

B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGLISH
(Common to all branches)

Time: 3 hours

Max Marks: 70

(Answer FIVE Questions in total with at least ONE question 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 by man. How does the author try to put forth the effect of modernism on the tradition in Ladakh?
2. Give an account of Raman's discovery during his voyage across the Mediterranean Sea and how did it prove to be important?
3. The narrator of the story "The Connoisseur" is a plain, simple and honest woman; whereas Miss Krishna is a curious and enigmatic woman. Compare and contrast both the ladies and elaborate their relation with one another.
4. On 13 Oct, 2009 Kurnool dist of A.P was devastated by floods. Imagine you are the district in charge of relief and rehabilitation operations. Relate Cuddalore experience and prepare a report on that of Kurnool.
5. Write what happened after the author entered the jungle grass
6. Describe the various steps involved in the making of a film

PART-B

7. (a) Write a letter to the principal of your college thanking him for mid-day meals arrangement for poor students.
(b) Write a letter to your friend inviting him to your birthday party
8. Provide one word substitutes
 - (a) A person very hard to please is.....
 - (b) handwriting that cannot be read is
 - (c) A person who eats too much.....
 - (d) Likely to break apart easily.....
 - (e) Something that becomes outdated.....
 - (f) Killing of human beings.....
 - (g) A person who looks at the dark side of things.....
 - (h) One who studies our stars to predict our future.....
 - (i) one who cures our foot ailments.....
 - (j) One who is obsessed with stealing things.....
 - (k) Study of the earth.....
 - (l) One who believes in God.....
 - (m) One who is obsessed with books.....
 - (n) One who walks in sleep.....

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PART-A

1. Objectives can be achieved with resourcefulness even in the lack of resources. How did Visvesvaraya prove it?
2. Monica Besra reported that her cancerous tumour had been cured by the beam of light from the picture of Mother Teresa. This miracle happened after Mother's death. How did she treat and serve people when she was alive?
3. Welfare economics seeks to evaluate economic policies in terms of their effect on the well-being of the community. Sen, who devoted his career to such issues, was called the "Conscience of his profession". How did Amartya Sen evaluate different problems and contributed to the society?
4. Do you think the district administration of Cuddalore responded immediately and has attended to the needs of the people from all the aspects of their lives? Give reasons.
5. How did Anand achieve the world's most coveted title in chess?
6. How did Chaplin become world famous?

PART-B

7. (a) Write a short letter to Doordarshan whether it would be possible to repeat at some future time some of the episodes of 'Malgudi Days' which you have enjoyed seeing.
(b) Write a letter to the Principal of your college requesting him to issue a transfer certificate.
8. Use the following idioms in your own words:
 - (a) A feather in one's cap
 - (b) Apple of discord
 - (c) To grease a person's palm
 - (d) Bell the cat
 - (e) In cold blood
 - (f) To fight tooth and nail
 - (g) To see eye to eye
 - (h) To build castles in the air
 - (i) Put the horse before the cart
 - (j) Blood is thicker than water
 - (k) To wake up a sleeping dog
 - (l) Make a clean breast of
 - (m) To enjoy the lion's share
 - (n) Jack of all trades

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PART-A

1. Visvesvaraya can be called the Mahatma of technologically independent India. Illustrate.
2. A boy whose story begins in a village near Tiruchirapalli goes to Stockholm to receive the Nobel Prize for Physics and takes India to its glorious heights. Describe the profile of C.V. Raman.
3. The narrator finally says, "Miss Krishna, it seems, had an unexpected sense of humour!" What is her experience with Miss Krishna and why did she give this statement?
4. Food, water, shelter, health, clothing, agriculture, animals, education -these are all various aspects in man's life which were disturbed by tsunami. How were they restored by the administration?
5. Why did the villagers not share their fears about the patch of grass before he set out the hunt the wild boar?
6. What are the three factors that guide a director to choose a story for a film?

