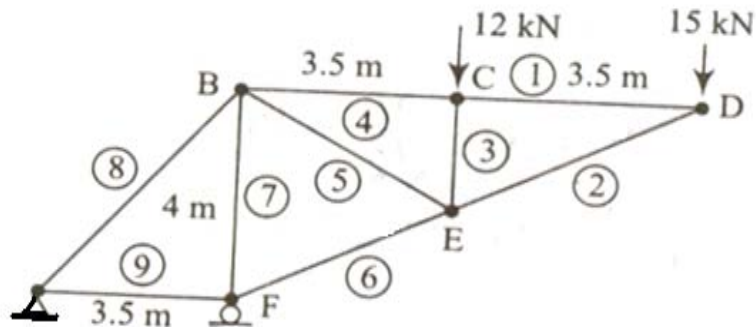Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   Write brief notes on free body diagram and explain with suitable example.

2   Determine the member forces of the overhang frame as shown in the below figure.

3   A body weighting 200 N rest on a horizontal surface, coefficient of friction is 0.25.
(i) Find the horizontal force to be applied on a body so as to just move it.
(ii) What least horizontal force would cause the body to slide if an additionally 100 N to the body.

4   Determine the distance $\overline{Y}$ to the center of gravity of homogenous rod bent in to the parabolic shape whose rod weight per unit length is 5 N/m.
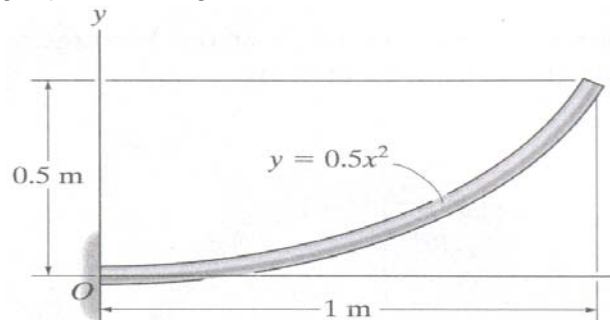
5 (a) Define mass moment of inertia and explain transfer formula for mass moment of inertia.
   (b) Determine the mass moment of inertia of slender rod of length 'l' about its centroidal axis normal to the rod.

6   A ladder AB of 3 m length remains in contact with the vertical wall and horizontal floor and the angle of inclination of the ladder with horizontal is 60^0. The ladder moves such that its ends remain in contact with the vertical wall at B and horizontal floor at A. If the end 'A' moves with a linear velocity of 0.1 m/s, find the velocity of its upper end B. If the linear acceleration of the end 'A' is 0.05 m/s^2, find the acceleration of the end 'B' and the resultant acceleration of the ladder AB.

7 (a) What is the advantage of work-energy theorem?
   (b) A shaft of radius 'r' rotates with constant angular speed 'w' in bearings for which are coefficient of friction is μ. Through what angle 'Ø' will it rotate after the driving force is removed.

8 (a) Explain how a simple pendulum differs from a compound pendulum, briefly with the help of differential mathematical equations.
   (b) Determine the stiffness in N/cm of a vertical spring to which a weight of 50 N is attached and is set vibrating vertically. The weight makes 4 oscillations per second.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to ECE, E.Con.E & BT)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Inscribe an ellipse in a parallelogram having sides 150 mm and 100 mm long and an included angle of 120^0.
   (b) A point P is 30 mm and 50 mm respectively from two straight lines which are at right angles to each other .Draw the rectangular hyperbola from p within 10 mm distance from each line.

2 (a) The line EF 60 mm long is in VP and inclined HP. The top view measures 45 mm. The end E is 15 mm above HP. Draw the projections of the line. Find it inclination with HP.
   (b) A line AB 60 mm long is parallel to HP. The point P is 20 mm above HP and 35 mm in front of VP. The length of the front view is 50 mm. Determine its true inclination with VP.

3 (a) A regular hexagonal lamina of 30 mm side rests on H.P with its plane surface vertical and inclined at 45^0 to VP. Draw its projections of the plane.
   (b) A square plate of side 30 mm is perpendicular to V.P and inclined at 30^0 to H.P Draw it projections.

4 (a) A triangular prism, side of base 35 mm and height 50 mm rests with its base on H.P. such that one of its rectangular faces is perpendicular to V.P. Draw its projections. The nearest edge parallel to V.P. is 10 mm in front of it.
   (b) A cube of 50 mm long edges is resting on the H.P with its faces equally inclined to the V.P. Draw its projections.

5   Draw the development of the lateral surface of the truncated cylinder of diameter 44 mm and height 70 mm, place on HP. A section plane, passing through the geometrical center of the top face of the cylinder, perpendicular to VP and inclined at 45^0 to HP, cuts off the top portion of the cylinder. A similar sectional plane making 30^0 to HP in opposite direction cuts the axis at a height of 14 mm from the base.

6   Draw the front view, top view and right side view of the object shown below (dimensions in mm).
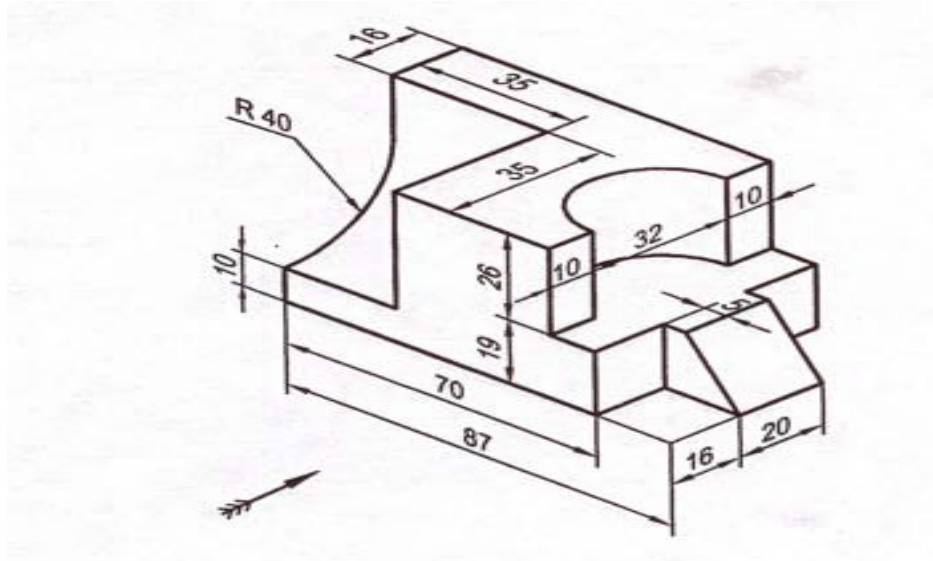
7   A hexagonal prism, having base with a 40 mm side and a 100 mm long axis, is resting on its base on the H.P. with a side of the base parallel to the V.P. It is penetrated by a square prism having base with a 35 mm side and a 100 mm long axis such that the axes of both the prism intersect each other at right angles. The faces of the square prism is equally inclined to the H.P. Draw the projections of the combination and show the lines of intersection.

8   Draw a perspective view of a pyramid having base with a 40 mm side and a 60 mm long axis, resting on its base in the GP with its axis at a distance of 40 mm behind the PP and all the edges of the base equally inclined to it. The station point is 50 mm in front of PP, 75 mm above GP and lies in a CP which is 50 mm towards right of the axis.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to ECE, E.Con.E & BT)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Construct a regular pentagon of its sides 35 mm by inscribe circle method.
   (b) A flowerbed in a botanical garden is elliptical in shape. Major and minor axes are 9 m and 5.5 m respectively. Draw the profile of the flowerbed to a scale of 1:100.

2 (a) The length of the top view of a line MN parallel to VP and inclined at 45^0 to the HP is 50 mm. Point M is 12 mm above HP and 25 mm in front of VP. Draw the projection of the line. Find the true length.
   (b) A line GH 45 mm long is in HP and inclined to VP. The end G is 15 mm in front of VP. The length of the front view is 35 mm. Draw the projections of the line. Determine its inclination with VP.

3 (a) A hexagonal plane of side 30 mm is perpendicular to V.P and parallel to H.P. One of its side is perpendicular to V.P. Draw its projections.
   (b) A circular lamina of 30 mm radius is perpendicular to V.P and its diameter AB is inclined at 45^0 to H.P. Draw its projections.

4 (a) A square pyramid side of base 30 mm and height 65 mm rests with one of the edges of its base on H.P such that its base makes 30^0 to H.P. Draw its projections.
   (b) A pentagonal pyramid ,side of base 25 mm and axis 55 mm long, lies with one of its slant edges on H.P such that its axis is parallel to V.P. Draw its projections.

5   A pentagonal pyramid side of base 36 mm and height 64 mm rests on its base on HP with one of its base sides parallel to VP. A section plane perpendicular to VP and inclined at 30^0 to HP cuts the pyramid, bisecting its axis. Draw the development of the truncated pyramid.

6   Draw the elevation, plan and right side views of the part shown in the picture below (dimensions in mm).
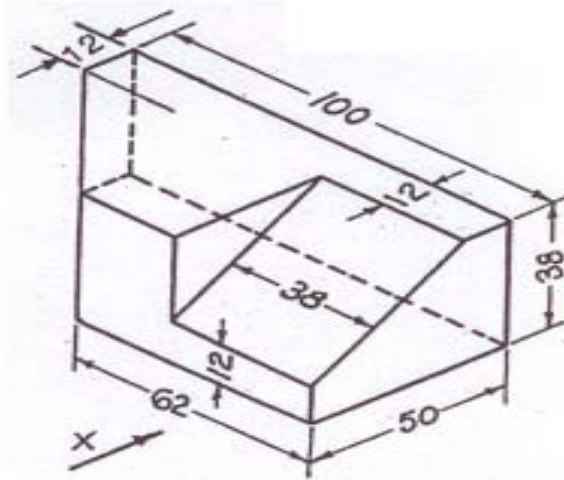
7   A cylinder with a 70 mm base diameter is resting on its base on the H.P. It is penetrated by another cylinder with a 50 mm base diameter, the axis of which is parallel to both the principal planes. The two axes are 10 mm apart. Draw the projections of the combination and show the curves of intersection.

8   A pentagonal prism having base with a 40 mm and a 60 mm long axis lies on its base in the GP with a face parallel to and 15 mm behind the PP. The station point lies in a CP which is 50 mm towards right of the axis, 65 mm in front of PP and 80 mm above GP. Draw its perspective view.

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Code: 9A03101a

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to ECE, E.Con.E & BT)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) To inscribe a regular octagon in a given square of 50 mm side.
   (b) Construct a parabola with base 60 and length of the axis 40. Draw a tangent to the curve at point 20 from the base. Also locate the focus and directrix to the parabola.

2 (a) A line CD is parallel to VP and inclined at 40^0 to HP. C is in HP and 25 mm in front of VP. The length of the top view is 50 mm. Determine its true length.
   (b) A line measuring 80 mm long has one of its ends 60 mm above HP and 20 mm in front of VP. The other end is 15 mm above HP and in front of VP. The front view of the line is 60 mm long. Draw the top view.

3 (a) A rectangular lamina of sides 40 × 60 rests on H.P on one of its longer sides the lamina is tilted about an edge on which it rests till the plane is inclined to H.P at 45^0. The edge on which it rests is perpendicular to V.P. Draw its projections.
   (b) Draw the projections of regular hexagon of 25 mm side having one of its edge in H.P and inclined at 60^0 to V.P and its surface making an angle of 60^0 to H.P.

4 (a) Draw the projections of a cone, base 75 mm diameter and axis 100 mm long, lying on one of its generators with parallel to the V.P.
   (b) A tetrahedron of 5 cm long edges is resting on the H.P. on one of its faces, with an edge of that face parallel to the V.P. Draw its projections and measure the distance of its apex from the ground.

5   The distance between the opposite parallel faces of a 50 mm thick hexagonal block is 75 mm. The block has one of its rectangular faces parallel to the H.P and its axis makes an angle of 30^0 with the V.P. It is cut by a section plane making an angle of 30^0 with the H.P. normal to the V.P. and bisecting the axis. Draw its sectional top view and another top view on a plane parallel to the section.

6   Draw the elevation, plan and left and right views of the bracket shown in the picture below (dimensions in mm).
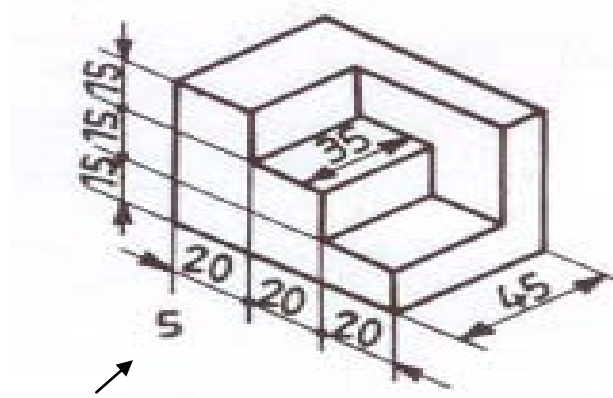
7   A vertical square prism of side of base 60 mm is penetrated by a horizontal triangular prism of 40 mm side. The axes are 5 mm apart. One rectangular face of the vertical prism is inclined at an angle of 60^0 to VP, while that of the horizontal prism is parallel to VP. Draw the projections showing the lines of intersection.

8   A pentagonal pyramid having a base with a 40 mm side and a 60 mm height rests on the GP with an edge of the base parallel to and 10 mm behind the PP. The station point is 75 mm above the GP and 60 mm in front of the PP and lies in a CP which is 40 mm towards the right of the axis of the pyramid. Draw its perspective projection.

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Code: 9A03101a

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to ECE, E.Con.E & BT)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Draw a hypo cycloid of a circle of 50 mm diameter, which rolls inside another circle of 180 mm diameter for one revolution counter clockwise.
   (b) Draw the involute of a square of side 25 mm.

2 (a) A line AB 65 mm long has its end A in the H.P. and 15 mm in front of the V.P. The end B is in the third quadrant. The line is inclined at 30^0 to the H.P and at 60^0 to the V.P. Draw its projections.
   (b) A line PQ 75 mm long has its end P in both HP and VP. It is inclined at an angle of 30^0 to HP and 45^0 to VP. Draw projections of the line.

3 (a) A square ABCD of 50 mm side has its corner A in the H.P, its diagonal AC inclined at 30^0 to the H.P and the diagonal BD inclined at 45^0 to the H.P. Draw its projections.
   (b) Draw the projections of a circle of 5 cm diameter, having its plane vertical and inclined at 30^0 to V.P. Its center is 3 cm above the H.P and 2 cm in front of the V.P.

4 (a) Draw the projections of a cylinder 75 mm diameter and 100 mm long, lying on the ground with its axis inclined at 30^0 to the V.P and parallel to the ground.
   (b) A triangular prism base 40 mm side and height 65 mm is resting on the H.P on one of its rectangular faces with the axis parallel to the V.P. Draw its projections.

5   A pentagonal pyramid, edge of base 25 mm long and height 50 mm is resting on the H.P on a corner of its base in such a way that the slant edge containing that corner makes an angle of 60^0 with the H.P and is parallel to the V.P it is cut by a section plane making an angle of 30^0 with the V.P perpendicular to the H.P and passing through a point on the axis at a distance of 6 mm from its base. Draw its sectional front view and true shape of the section.

6   Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm).
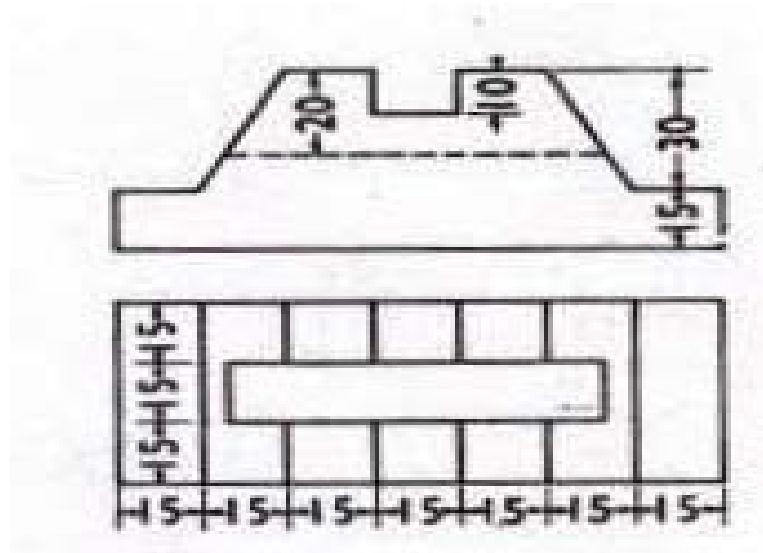
7   A square pipe of 60 mm side is connected to another square pipe of side 45 mm. The axis of bigger pipe is vertical and the axis of the smaller pipe intersects the axis of the bigger pipe at an angle of 45^0. All the faces of both the pipes are equally inclined to V.P. Draw the projections showing the lines of intersection.

8   A square prism having base with a 40 mm side and 60 mm long axis is resting on its rectangular face on the GP with axis inclined at 45^0 to PP. A side of base nearer to the PP is 20 mm behind it and 20 mm to the left of the station point. The station point is 80 mm in front of PP and 70 mm above GP. Draw its perspective view.

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Code: 9A03101b

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to CE, CSE & CSSE)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Construct a parabola with the length of base as 60 mm and axis 30 mm long. Also draw a tangent to the curve at a point 25 mm from the base.
   (b) The major and minor axis of an ellipse is 120 and 80 mm. Draw an ellipse by arcs of circles method.

2   A line AB 120 mm long is inclined at 45^0 to HP and 30^0 to the VP. It's mid –point C is in VP and 20 mm above HP. The end A is in third quadrant and B is in first quadrant. Draw the projections of the line.

3 (a) Draw the projections of a regular hexagon of 25 mm side, having one of its sides in the H.P. and inclined at 60^0 to the V.P and its surface making an angle of 45^0 with the H.P.
   (b) Draw the projections of a circular disc of 120 mm diameter resting on HP on a point on the circumference with its surface inclined at 50^0 to HP and perpendicular to VP.

4 (a) A hexagonal pyramid base 25 mm side axis 50 mm long has edge of its base on the ground. Its axis is inclined at 30^0 to ground, and parallel to V.P. Draw projections.
   (b) Draw the projections of a cone base 75 mm diameter and axis 100 mm long, lying on the H.P on one of its generators with the axis parallel to the V.P.

5 (a) A right circular cone of 50 mm base diameter and of altitude 60 mm is lying on one of the generator on HP, such that the axis of the cone is parallel to VP it is cut by a section plane to HP and perpendicular to VP and 30 mm above HP. Show the sectional plan and elevation of the solid.
   (b) A sphere of 60 mm diameter is cut by a section plane perpendicular to the VP, inclined at 45^0 to the HP and at a distance of 15 mm from its centre. Draw the sectional plan and true shape of section.