PART-B

7. A committee was appointed to look into the complaints of serious financial irregularities in a branch office. As the convenor of the committee, draft your report to the general manager pointing about the problem and suggesting the actions to be taken.
8. Provide question tags:
 - (a) He seldom comes late.....
 - (b) He teaches English.....
 - (c) The man in the blue dress is your uncle.....
 - (d) It's your own fault.....
 - (e) My cousins live on a very isolated farm in Wales.....
 - (f) He was awarded the Nobel Prize.....
 - (g) I'm playing tennis on Tuesday.....
 - (h) Everyone speaks English now-a days.....
 - (i) We haven't got enough money for a taxi.....
 - (j) The problem is, they can't score goals.....
 - (k) Look after my suitcase for me.....
 - (l) He hasn't done very well.....
 - (m) They'll have to sack the manager.....
 - (n) I've never seen the Taj Mahal.....
 - (o) Shut up! You can never keep quiet.....

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PART-A

1. How did Visvesvaraya develop Mysore into a model state?
2. Mother Teresa had become an international celebrity. Give reasons to support this statement.
3. The narrator finally says, "Miss Krishna, it seems, had an unexpected sense of humour!" What is her experience with Miss Krishna and why did she give this statement?
4. A school girl researched scientists on the internet and selected Gertrude as her heroine. Do you think Gertrude deserves it?
5. 'The heat made me sweat, but the laughter made me shake'. What does the author mean by this statement?
6. "Avant-gardism is a luxury which we cannot yet afford in our country" Discuss.

PART-B

7. 'Smoking among the youth in India is on the rise. Studies have consistently shown that smoking leads to various ailments. Consequently, it is a major public concern.' You as a public health professional have been asked to prepare a report and submit to the District Health Officer.
8. Fill in the blanks with suitable prepositions:
 - (a) There was an accident _____ the crossroads this morning.
 - (b) There are some beautiful trees _____ the park.
 - (c) I like that picture hanging _____ the wall _____ the kitchen.
 - (d) In India we drive _____ the left.
 - (e) Write your name _____ the top _____ the page.
 - (f) We stayed _____ a very nice hotel when we were _____ Amsterdam.
 - (g) I had lost my key but I managed to climb _____ the house through a window.
 - (h) Marcel is French. He has just returned _____ France after two years _____ Brazil.
 - (i) Have you ever been bitten _____ a dog.
 - (j) I don't mind going _____ car, but I don't want to go _____ your car.
 - (k) We had a discussion _____ what we should do.
 - (l) Don't wait _____ me. I'll join you later.
 - (m) The school provides all its students _____ books.
 - (n) I hope you succeed in getting what you want _____.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING PHYSICS
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Max Marks: 80

Answer any FIVE questions
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1. (a) Explain the principle of Superposition of waves.
(b) Explain Young's experiment on the basis of wave theory.
(c) Two coherent sources produce interference pattern. Intensity ratio of bright fringe to dark fringe is 9:1. Calculate the intensity ratio of the sources.
2. (a) Define Coordination Number, Nearest Neighbor Distance, Atomic Radius and Packing Fraction.
(b) Obtain expressions for Atomic Radius and Packing Fraction for SC, BCC and FCC lattices.
3. (a) Derive time independent Schrodinger wave equation for a free particle.
(b) Explain the physical significance of wave function.
4. (a) Explain the concept of drift and diffusion current. How they are different?
(b) Write notes on intrinsic semiconductors.
(c) Explain charge neutrality in an intrinsic semiconductor.
5. (a) What are dielectric materials and describe the dielectric behaviour in The presence of electric field.
(b) What is dielectric constant and explain the factors on which it depends.
6. (a) Describe the important characteristics of laser beam.
(b) Explain the process of Stimulated absorption of radiation along with Its importance.
7. (a) Explain the principle of an optical fiber.
(b) Describe the fiber construction.
8. (a) Explain the sensor and catalyst applications of Carbon Nanotubes.
(b) Mention the important applications of Carbon Nanotubes in Material technology.