6   Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)
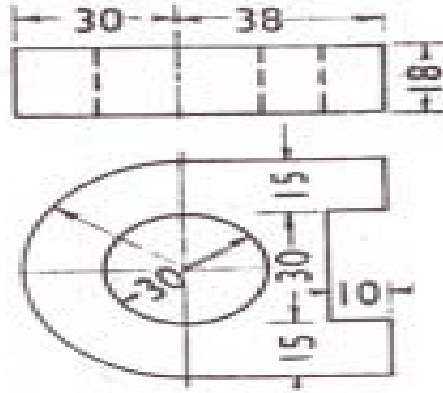
7   (a)   A vertical cylinder of diameter 80 mm intersects a horizontal cylinder of diameter 40 mm. The shortest distance between their axes is 40 mm. Draw the projections showing the intersection profile.

    (b)   A horizontal cylinder of 50 mm diameter penetrates a vertical cylinder of 75 mm diameter resting on HP. The two axes are coplanar. The axis of the horizontal cylinder is 50 mm above the HP. Draw the projections showing the curves of intersection.

8   A composite plane is made up of a rectangle with 60 mm and 40 mm sides and a semicircle on its longer side. Draw its perspective view when it is lying in the GP. The longer side is perpendicular to PP and the shorter side is 10 mm behind it. The station point is 50 mm in front of the PP, 60 mm above the GP and lies in the CP which is 50 mm to the right of the centre of the semicircle.

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2

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to CE, CSE & CSSE)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) A circle of 75 mm diameter rolls on another circle of 115 mm diameter with internal contact. Draw the locus of a point on the circumference of the rolling circle for its one complete revolution.

   (b) Draw the involute of an equilateral triangular of side 20 mm.

2   The mid-point of line is 80 mm long is 25 mm above HP and 30 mm in front of VP. The line inclined at an angle of 30^0 to HP and 40^0 VP. Draw its projections.

3 (a) A circular lamina of 42 mm diameter has its surface parallel to HP and perpendicular to VP. Its center is above 15 mm HP and 30 mm in front of VP. Draw its projections.

   (b) An equilateral triangular lamina of side 50 mm is perpendicular to both planes. Draw its projections.

4 (a) A square prism, side of base 35 mm and height of 50 mm rests with its base on H.P. such that one of its rectangular faces is inclined at an angle of 30^0 to V.P. Draw its projections.

   (b) Draw the projections of a square pyramid having one of its triangular faces in the V.P. and the axis parallel to and 40 mm above the H.P base 30 mm side axis 75 mm long.

5 (a) A cone of base diameter 50 mm and axis length 60 mm is resting on HP on its base. It is cut by a plane inclined at 40^0 to VP and perpendicular to HP that cuts the cone at distance 10 mm from the axis and in front of it. Draw its top view, sectional front view and true shape of section.

   (b) A square pyramid of base side 30 mm and axis length 60 mm is resting on HP on its base with a side is inclined at 30^0 to VP. It is cut by a plane perpendicular to both HP and VP and is 10 mm away from the axis. Draw its top view, front view and sectional side view.

6   Two views of a casting are shown below. Draw the isometric projection of the casting (dimensions are in mm)
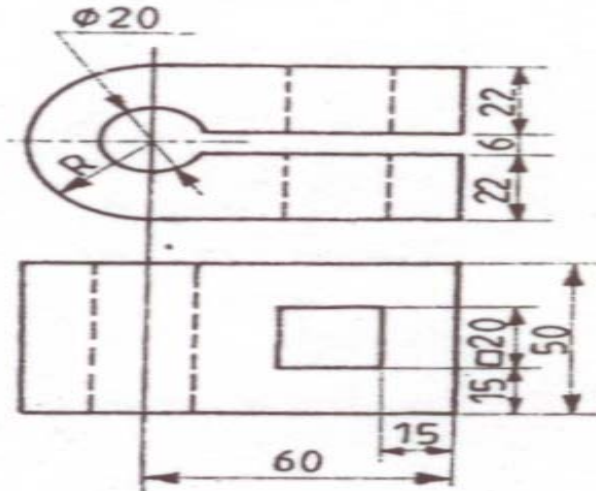
7 (a) A right circular cylinder of 60 mm diameter penetrates another cylinder of 80 mm diameter. Their axes are at right angles to each other, but 8 mm apart. Draw the projections of the curves of intersection on a plane parallel to the axes of the cylinders.
   (b) A vertical pipe, 60 mm diameter has a horizontal branch of 40 mm diameter on one side. The axis of the horizontal pipe is 6 mm from the axis of the main pipe and parallel to VP. Draw the projections of the pipe showing the curves of intersection.

8   Draw the perspective projection of a shed with one corner of the longer side of the roof touching the PP at a point. The eye is 5 m in front of the point touching the PP and 2 m above the GP. The roof of the shed is supported on four pillars of 50 cm x 50 cm x 6 m high. The roof comprises of two rectangular surfaces of 15 m x 5 m inclined mutually at 120^0. Assume that the outer surfaces of the pillars are in flush with the sides of the roof at the corners.

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3

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to CE, CSE & CSSE)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Draw a hypo-cycloid of a circle of 40 diameters, which rolls inside another circle of 160 diameters, for one revolution counter clockwise.

(b) Draw the involute of a regular hexagon of side 20 mm. Draw a tangent and normal to the curve at a distance of 100 mm from the center of the hexagon.

2 The mid-point of straight line AB is 60 mm above HP and in front of VP. The line measures 80 mm long and inclined at an angle of 30^0 to HP and 45^0 VP. Draw its projections.

3 (a) A rectangular lamina of sides 30 mm × 40 mm is perpendicular to HP and inclined at 30^0 to VP. Draw its projections.

(b) A square lamina ABCD of side 40 mm is perpendicular to HP and parallel to VP. Draw its projections.

4 (a) A cube of 40 mm side rests with one of its square faces on H.P such that one of its vertical faces is perpendicular to V.P. Draw its projections.

(b) A rectangular prism side of base 40 mm × 25 mm and height 60 mm rests with its base on H.P such that one of its larger rectangular faces is parallel to V.P. Draw its projections.

5 (a) A cone of base diameter 50 mm and axis length 75 mm in resting on HP on its base is cut by a plane inclined at 45^0 to HP and perpendicular to VP and is bisecting the axis. Draw the front view and sectional top view and true shape of this section.

(b) A pentagonal prism of base side 30 mm and axis length 60 mm is resting on HP on one of its rectangular faces, with its axis is perpendicular to VP. It is cut by a plane inclined at 40^0 to VP and perpendicular to HP and passing through a point 25 mm from rear base of the prism. Draw its top view, sectional front view and true shape of section.

6   Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)
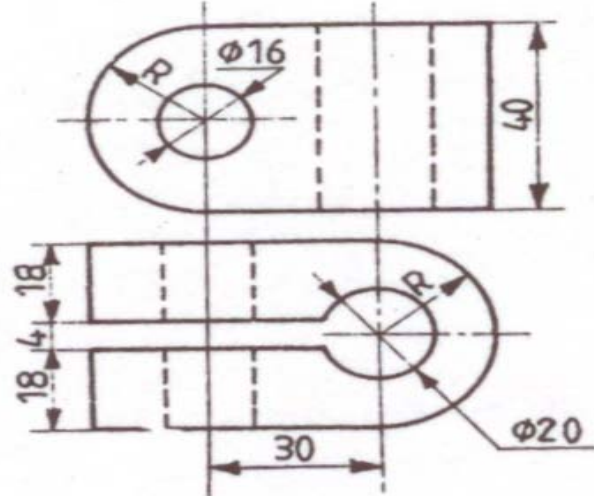
7   (a)   A horizontal tube of 30 mm diameter is joined with an another vertical tube of 60 mm diameter. Their axis is 15 mm apart. Draw the intersection curves, when the axis of the horizontal tube is parallel to VP.

    (b)   A vertical square prism of side of base 50 mm has a face inclined at an angle of 30^0 to VP. It has circular hole of 65 mm diameter drilled through. The axis of the hole is parallel to both HP and VP and is 5 mm away from the axis of the prism. Draw the projections, showing the lines of intersection.

8   A solid is in the form of a square prism of side of base 20 mm up to a height of 35 mm and thereafter tapers into the frustum of a square pyramid. Whose top surface is a square of side 10 mm. Total height of solids is 50 mm. Draw the solid in perspective, given that a side of its base rests on GP parallel to PP. The end of the side nearest to the edge is 20 mm to the right of the eye and 15 mm behind PP. The eye is 70 mm from PP and 60 mm above GP.

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Code: 9A03101b

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to CE, CSE & CSSE)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Draw the involute of an equilateral triangular of side 20 mm.
   (b) A tread of length 165 mm is wound round a circle of 40 mm diameter. Trace the path of end point of the tread.

2   A line MN is 70 mm long. It's mid –point is 30 mm above HP and 25 mm in front of VP. The line inclined at an angle of 45^0 to HP and 35^0 VP. Draw its projections.

3 (a) Draw the projections of regular pentagon of 40 mm side, having its surface inclined at 30^0 to VP and the side on which it rests on VP, makes an angle of 60^0 with HP.
   (b) Draw the orthographic views of a regular hexagonal lamina of 25 mm side, resting on HP on one of its sides with its plane perpendicular to HP and inclined at 45^0 to VP. Take the nearest corner point 25 mm away from VP.

4 (a) A cone of base 60 mm diameter and height 80 mm is resting on a point on the circumference of base on HP with its apex 55 mm above the HP. Draw its projections when its axis is inclined to the VP at 45^0.
   (b) A pentagonal pyramid, side of base 25 mm and axis 55 mm long, lies with one of its slant edges on H.P such that its axis is parallel to V.P. Draw its projections.

5 (a) A hexagonal pyramid side of the base 30 mm and altitude 70 mm rests with its base on HP and with a side of the parallel to VP. It is cut by a cutting plane inclined at 35^0 to HP and perpendicular to VP and is bisecting the axis. Draw the sectional plan of the pyramid and the true shape of the section.
   (b) A cylinder of base diameter 45 mm and height 65 mm rests on its base on HP. It is cut by a plane perpendicular to VP and inclined at 30^0 to HP and meets the axis at a distance 30 mm from base. Draw the front view, sectional top view, and the true shape of section.

6   Two views of a model are shown below. Draw the isometric projection of the model (dimensions are in mm)
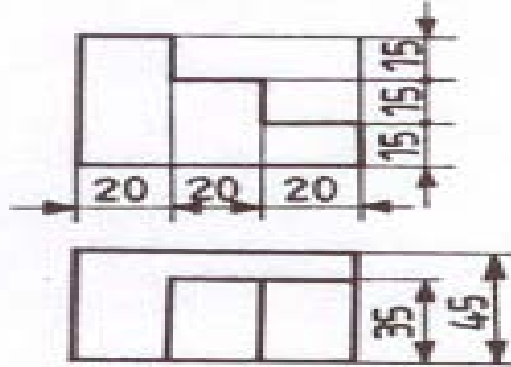
7   A right circular cone of base 50 mm and altitude 80 mm standing on HP with its axis vertical is penetrated by a cylinder of diameter 20 mm such that the axes intersect at an angle of 60^0 at a height of 35 mm from the base and the plane containing the axes is parallel to VP. Draw the curves of intersection.

8   A 25 mm thick octagonal slab rests with its base on ground and supports a square pyramid of 50 mm height and edge of base 40 mm on it such that each corner of the base of the pyramid rests on a top corner of the slab. Draw the perspective projection of the arrangement with the axis of the pyramid 75 mm behind the PP and 60 mm to the left of the eye. One of the rectangular faces of the octagonal slab is parallel to the PP. The eye is 125 mm in front of the PP and 100 mm above the ground.

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1

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to AE, EEE & ECM)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) A parallelogram has sides 100 and 80 mm at an included angle of 70^0. Inscribe an ellipse in the parallelogram. Find the major and minor axis of the curve.
   (b) Draw an ellipse by concentric circles method and find the length of the minor axis with the help of the following data:
        (i) Major axis = 100 mm. (ii) Distance between foci 80 mm.

2 (a) A line CD measures 80 mm is inclined at an angle of 30^0 to HP and 45^0 to VP. The point C is 20 mm above HP and 30 mm in front of VP. Draw the projections of the line.
   (b) Draw the projections of a line JK 70 mm long and touching both HP and VP. It is inclined at 40^0 to HP and 35^0 to VP.

3 (a) An equilateral triangular lamina of side 30 mm is perpendicular to H.P and parallel to V.P One of its edges 15 mm above H.P and 25 mm in front of V.P. Draw its projections.
   (b) A rectangular plate of negligible thickness and having 40 X 60 mm dimensions is perpendicular to both planes. It is longer side is perpendicular to V.P and in H.P and 20 mm in front of V.P. Draw its projections.

4 (a) Draw the projections of a hexagonal prism side of base 25 mm and height 60 mm resting with its base on H.P such that one of its rectangular faces is parallel to V.P.
   (b) A pentagonal pyramid of base 25 mm side and axis 60 mm long is resting on H.P on a base corner with edge of base containing that corner making 30^0 angle with H.P. Draw the projection of pyramid when its axis perpendicular to V.P and base is 15 mm from V.P.

5 (a) A square pyramid of base side 35 mm and axis length 60 mm is resulting on HP on one of its triangular faces with its axis parallel to VP. It is cut by a plane inclined at 45^0 to VP and perpendicular to HP and is bisecting the top view of the axis. Draw its top view, sectional front view and true shape of section.
   (b) A hexagonal prism of base side 25 mm and axis length 60 mm is resting on HP on one of its base sides, with its axis inclined at 50^0 to HP and parallel to VP. It is cut by a plane inclined 65^0 to HP and perpendicular to VP and is passing through the top most edges e prism. Draw the front view, sectional top view and true shape of section.

6   Two views of a grip are shown below. Draw the isometric view of the grip (dimensions are in mm)
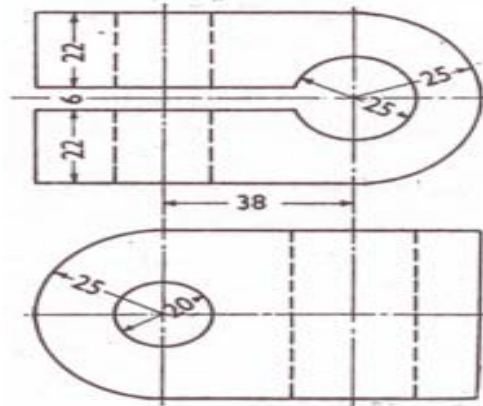
7   A cylindrical pipe of 36 mm diameter has a similar branch of the same size. The axis of the branch intersects the axis of the main pipe at an angle of 60^0. Draw the projections, when the two axes lie in a plane parallel to the VP and the axis of the main pipe is vertical. Also, develop the surfaces of the two pipes assuming suitable lengths.

8   A model of steps has three steps of 15 mm tread and 10 mm rise. The steps measure 60 mm width wise. Draw the perspective projection of the model when placed with its first step 25 mm within the picture plane and the longer edge being parallel to it. The station point is 95 mm from the picture plane and 60 mm above the ground and lies on the central line.

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Code: 9A03101c

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to AE, EEE & ECM)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Construct a rectangular hyperbola when a point P on it is at a distance of 18 mm and 34 mm from two asymptotes. Also draw a tangent to the curve at a point 20 mm from an asymptote.

(b) The vertex of a hyperbola is 60 mm from its focus. Draw the curve, if the eccentricity is 3/2. Draw a normal and a tangent at a point on the curve, 75 mm from the directrix.

2 (a) Draw the projections of a line LM 40 mm long, parallel to HP and inclined at 35^0 to VP. The end L is 20 mm above HP and 15 mm in front of VP. Find its traces.

(b) One end R of a straight line RS is 35 mm above HP and 25 mm in front of VP. The other end S is 20 mm below HP and 55 mm behind VP. The distance between the projectors is 50 mm. Determine the true length, inclinations of the line RS and its traces.

(c) A line AB 40 mm long is parallel to VP and inclined at 35^0 to HP. The end A is 15 mm above HP and 20 mm in front of VP. Draw the projections of the line and find its traces.

3 (a) Draw the projections of a pentagonal plane figure of side 28 mm resting with one of its edges on HP. Such that the plane figure is inclined at 30^0 to VP perpendicular to HP.

(b) A thin square plate ABCD of side 40 mm is perpendicular to both HP and VP. Draw its projections.

4 (a) Draw the projection of cylinder of base diameter 50 mm and axis 65 mm long axis perpendicular to the V.P and 40 mm above H.P, one end is 20 mm in front of V.P.

(b) A pentagonal pyramid of base 25 mm side and axis 65 mm long is resting on an edge of base. Draw the projections of pyramid when axis is perpendicular to V.P base is at 15 mm from V.P.

5 (a) A pentagonal prism of base side 30 mm and axis length 60 mm is resting on HP on one of its rectangular faces with its axis perpendicular to VP. It is cut by a plane inclined at 50^0 to HP and perpendicular to VP and is 15 mm away from axis. Draw it, front view, sectional top view and true shape of section.

(b) A square pyramid of base side 25 mm and height 60 mm rests on HP on its base with a base edge perpendicular to VP. It is cut by a plane perpendicular to VP and inclined at 30^0 to HP the cutting plane meets the axis at 25 mm from the vertex. Draw the elevation, sectional plan and true shape of the section.

6   Two views of a bracket are given below. Draw the isometric view of the bracket (dimensions are in mm)
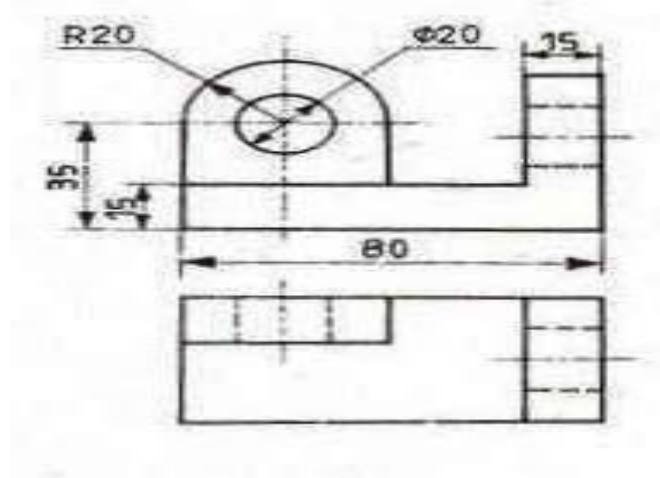
7   A vertical square prism, base 50 mm side, has a face inclined at 30^0 to the VP. It has a hole of 65 mm diameter drilled through it. The center line of the hole is parallel to both the HP and the VP and is 5 mm away from the axis of the prism. Draw the projections of the prism and show the curves of intersection.

8   A square plane with a 60 mm side lies on the GP with the edge nearer to the observer lying in the PP. The station point is 50 mm in front of pp, 60 mm above GP and lies in a CP which is 50 mm towards right of the centre of the object. Draw its perspective view.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to AE, EEE & ECM)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) The major axis of an ellipse is 100 mm long and the distance between its foci is 70 mm. Draw the ellipse.
   (b) Draw a hyperbola having the double ordinate of 100 mm, the abscissa of 60 mm and the transverse axis of 100 mm.

2 (a) A line PQ, 9 cm long is in the H.P and makes an angle of 30 degrees with the V.P. Its end P is 2.5 cm in front of the V.P. Draw its Projections.
   (b) A 100 mm long line is parallel to and 40 mm above the H.P. Its two ends are 25 mm and 50 mm in front of the V.P respectively. Draw the projections of the line and determine its inclination with the V.P.