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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) Define Packing Fraction and show that FCC is the most closely packed one when compared to SC and BCC lattices.
(b) Iron has BCC structure with atomic weight 55.85 and density 7850 Kg/m³. Find the lattice constant.
3. (a) Explain the de Broglie hypothesis.
(b) Explain the physical significance of wave function.
(c) Show that the energies of a particle in a potential box are quantized.
4. (a) Distinguish between n- and p-type semiconductors.
(b) Explain the detailed mechanism of current conduction in n- and p-type semiconductors.
(c) Explain charge neutrality in an intrinsic semiconductor.
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) Describe the process of Spontaneous emission of radiation.
(b) Explain the process of Stimulated emission of radiation and mention Its advantages with respect to Spontaneous emission of radiation.
7. (a) What is the acceptance angle of an optical fiber and derive an Expression for it.
(b) A fiber has a core refractive index of 1.44 and cladding refractive Index of 1.4. Find its acceptance angle.
8. (a) Mention the important applications of Carbon Nanotubes in Information technology.
(b) Mention the important applications of Carbon Nanotubes in Biomedical fields.

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1. (a) Explain the concept of coherence.
(b) Discuss why two different sources of light of the same wavelength cannot produce interference fringes.
(c) Give the theory of interference and obtain the condition for constructive and destructive interference.
2. (a) Explain the terms 'Basis' and 'Space lattice'.
(b) Obtain the relation between the edge of the unit cell and atomic radius for SC, BCC and FCC lattices.
(c) Chromium has BCC structure. Its atomic radius is 0.1249 nm. Calculate the free volume per unit cell.
3. (a) State and explain uncertainty principle.
(b) Show that the energies of a particle in a potential box are quantized.
4. (a) What is doping? Explain how the doping makes a semiconductor more useful.
(b) Explain the physical mechanism of conduction in semiconductors.
(c) Distinguish between intrinsic and extrinsic semiconductors with suitable examples.
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) Derive the relation between the various Einstein's Coefficients of Absorption and emission of radiation.
(b) Distinguish between Spontaneous and Stimulated emission of radiations.
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) Mention the importance of Carbon Nanotubes in Energy Storage Applications.
(b) Mention the important applications of Nanomaterials in medicine.

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1. (a) Define interference of light.
(b) Derive an expression for fringe width in interference pattern and show that the fringes are uniformly spaced with relevant ray diagram.
(c) Two slits separated by a distance of 0.2mm are illuminated by a monochromatic light of wavelength 550nm. Calculate the fringe width on a screen at distance of 1m from the slits.
2. (a) What is Primitive cell? How does it differ from unit cell?
(b) Illustrate the SC, BCC and FCC crystal structures.
(c) Derive the expression for density of the crystal in terms of lattice constant.
3. (a) Explain the de Broglie hypothesis.
(b) Derive time independent Schrodinger wave equation for a free particle.
4. (a) Describe the intrinsic conductivity in an intrinsic semiconductor.
(b) Derive an expression for intrinsic carrier concentration in an intrinsic semiconductor.
5. (a) Define the terms ionic polarization and ionic polarisability for an ionic Dielectric.
(b) Describe ionic polarization in an ionic dielectric.
6. (a) Explain the importance of population inversion in emission of laser beam.
(b) Describe various methods of achieving population inversion.
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) What are Nanomaterials? How they are classified.
(b) Describe the basic principles of Nanomaterials.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING CHEMISTRY
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1. (a) Define temporary hardness and permanent hardness of water.
(b) How is hardness of water expressed? Explain any one method for the determination of hardness of water.
2. Define corrosion of metals and explain the mechanism of Electrochemical corrosion?
3. Compare the following with suitable examples
 - (a) Thermosetting & Thermoplastic polymers
 - (b) Addition & Condensation polymerization.
4. (a) What is the nano particle ? How are they fabricated?
(b) Write an account on carbon nano tubes.
5. (a) What is meant by Specific Conductance and Equivalent conductance? What are its Units?
(b) Equivalent Conductance of an electrolyte increases; where as Specific Conductance decreases. Explain.
6. Discuss the phase diagram of two-component system by taking suitable example.
7. Write short notes on:
 - (a) Coal Gas.
 - (b) Biogas.
 - (c) Units for calorific value.
8. Explain the hardening and setting of cement using the chemical equations.