3 (a) A square lamina of 40 mm side is perpendicular to H.P. One of its sides is 20 mm above H.P and 15 mm in front of V.P. Draw its projections.
   (b) A square lamina of 40 mm is perpendicular to both planes. Draw projections with lamina is 25 mm above H.P and 40 mm in front of V.P.
   (c) An equilateral triangle lamina of side 60 mm is perpendicular to H.P and inclined to V.P at an angle of 30^0. Draw its projections.

4 (a) Draw the projections of hexagonal pyramid with side of base 30 mm and axis 70 mm long resting with slant face on H.P such that axis parallel to V.P.
   (b) Draw the projections of a right circular cone of base 40 mm diameter and height 60 mm when resting with its base on H.P.

5 (a) A cylinder of base diameter 40 mm and axis length 60 mm is resting on HP on one of its generators with its axis parallel to VP. It is cut by a plane inclined at 40^0 to VP and perpendicular to HP and is bisecting the axis of the cylinder. Draw its top view, sectional front view and true shape of section.
   (b) A hexagonal prism of side 50 mm is resting on HP on one of its base with two vertical faces being parallel to VP. It is cut by a vertical plane inclined at 45^0 to VP and is 8 mm away from the axis. Draw its top view, sectional front view and true shape of section.

6   Two views of a casting are shown below. Draw the isometric Projection of the casting (dimensions are in mm)
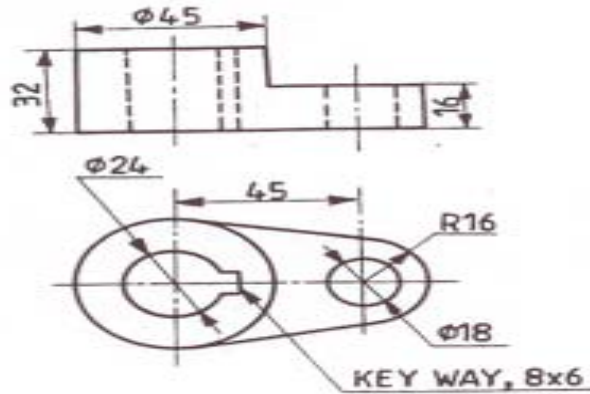
7   A vertical cylinder of 60 mm diameter is penetrated by a square prism of 35 mm side. The axis of the prism is inclined at an angle of 30^0 to the ground, but parallel to the VP. The faces of the prism are equally inclined to the VP and the axis of the prism is 10 mm in front of the axis of the cylinder. Draw the projections of the solids showing the curves of interpenetration.

8   A hexagonal prism having 30 mm base side and 70 mm long axis is resting on its face in the GP with the axis inclined at 30^0 to the PP. The station point is 90 mm in front of PP, 100 mm above the GP and lies in the CP which is 70 mm rightwards to the corner nearer to the PP. Draw a perspective view when the corner nearer the observer touches the PP.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to AE, EEE & ECM)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) A circle of diameter 40 mm rolls inside another circle of radius 60 mm. Draw the hypo cycloid traced by a point on the rolling circle initially in contact with the directing circle for one revolution.

(b) A circle of 50 mm diameter rolls along a line for one revolution clock-wise. Draw the locus of the point on the circle, which is in contact with the line.

2 (a) A line AB 75 mm long is inclined at 45^0 to the H.P and 30^0 to the V.P. Its end B is in the H.P and 40 mm in front of the V.P. Draw the projections.

(b) A line AB is 30 mm long and inclined at 30^0 to VP and parallel to HP. The end A of the line is 15 mm above HP and 20 mm in front of VP. Draw the projections.

3 (a) An isosceles triangle ABC of base 60 mm and altitude 75 mm has its base AC in HP and inclined at 30^0 to VP. The corners A and B are in VP. Draw its projections.

(b) Draw the projections of a regular pentagon of 25 sides, with its surface making an angle of 45^0 with H.P. One of the sides of the pentagon is parallel to H.P and 15 away from it.

4 (a) A hexagonal prism base 30 mm side and axis 75 mm long, has an edge of the base parallel to the H.P. and inclined at 45^0 to the V.P. Its axis makes an angle of 60^0 with the H.P. Draw its projections.

(b) A triangular prism side of base 35 mm and height 60 mm lies with one of its longer edges on H.P such that its axis is parallel to both H.P and V.P Draw its projections.

5 (a) A sphere of 60 mm diameter is cut by a cutting plane inclined at 55^0 to VP and perpendicular to HP and it is 12 mm away from the center of the sphere. Draw its top view, sectional front view and true shape of section.

(b) A cone, diameter of base 45 mm and axis 60 mm is resting on its base on the HP. It is cut by a section plane perpendicular to the VP and inclined at 80^0 to the HP. The section plane passes through the apex. Draw the sectional top view and also obtain the true shape of the cut section.

6   Two views of a piece are given below. Draw the isometric view of the piece (dimensions are in mm)
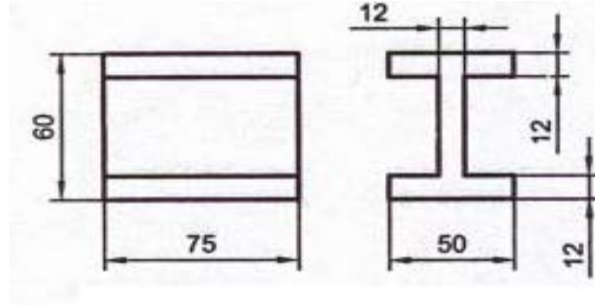
7   A pentagonal prism, having base with a 45 mm side and a 100 mm long axis, is resting on its base on the H.P. with a side of the base parallel to the V.P. It is penetrated by a square prism having base with a 35 mm side and a 100 mm long axis, such that the axes of both the prism bisect each other at right angles. The faces of the square prim are equally inclined to the H.P. Draw the projections of the combination and show the lines of intersection.

8   A cylinder with a 40 mm base diameter and 50 mm long axis rests on the GP with its axis parallel to and 30 mm behind the PP. The station point is 80 mm above the ground and at a distance of 50 mm in front of the PP and lies in the CP which passes through the axis of the cylinder. Draw its perspective projection.

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Code: 9A03101d

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to ME, EIE & IT)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) A circle of 40 mm diameter rolls along a line for one revolution clockwise. Draw a locus of a point on the circle, which is in contact with the line. Also draw a tangent and a normal to the curve at a point 35 mm from the directing line.
   (b) Draw an involute of a circle of 30 mm diameter for one complete revolution.

2 (a) Draw the projections of a point A lying on HP and 50 mm in front of VP.
   (b) Draw the projections of a point A lying on VP and 55 mm above HP.
   (c) A point D is 35 mm below HP and 35 mm behind VP. Draw the projections.
   (d) A point S is 35 mm above HP and 55mm behind VP. Draw the projections

3 (a) A regular hexagonal lamina of 22 mm side rests on one of its sides on HP. It is parallel to and 15 mm away from VP. Draw its projections.
   (b) A regular hexagonal plane surface of 25 mm side has two of its edges parallel to both HP and VP and the nearest edge is 1.5 mm from each plane. The surface is inclined at an angle of 60^0 to HP. Draw the projections.

4 (a) Draw the projections of a cube of 30 mm edge, resting in the H.P on one of its corners with a solid diagonal parallel to both H.P and V.P.
   (b) A cone of base 50 mm diameter and axis 65 mm long, lies with one of its generators on H.P and its axis parallel to V.P. Draw its projections.

5   A pentagonal pyramid, base 30 mm side and axis 75 mm long has its base horizontal and an edge of the base parallel to the V.P it is cut by a section plane, perpendicular to the V.P inclined at 60^0 to the H.P and bisecting the axis. Draw the front view and the top view when the pyramid is tilted so that it lies on its cut-face on the ground with the axis parallel to the V.P show the shape of the section by dotted lines. Develop the surface of the truncated pyramid.

6   Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)
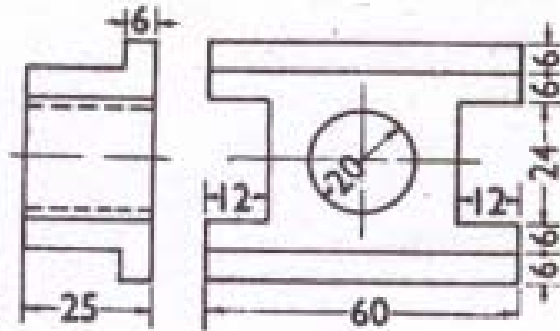
7   A cylinder of 60 mm diameter stands vertically on its base. It is pierced by a horizontal square prism of 35 mm side of base such that the axes of the two solids intersect each other at right angles. A face of the prism is inclined at an angle of 60^0 to HP and 30^0 to VP. Draw the projections of the solids, showing the lines of intersection.

8   The frustum of a square pyramid with a 50 mm base edge, 25 mm top edge and 40 mm height rests on its base in the GP with an edge of the base inclined at 30^0 to the PP and axis 40 mm behind it. The station point is 70 mm above the GP and 60 mm in front of the PP and lies in a CP which is 40 mm towards the right of the axis. Draw its perspective projection.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to ME, EIE & IT)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Draw the involute of a circle 40 mm diameter. Draw a tangent and normal to the curve at a point 95 mm from the center of the circle.
   (b) Draw the involute of a regular hexagon of side 25 mm. Draw a tangent and normal to the curve at a distance of 100 mm from the center of the hexagon.