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1. (a) How water gets hardness. Distinguish between hard water and soft water?
(b) How do you estimate the total hardness of water by EDTA method.
2. Explain various factors influence the corrosion of metals?
3. What are liquid crystal polymers? How they are produced? Explain the characteristics and uses of LCP.
4. (a) What are fullerene and Give an account of their application.
(b) Write the applications of Carbon nano tubes.
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) What is condensed system? Write the reduced phase rule equation.
(b) Write short notes on Freezing mixtures.
7. (a) Describe how synthetic petrol is synthesized from Bergius process.
(b) Distinguish between coke and coal.
8. (a) What is cement? How do you classify the cement?
(b) Explain the different raw materials and mixing of the raw materials by the dry process during the manufacture of cement.

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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. Explain the theory and mechanisms of Corrosion.
3. What are conducting polymers? How are they classified? Write important engineering applications..
4. (a) What is the effect of nanotechnology on food science .
(b) What are the advancements of nanotechnology is refered to as nano medicine.
5. (a) Define the Cell Constant of a Conductivity Cell? Explain how it is measured? What are its Units.
(b) The resistance of N/2 solution of an electrolyte in a well was found to be 50 ohm. Calculate the equivalent conductance of the solution, if the electrode in cell are 2.2 cm apart and with an area of 3.8 Sq cm.
6. (a) Describe the salient features of lead-silver system.
(b) Explain the main features of the phase diagram of water system. Discuss why the slope solid-liquid line is negative for water.
7. (a) What are the gaseous fuels? How they are advantages over other fuels.
(b) What are the different units expressed to know the efficiency of a fuel?
8. Explain the chemistry of the manufacture of cement by wet process.

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1. Describe the basic principle involved in the estimation of alkalinity of water and give detailed procedure for the estimation of alkalinity of water.
2. (a) Explain the differential aeration corrosion.
(b) Galvanization process.
3. Give an account of preparation, properties and uses of the following.
(a) Polyurethane rubber
(b) Nitrile rubber
4. (a) How are lubricant classified? Give example?
(b) Explain the Boundary film lubrication theory and the mechanism of the lubricants.
5. (a) Discuss the titration curve obtain in conductometric titration of weak acid and strong base?
(b) What are the limitations of conductometric titrations?
6. Discuss the general Phase diagram of two-component systems forming Compounds in solid state with:
(a) Congruent melting points.
(b) Incongruent melting points.
7. What do you mean by refining of petroleum? List out the various fractions obtained during refining of crude oil with their approximate composition, temperature range and uses.
8. What are Refractories? Explain Thermal spalling, strength and porosity of the refractories.

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MATHEMATICS-I
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Answer any FIVE questions
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1. (a) Solve : $(y^2 - 2xy)dx = (x^2 - 2xy)dy$.
 (b) Solve : $(x^2 - ay)dx = (ax - y^2)dy$.
2. (a) Solve : $(D^2 - 5D + 6) y = xe^{4x}$
 (b) Solve : $(D^2 + a^2) y = \sec ax$
3. (a) Verify Rolle's theorem for $f(x) = e^{-x} \sin x$ in $[0, \pi]$.
 (b) Verify Rolle's theorem for $f(x) = \sqrt{4 - x^2}$ in $[-2, 2]$.
4. (a) Find the radius of curvature at any point on the curve $y = c \cosh \frac{x}{c}$.
 (b) Find the radius of curvature of the curve $x^2y = a(x^2 + y^2)$ at $(-2a, 2a)$.
5. (a) Evaluate $\int_0^1 \int_0^{X^2} e^{y/x} dy dx$.
 (b) Change the order of integration and evaluate $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy dx$.
6. (a) Find the Laplace transform of i) $e^{-3t} (2 \cos 5t - 3 \sin 5t)$. ii) $e^{3t} \sin 2t$
 (b) Find $L^{-1} \left\{ \frac{s^2}{(s^2+4)(s^2+9)} \right\}$ Using Convolution theorem.
7. (a) Using Laplace Transform, show that $\int_0^\infty t^2 e^{-4t} \sin 2t dt = \frac{11}{500}$.
 (b) Solve the D.E $y'' + n^2y = a \sin(nt + 2)$, $y(0) = 0$, $y'(0) = 0$ Using Laplace transform.
8. (a) If $r = xi + yj + zk$, show that $\nabla r^n = nr^{n-2}\bar{r}$
 (b) Find the works done in moving in a particle in the force field $\bar{F} = (3x^2)i + (2zx - y)j + zk$, along i) the straight line from $(0,0,0)$ to $(2,1,3)$ ii) the curve defined by $x^2 = 4y$, $3x^3 = 8z$ from $x= 0$ to $x= 2$.