2 (a) A point M is 35 mm above HP and 40 mm in front of VP. Draw its projections.
   (b) A point B is 45 mm above HP and 60 mm behind VP. Draw the projections.
   (c) Draw the projections of a point B lying on HP and 55 mm in front of VP.
   (d) A point M is 60 mm below HP and 45 mm in front of VP. Draw the projections.

3 (a) A triangular lamina of 50 mm side, is standing on one of its sides, which is inclined 45^0 to VP and surface of the lamina is making an angle of 30^0 to HP. Draw its projections.
   (b) A regular pentagonal plate of side 28 mm is placed with one side on HP such that the surface is inclined at 45^0 to HP and perpendicular to VP. Draw its projections.

4 (a) A square prism side of base 30 mm and axis 50 mm long, has an edge of its base in H.P. Its axis is inclined at 60^0 to H.P and parallel to V.P. Draw its projections.
   (b) A square prism side of base 40 mm and axis 60 mm long, rests with one of its base corners on H.P its base makes on angle of 45^0 to H.P and its axis is parallel to V.P. Draw its projections.

5   A tetrahedron of 65 mm long edges is lying on the H.P on one of its faces, with an edge perpendicular to the V.P it is cut by a section plane which is perpendicular to the V.P so that the true shape of the section is an isosceles triangle of base 50 mm long and altitude 40 mm. Find the inclination of the section plane with the H.P and draw the front view, sectional top view and the true shape of the section.

6   Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)
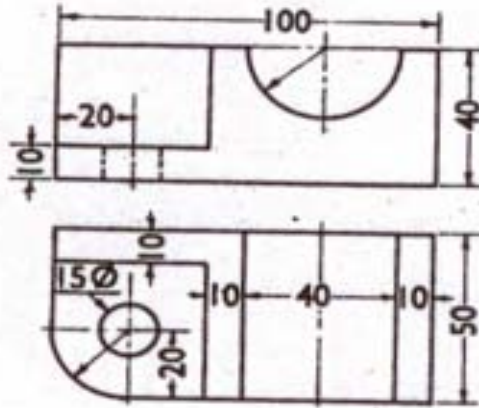
7   A square prism, having base with a 50 mm side, is resting on its base on H.P with the faces equally inclined to the V.P. It is completely penetrated by a horizontal cylinder with a 50 mm base diameter such that their axes of bisect each other at right angles. Assuming suitable lengths of both the solids draw their projections and show the curves of intersection.

8   The frustum of a hexagonal pyramid with a 40 mm base edge, 20 mm top edge and 40 mm long axis, rests on the GP with an edge of the base parallel to and 10 mm behind the PP. The station point is 40 mm above the ground and at a distance of 70 mm in front of the PP and 50 mm towards the right of the axis of the pyramid. Draw its perspective projection.

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3

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to ME, EIE & IT)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Divide a given line 125 mm in 9 equal parts.
   (b) Inscribe a pentagon in a circle of 50 mm diameter.
   (c) Construct an ellipse, with distance of the focus from the directrix as 50 mm and eccentricity as 2/3. Also draw normal and tangent to the curve at a point 40 mm from the directrix.

2 (a) A line AB of 100 mm length is inclined at an angle of 30^0 to HP and 45^0 to VP. The point A is 15 mm above HP and 20 mm in front of VP. Draw the (i) Front view. (ii) Top view
   (b) A line AB of 100 mm length is inclined at 30^0 to HP and 45^0 to VP. The point A is 15 mm above HP and 20 mm in front of VP. Draw the projections of the line.

3 (a) A square ABCD of 50 mm side has its corners A in H.P its diagonal AC is inclined at 30^0 to H.P and the diagonal BD is inclined at 45^0 to V.P and parallel to H.P. Draw its projections.
   (b) A thin 30^0-60^0 set square has its longest edge in V.P and inclined at 30^0 to H.P. Its surface makes an angle of 45^0 with V.P. Draw its projections.

4 (a) A hexagonal pyramid, side of base 25 mm and axis 50 mm long, rests with one of the edges of its base on H.P and its axis is inclined at 30^0 to H.P and parallel to V.P. Draw its projections.
   (b) A pentagonal prism side of base 25 mm and axis 50 mm long rests with one of its shorter edges on H.P such that the base containing that edge makes an angle a 30^0 to H.P. and its axis is parallel to V.P. Draw its projections.

5   A hexagonal pyramid of side of base 24 mm and height 56 mm is resting on its base in the HP with one of the sides of the base parallel to VP. It is cut by a plane normal to VP and inclined at 30^0 to HP and passing through a point P at 16 mm from the apex on the axis. It is also cut by an another plane perpendicular to VP and passing through the same point P and perpendicular to previous section plane. The portion containing the apex removed. Draw the sectional top view and the development of the lateral surface of the remaining solid such that the developed surface is symmetrical.

6   Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)
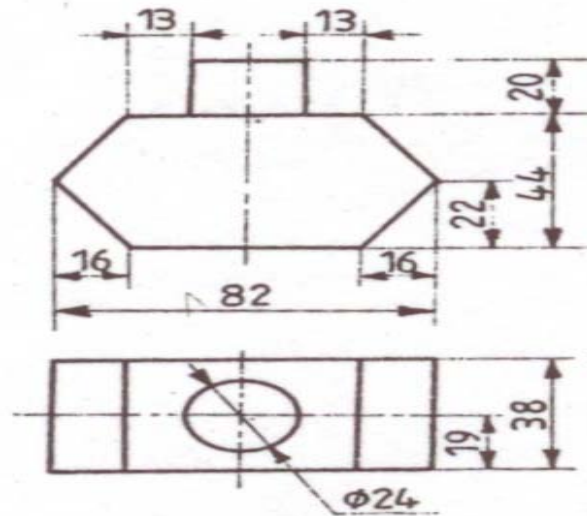
7   A square prism, having base with a 60 mm side and a 100 mm long axis, is resting on its base on H.P with the faces equally inclined to the V.P. It is completely penetrated by a hexagonal prism having base with a 30 mm side and a 100 mm long axis having a face parallel to H.P. The axes of the prisms bisect each other at right angles. Draw their projections and show the curves of intersection.

8   Draw the perspective projection of a cube of side 55 mm resting on the ground plane on its base with all the vertical faces equally inclined to the picture plane. One vertical edge is touching the picture plane and is 15 mm to the left of the station point which is 60 mm above the ground and 50 mm in front of the picture plane.

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Code: 9A03101d

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING DRAWING
(Common to ME, EIE & IT)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) To construct a pentagon length of a side is 30 mm.
   (b) To draw an arc passing through three points not in straight line.
   (c) Construct a parabola, with the distance of the focus from the directrix as 50 mm, also draw normal and tangent to the curve at a point 40 mm from the directrix.

2 (a) Draw the projections of a line CD 30 mm long, parallel to HP and inclined to VP. The end C is 10 mm in front of VP and D is 20 mm in front of VP. The line is 15 mm above HP. Also find the traces.
   (b) A line RS 4o mm long is parallel to both planes. It is 20 mm above HP and 15 mm in front of VP. Draw projections and its traces.

3 (a) A square lamina of 50 mm side is inclined at 45^0 to V.P and parallel to H.P. Draw it projections.
   (b) An equilateral triangle lamina of side 30 mm parallel to H.P and to V.P. One of its side is 20 mm in front of V.P and 30 mm above H.P. Draw its projections.

4 (a) Pentagonal prism base 30 mm side and axis 60 mm long has an edge of its base in H.P. Axis is inclined at 45^0 to ground and parallel to V.P. Draw the projections.
   (b) Draw the projection of a cone, base 75 mm diameter and axis 100 mm long lying on H.P with its axis parallel to V.P and inclined at 30^0 to H.P.

5   A pentagonal prism, side of base 45 mm and height 130 mm, is kept on the ground on its base with one of the vertical faces which is away from the observer parallel to VP. A circular hole of diameter 74 mm is cut through it, so that the axis of the hole is bisecting the axis of the prism and it is parallel to HP and VP. Draw the development of the lateral surface of the prism.

6   Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)
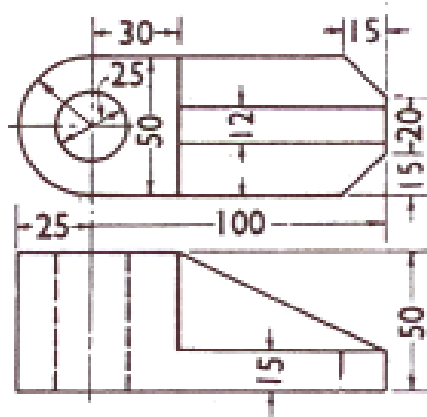
7   A square prism, having base with a 60 mm side and 100 mm long axis, is resting on its base on the H.P with a face inclined at 30^0 to the V.P. It is penetrated by a horizontal square prism having base with a 45 mm side and a 100 mm long axis. The axis of the penetrating prism is 15 mm away from that of the former and a face inclined at 30^0 to the H.P. Draw three views of the combination and show lines of intersection.

8   Draw a perspective view with a square plane with a 40 mm side which stands vertically on the GP with an edge parallel to and 10 mm behind the PP. The surface of the plane is inclined at 30^0 to PP. The station point is 50 mm in front of PP, 55 mm above GP and lies in a CP high is 50 mm towards right of the centre of the plane.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
PROGRAMMING IN C AND DATA STRUCTURES
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   What is secondary storage? What are the reasons for having secondary storage devices? Explain different secondary storage devices.

2 (a)   Write a program to generate prime numbers between 1 and 1000.
   (b)   What is conditional operator? Write a program to enter two numbers and find the smallest out of them. Use conditional operator.

3 (a)   Write a program to find the average marks obtained by a class of 50 students in a test.
   (b)   What is an array? How is a one dimensional array declared and initialized?

4 (a)   What is a pointer? What are the features of pointers? Write a C program to print address of a variable.
   (b)   Explain the declaration of pointers with examples.

5   Discuss below terms with examples:
   (a)   Nested structures.
   (b)   Array of structures.

6 (a)   Write a program to display the contents of the file in reverse.
   (b)   Write a program to read and print text file of integers.

7 (a)   What is circular queue?
   (b)   What are the advantages of circular queue over linear queue?
   (c)   Write a program implementing circular queue.

8 (a)   Apply insertion sort to the list of integers found in a file. Write the sorted output to the file.
   (b)   Justify the fact that the efficiency of quick sort is O(logn) under best case.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
PROGRAMMING IN C AND DATA STRUCTURES
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   What is central processing unit? What are its major roles?
    (b)   With a neat explain flow of information during program execution.

2   (a)   What is a string constant? How do string constants differ from character constants? Do string constants represent numerical values?
    (b)   Write a program whether the given number is "Even" or "Odd" using GOTO statement.

3   (a)   Write a program to find the total of an array called prices which contains the list of prices of 25 items.
    (b)   Explain with an example function with no arguments and no return values.

4   (a)   Write a C program to show that pointer of any data type occupies same space.
    (b)   With proper examples explain different arithmetic operations on pointers.

5   (a)   Define union. Give the general template for union.
    (b)   List out the differences between unions and structures.

6   (a)   Why we cannot use relation and logical operators in structure variable?
    (b)   Write a C program to illustrate the concept of structure within structure.

7   (a)   Explain the various operations on a stack.
    (b)   Write a program implementing stack.

8   (a)   Write a program in C using functions to apply merge sort to the given arrays of integers.
    (b)   Discuss linear search algorithmic technique with an example.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
PROGRAMMING IN C AND DATA STRUCTURES
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Write an algorithm to generate Fibonacci series of numbers up to 'n'.
   (b) Write an algorithm to find whether the given number is prime or not.

2 (a) What are different types of integer constants? What are long integer constants? How do these constants differ from ordinary integer constants? How can they be written and identified?
   (b) Write a program whether the given number is "Even" or "Odd".

3   What is a function? What are the types of functions? What is the advantage of functions? Explain any two built in functions with an example.

4 (a) Explain the concept of pointer to pointers with examples.
   (b) Explain the concept of void pointers with examples.

5 (a) What is union in C?
   (b) How data elements are stored under unions with example?
   (c) With example discuss how to use structure within union.

6   Write a C program that uses fseek () function to alter the file pointer in multiples of 2 and copy those contents into a new file.

7 (a) Explain the various operations on queue.
   (b) Write a program to implement a queue using an array.

8 (a) Define binary searching method.
   (b) Write a program in C using functions to perform quick sort in a given list of integers.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
PROGRAMMING IN C AND DATA STRUCTURES
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Write an algorithm to find the root of a quadratic equation for all the cases.
   (b) Draw the flow chart to find the roots of a quadratic equation for all the cases.

2 (a) What is a variable? How can variables be characterized? Give the rules for variable declaration.
   (b) What are tokens? What are the types of 'C' tokens? Explain briefly.

3 (a) What are the advantages and disadvantages of recursion?
   (b) Write a program to find the sum of all floating point elements in an array.

4 (a) Write a C program to read and print an array of elements using pointers.
   (b) Explain the concept of array of pointers with examples.

5 (a) Explain the memory allocation of variables in a union.
   (b) What are the different ways of passing entire structure to a function with an example?

6 (a) Write a program in C to rename a file.
   (b) Discuss command line arguments in detail with examples.

7 (a) What are the applications of singly linked list?
   (b) Write a program in C to create a singly linked list with header.

8 (a) Write a program in C to perform binary searching method.
   (b) Compare the efficiencies of linear and binary searching methods.

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Code: 9ABS101

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGLISH
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer FIVE full questions choosing at least one from Part B
All questions carry equal marks
*****

Part A

1   The ruined nine storey palace in Leh stands as a symbol of the falling tradition of Leh.But the Nubra Valley presents the most pristine and surreal landscape untouched byman. How does the author try to put forth the effect of modernism on the tradition in Ladakh?

2   Mother Teresa was ranked as the most admired person of the 20th Century. How do you think she deserves it?

3 (a) Write a note on Miss Krishna's past.
   (b) Did she make a good guest? Why do you think so?

4 (a) As a woman Gertrude faced many hardships in her education and career. Explain.
   (b) How does Jon Elion recall Gertrude's memories?

5 (a) Why did the author enter the arti-goth patch?
   (b) Describe the priest of Arti-goth. Why did the villagers stone the priest?

6   How did Chaplin become world famous?

Part B

7 (a) Write a letter to the commissioner of the local municipality about the menace of street dogs and the need to take measures to sterilize them.
   (b) Write a letter to your friends living in the USA accepting an invitation to his brother's wedding. Inventing relevant names and dates, etc., give details of your programme of arrival.

8 (a) **Use the following in your own words:**
(i) At the eleventh hour
(ii) Bear the brunt

(b) **Fill in the blanks in the following sentences with the right form of adjective in brackets:**
(i) What kind of food do you like the _____?(little)
(ii) Mother is a _____(good) singer than me.

(c) **Choose the alternative that best fits the blank in each sentence:**
(i) The night was so cold that all of us started _____(shivering, trembling, quivering)
(ii) The little girl was _____ punished for a small mistake (strictly, severely, soundly)

(d) **Write as directed:**
(i) (a) I reminded him to write to his teacher.
(b) I made him_____
(ii) (a) I did not have enough money so I did not buy the book.
(b) If I_____

(e) **Correct errors , if any, in the following sentences and rewrite them:**
(i) I have just little more pages to read.
(ii) Are there many places to visit around Delhi?

(f) **Insert articles where necessary:**
(i) Camel is ship of the desert.
(ii) The Kalidas is Shakespeare of India.

(g) **Choose the right option for the underlined word:**
(i) Though my grand-aunt is very old, she leads a **strenuous** life
(a) Energetic
(b) Sincere
(c) Useful
(d) Interesting
(ii) Ambica is **extravagant** when it comes to praising her students
(a) Careful
(b) Judicious
(c) Liberal
(d) Miserly

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGLISH
(Common to all branches)

Time: 3 hours

Max. Marks: 70

Answer FIVE full questions choosing at least one from Part B
All questions carry equal marks
*****

Part A

1   In his travelogue, "Heavens Gate", Pico Iyer tries to bring out the sensitive contrast between traditionalism and westernization. How does he do it?

2   Mother Teresa had become an international celebrity. Give reasons to support this statement.

3   (a)   Miss Krishna's mother was a domineering woman with whom she seemed to have had a curious love-hate relationship. How did Miss Krishna suffer till her mother was alive?
    (b)   How did Miss Krishna enjoy herself when she stayed as a guest in the narrator's house?

4   (a)   Leukemia is a dreadful disease and Gertrude prepared a compound that is effective in some cancers. Explain how she achieved this.
    (b)   What were Gertrude's favorite pastimes? How did she enjoy them?

5   (a)   Who went along with the writer into the grass patch and why?
    (b)   What did the writer see when he pushed his way through a thick clump of grass?

6   Write about Chaplin's married life.

Part B

7   (a)   You are the public relations officer of an automobile company that is shortly launching a new car. Compose a letter to a newspaper office requesting them to cover the event.
    (b)   Write a letter to your pen friend about the marriage rituals of your religion.

8 (a) **Use the following in your own words:**
(i) Bear the brunt
(ii) To break the ice

(b) **Fill in the blanks in the following sentences with the right form of adjective in brackets:**
(i) Rahul is a _____(kind)boy.
(ii) This task is _____(urgent) than all others.

(c) **Choose the alternative that best fits the blank in each sentence:**
(i) Fresh air is _____ to one's health(benefit, beneficent, beneficial)
(ii) He was arrested for _____ possession of drugs (illegal, lawless, illegitimate)

(d) **Write as directed:**
(i) (a) A young boy met us yesterday at the station. He is my cousin.
   (b) The young boy_____
(ii) (a) They marketed the first video disc in USA in 1980.
   (b) The first _____

(e) **Correct errors , if any, in the following sentences and rewrite them:**
(i) They did not give him any idea for his presentation.
(ii) Have you seen some new friends recently?

(f) **Insert articles where necessary:**
(i) Socrates is wisest of Greek Philosophers.
(ii) Elephant is huge animal.

(g) **Choose the right option for the underlined word:**
(i) Nagesh has **resolved** that he will not buy anything made of leather.
   (a) Announced
   (b) Suggested
   (c) Proposed
   (d) Determined
(ii) The minister's visit to the hospital **assuaged** the miseries of accident victims
   (a) Increased
   (b) Comforted
   (c) Treated
   (d) Set aside

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGLISH
(Common to all branches)

Time: 3 hours

Max. Marks: 70

Answer FIVE full questions choosing at least one from Part B
All questions carry equal marks
*****

Part A

1 "The other worldly and highly magical Ladakh is the latest secret treasure to dramatize all the paradoxes of civilization and its discontents." What is the effect of westernization on the local tradition and culture of Ladakh?

2 Give a detailed account of the services rendered by Mother Teresa.

3 (a) "She was an irritating guest, fidgeting about the house, picking up things and asking questions, endless questions." Do you think the narrator was patient enough to tolerate Miss Krishna? How did she keep an end to Miss Krishna's stay in her house?
 (b) Miss Krishna never opened her black trunks till she was alive. How were they opened after her death and what did they reveal? What is it the narrator picks up from the trunk?

4 (a) Describe the childhood and education of Gertrude Elion.
 (b) What achievement of Gertrude won her the Nobel Prize?
 (c) What are the memberships & awards won by Gertrude?

5 (a) Describe the patch of jungle grass.
 (b) What was the priest's reaction when the writer suddenly appeared at his hut?