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1. (a) Solve : $\left(1 + e^{x/y}\right) dx + \left(1 - \frac{x}{y}\right) e^{\frac{x}{y}} dy = 0$ item Solve : $x dx + y dy = \frac{xdy - ydx}{x^2 + y^2}$.
2. (a) Solve : $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 3y = e^{2x}$ item Solve : $(D^3 - 5D^2 + 8D - 4) y = e^{2x}$
3. (a) Verify Rolle's theorem for $f(x) = (x - a)^m (x - b)^n$ in $[a, b]$. item Verify Rolle's theorem for $f(x) = \log \frac{x^2 + ab}{(a+b)x}$ in $[a, b]$.
4. (a) Trace the curve $y = x^3$. item Trace the curve $y = (x - 1)(x - 2)(x - 3)$.
5. (a) Evaluate $\iint_R y dx dy$, where R is the region bounded by the parabola $y^2 = 4x$ and $x^2 = 4y$ item Evaluate the integral by changing the order of integration $\int_0^1 \int_0^{\sqrt{1-x^2}} y^2 dx dy$.
6. (a) Find the Laplace transform of $f(t)$ defined as $f(t) = t/\tau$ when $0 < t < \tau$ = 1 when $t > \tau$. item Find $L^{-1} \left\{ \frac{s}{(s^2 + a^2)^2} \right\}$ Using Convolution theorem.
7. (a) Using Laplace transform, evaluate $\int_0^\infty \frac{(\cos at - \cos bt)}{t} dt$. item Solve the D.E. $y^{11} + 2y^1 + 5y = e^{-t} \sin t, y(0) = 0, y^1(0) = 1$. Using L.T.
8. (a) If A is a constant vector and $R = xi + yj + zk$, prove that $\nabla X \left(\frac{\bar{A} \cdot X \bar{r}}{r^n} \right) = \frac{(2-n)\bar{A}}{r^n} + \frac{n(\bar{r} \cdot \bar{A})\bar{r}}{r^{n+2}}$. item If $\bar{F} = (5xy - 6x^2)i + (2y - 4x)j$, Evaluate $\int_C \bar{F} \cdot d\bar{R}$, where C is the curve in the xy-plane $y = x^3$ from (1, 1) to (2, 8).

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1. (a) Solve : $\frac{dy}{dx} + \frac{y \cos x + \sin y + y}{\sin x + x \cos y + x} = 0$
 (b) Solve : $\frac{y(xy+e^x)dx - e^x dy}{y^2} = 0$
2. (a) Solve : $(D^2 - 3D + 2)y = \cos hx$
 (b) Solve : $(D + 2)(D - 1)^2 y = e^{-2x} + 2 \sin hx$
3. (a) Verify Rolle's theorem for $f(x) = x(x + 3) e^{-x/2}$ in $[-3, 0]$.
 (b) Verify Rolle's theorem for $f(x) = e^x \sin x$ in $[0, \pi]$.
4. (a) Trace the curve $r = a(1 + \cos \theta)$.
 (b) Trace the curve $r = a + b \cos \theta$, $a > b$.
5. (a) Evaluate $\int_A xy dx dy$, where A is the domain bounded by x-axis, ordinate $x=2a$ and the curve $x^2 = 4ay$.
 (b) Evaluate the integral by changing the order of integration $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y} dy dx$.
6. (a) Find the Laplace Transform of $\left\{ \left(\sqrt{t} + \frac{1}{\sqrt{t}} \right)^3 \right\}$
 (b) Find $L^{-1} \left\{ \frac{s}{s^4 + 4a^4} \right\}$.
7. (a) Using Laplace transform, evaluate $\int_0^\infty \frac{(e^{-t} - e^{-2t})}{t} dt$.
 (b) Solve the D.E $(D^2 + n^2)y = a \sin(nt + a)$, given $y = Dy = 0$ at $t = 0$ Using Laplace transform.
8. (a) Find the directional derivative of the function $f = x^2 - y^2 + 2z^2$ at the point P (1, 2, 3) in the direction of the line PQ where Q is the point (5, 0, 4).
 (b) Evaluate the Line integral $\int_c [(x^2 + xy)dx + (x^2 + y^2)dy]$ where c is the square formed by the lines $x = 1$ and $y = 1$.