6 How did Chaplin blend comedy and pathos?

Part B

7 (a) Write an application letter in response to an advertisement for the post of project engineer in a well –known petrochemical company.
 (b) Write a letter to the sales manager of science tech publication in Mumbai asking for a catalogue and enquiring about the possibility of being their distribution for the southern zone.

8 (a) **Use the following in your own words:**
(i) ask for
(ii) call off

(b) **Fill in the blanks in the following sentences with the right form of adjective in brackets:**
(i) He thinks his car is as_____(fast) as yours.
(ii) The man was_____(noble) than his father.

(c) **Choose the alternative that best fits the blank in each sentence:**
(i) The streets look_____ on winter nights (crowded, sparse, deserted)
(ii) The _____ schools charge a very high fee(municipal, elite, government)

(d) **Write as directed:**
(i) (a) They are going to award the best student a gold medal.
     (b) The best student_____
(ii) (a) The doctor arrived too late. He could not save the old man.
     (b) If _____

(e) **Correct errors , if any, in the following sentences and rewrite them:**
(i) There were a vase of roses on the table.
(ii) There was few petrol in the tank

(f) **Insert articles where necessary:**
(i) Rama is not cleverest of the boys.
(ii) This is book I want.

(g) **Choose the right option for the underlined word:**
(i) The Republic Day celebrations held at Delhi are often **spectacular.**
    (a) Expensive
    (b) Enjoyable
    (c) Striking
    (d) Passable
(ii) The leader **exhorted** his men to brave the situation briefly
    (a) Urge strongly
    (b) Advised
    (c) Beg
    (d) Request

*****

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGLISH
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer FIVE full questions choosing at least one from Part B
All questions carry equal marks
*****

Part A

1   "Ladakh is a way to retrieve something lost, sustaining within us that, which once experienced, comes to seem as contemporary, as invigorating, as tomorrow." What do you think that the author has lost, and how is it retrieved in Ladakh?

2   "Service to humankind is service to God." Apply this statement to the service of Mother Teresa.

3   Sketch the characters of the following:
  (a) Miss Krishna
  (b) The narrator of the story "The connoisseur"
  (c) Maya's sister

4   (a) Explain how Gertrude started out making compounds and how it become her passion.
     (b) What was the association of Gertrude with students?
     (c) How did Elion respond to the mail of Gertrude after her death?

5   (a) Why was the writer angry with the priest?
     (b) What did the writer see in the well?

6   Describe the greatest film of Chaplin.

Part B

7   (a) Write a letter to the post master of your town complaining about the non- receipt of a registered parcel.
     (b) Write a letter to the editor of a newspaper about the kidnapping of small children and of forcing children to do hard work for long hours.

8 (a) **Use the following in your own words:**
     (i) dress up
     (ii) catch up

  (b) **Fill in the blanks in the following sentences with the right form of adjective in brackets:**
     (i) Savitha is the _____(childish) of all my friends.
     (ii) Mount Everest is the _____(high) mountain in the world.

  (c) **Choose the alternative that best fits the blank in each sentence:**
     (i) The criminal's face was _____ beyond recognition.(hit, battered, attacked)
     (ii) The money he has is just enough for his_____(existence, existing, exist)

  (d) **Write as directed:**
     (i) (a) She beats animals. She enjoys it.
       (b) She enjoys_____
     (ii) (a) I met a man at the gate. He was an old soldier.
       (b) The man_____

  (e) **Correct errors , if any, in the following sentences and rewrite them:**
     (i) He has not come home since some months.
     (ii) There weren't much people in the restaurant.

  (f) **Insert articles where necessary:**
     (i) Ganges is a holy river.
     (ii) Stranger over there looks like stranger.

  (g) **Choose the right option for the underlined word:**
     (i) After the enquiry, the police was **exonerated** from all the blame
       (a) Found guilty of
       (b) Declared free from
       (c) Found responsible for
       (d) Suspected of
     (ii) She was **elated** by the news.
       (a) Shocked
       (b) Puzzled
       (c) Happy
       (d) Terrified

*****

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING PHYSICS
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Explain the phenomenon of interference.
   (b) What are the necessary conditions for obtaining interference fringes?
   (c) Give the analytical treatment of interference of light and hence obtain the condition for maximum and minimum intensity.

2 (a) What are Miller indices? What are their important features?
   (b) Calculate the ratio $d_{100} : d_{110} : d_{111}$ for simple cubic structure.
   (c) Sketch the following planes of the cubic unit cell: (110), (111), and ($\bar{1}$21).

3 (a) Derive time independent Schrodinger wave equation for a free particle.
   (b) Explain the physical significance of wave function.

4   Explain the following:
   (a) Direct and indirect band gap semiconductors.
   (b) P-n junction.
   (c) Photo diode.

5 (a) Define the terms magnetic permeability, magnetic induction field strength and magnetization and derive the relation between them.
   (b) What are the sources of permanent magnetic moment in magnetic materials?

6 (a) Describe the principle of lasing action.
   (b) Mention the important differences between laser beam and ordinary light beam.

7 (a) What is the numerical aperture of an optical fiber and derive an expression for it?
   (b) An optical fiber has a core refractive index of 1.55 and cladding refractive index of 1.50. Find its numerical aperture.

8 (a) What are nanomaterials and mention their significance in various fields?
   (b) Describe the principal factors causing the change of nanomaterial properties.

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B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING PHYSICS
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   What is meant by double refraction?
    (b)   Write notes on optic axis and its characteristics.
    (c)   Discuss the construction and action of Nicol prism.

2   (a)   Define coordination number and packing fraction.
    (b)   Show that FCC is the most closely packed of the three cubic structures by working out the packing factors.
    (c)   Find the Miller indices of a set of parallel planes which makes intercepts in the ratio 3a:4b on the X and Y-axes and are parallel to Z-axis; a, b, c being primitive vectors of the lattice.

3   (a)   State and explain uncertainty principle.
    (b)   Show that the energies of a particle in a potential box are quantized.

4   (a)   Explain law of mass action.
    (b)   Derive the diode equation.
    (c)   What are applications of hall effect?

5   (a)   Define the terms magnetic susceptibility and relative permeability and derive the relation between them.
    (b)   Discuss the origin of magnetic moments in magnetic materials.

6   (a)   Describe the various construction components of a laser device.
    (b)   Explain the importance of the concept of energy level diagram in the emission of laser beam.

7   (a)   Describe briefly the different types of optical fibers with neat diagrams.
    (b)   Calculate the refractive indices of core and cladding of an optical fiber with a numerical aperture of 0.33 and their fractional change of refractive indices being 0.02.

8   (a)   How the physical and chemical properties of nanomaterials vary with their size?
    (b)   Write the important applications of nanomaterials.
*****

3

ENGINEERING PHYSICS
(Common to all branches)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) What are the necessary conditions for obtaining interference fringes?
  (b) What are the types of diffraction and give the differences between them?
  (c) Write notes on quarter and half wave plates.

2 (a) What are Miller indices? Draw (001), (120) and ($\bar{\bar{2}}11$) planes.
  (b) How can the inter-planar spacing of a set of Miller planes be calculated in terms of lattice parameters?

3 (a) Explain the de Broglie hypothesis.
  (b) Derive time independent Schrodinger wave equation for a free particle.

4 (a) Explain the experiment to determine the hall coefficient.
  (b) Explain the applications of hall effect.
  (c) The R_H of a specimen is $3.66 \times 10^{-4}\, m^3\, c^{-1}$. Its resistivity is $8.93 \times 10^{-3}\, \Omega m$. Find mobility and charge carrier concentration.

5 (a) Explain the terms polarization, polarisability, susceptibility and electric flux density for dielectric.
  (b) Derive the relation between dielectric constant and susceptibility of a dielectric.

6 (a) What is penetration depth of a magnetic field on a superconductor and discuss its variation with the temperature?
  (b) Describe the significance of penetration depth on superconductor.

7 (a) Explain the advantages and disadvantages of step index optical fiber.
  (b) Describe the glass fiber structure.

8 (a) What are nanomaterials? How they are classified?
  (b) Describe the basic principles of nanomaterials.

*****

4

B.Tech I Year (R09) Regular & Supplementary Examinations, June 2013
ENGINEERING PHYSICS
(Common to all branches)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) What are the necessary conditions for obtaining interference fringes?
   (b) Discuss the theory of Newton's rings with relevant diagram.
   (c) Two coherent sources whose intensity ratio is 36:1 produce interference fringes. Deduce the ratio of maximum intensity to minimum intensity.

2 (a) State Bragg's law of X-ray diffraction.
   (b) Describe Bragg's X-ray spectrometer and explain how Bragg's law can be verified.
   (c) Draw (001), (120) and ($\bar{\bar{2}}11$) planes.

3 (a) Explain Bloch theorem.
   (b) Discuss the theory of free electron gas in one-dimensional box. Explain the energy levels.

4 (a) Explain law of mass action.
   (b) Distinguish between drift and diffusion currents.
   (c) Derive expressions for drift and diffusion currents in a semiconductor.

5 (a) Explain electronic polarization in a dielectric.
   (b) An elemental dielectric has a relative dielectric constant of 12. It also contains 5×10^{28} atoms/ m^3. Calculate its electronic polarisability assuming Lorentz field.

6 (a) Explain how electron-phonon interaction will form cooper pairs causing superconductivity in superconductor.
   (b) Show that the trapped flux in a superconductor is quantized.

7 (a) Describe the construction of a typical optical fiber along with the dimensions of the various parts.
   (b) What is total internal reflection? Discuss its importance in optical fiber.

8 (a) Write a detailed note on nanomaterials.
   (b) Explain why nanomaterials exhibit different properties.

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