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1. (a) Solve : (i) $\frac{ydx - xdy}{x^2} + e^{y^2} dy^2 = 0$
 (ii) $\frac{ydx - xdy}{xy} + 2x \sin x^2 dx = 0$
 (b) Solve: (i) $ydx + xdy + xy(ydx - xdy) = 0$
 (ii) $x dy + 2y dx = 2y^2 x dy$
2. (a) Solve : $(D^2 + 5D + 6)y = ex$
 (b) Solve : $(D^2 + 6D + 9)y = 2e^{-3x}$
3. (a) Verify Rolle's theorem for $f(x) = x^2 - 5x + 6$ in $[2, 3]$.
 (b) Examine if Rolle's theorem is applicable for the function $f(x) = \tan x$ in $[0, \pi]$.
4. (a) Trace the curve $x = a(1 + \sin \theta)$, $y = a(1 + \cos \theta)$.
 (b) Trace the curve $x = a(1 - \sin \theta)$, $y = a(1 - \cos \theta)$.
5. (a) Evaluate $\int_0^3 \int_1^2 xy(1 + x + y) dy dx$
 (b) Evaluate the integral by changing the order of integration $\int_0^3 \int_1^{\sqrt{4-y}} (x + y) dx dy$.
6. (a) Find the Laplace transform of i) $\left\{ \frac{\sin 3t \cdot \cos t}{t} \right\}$.
 ii) $\{t^2 \sin 2t\}$.
 (b) Find $L^{-1} \left\{ \frac{s+1}{(s^2+2s+2)^2} \right\}$.
7. (a) Using Laplace transform, evaluate $\int_0^\infty \frac{(\cos 5t - \cos 3t)}{t} dt$.
 (b) Solve the D.E. $\frac{d^2x}{dt^2} + 9x = \sin t$ Using L.T. given that $x(0) = 1, x\left(\frac{\pi}{2}\right) = 1$.
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 $x^2 + y^2 = a^2$.

B.TECH. I Year(R09) Regular Examinations, May/June 2010

MATHEMATICAL METHODS

(Common to Computer Science & Engineering, Electronics & Communication Engineering, Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Computer Engineering, Electronics & Control Engineering, Information Technology, Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. (a) Reduce the matrix $A = \begin{pmatrix} 3 & 1 & 4 & 6 \\ 2 & 1 & 2 & 4 \\ 4 & 2 & 5 & 8 \\ 1 & 1 & 2 & 2 \end{pmatrix}$ to an Echlon form and hence

find its rank.

- (b) Find two non-singular matrices P and Q such that PAQ will be in the normal form

$$\text{where } A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & -1 & 0 \\ 3 & 1 & 2 \end{pmatrix}$$

2. (a) Prove that the eigen values of an orthogonal matrix are of unit modulus.
(b) Reduce the following quadratic form to canonical form by Lagrange's reduction.
 $x_1^2 + 5x_2^2 + 9x_3^2 - 2x_1x_2 + 10x_2x_3 + 2x_1x_3$ and hence find the index, signature and nature of the quadratic form.
3. (a) Find the root of the equation $x^3 - 5x + 1 = 0$ using the Bisection method in 5 stages.
(b) By using Regula-Falsi method, find an approximate root of the equation $x^4 - x - 10 = 0$ that lies between 1.8 and 2. Carry out three approximations.
4. (a) Find by Taylor's series method the value of y at $x=0.1$ to five places of decimals from $\frac{dy}{dx} = x^2y - 1, y(0) = 1$.
(b) Find the value of y at $x=0.1$ by Picard's method, given that $\frac{dy}{dx} = \frac{y-x}{y+x}, y(0) = 1$.
5. (a) Define a Fourier series and write the Dirichlet conditions for the expansion of $f(x)$ as a Fourier Series $(\alpha, \alpha + 2\pi)$.
(b) Express the function $f(x) = \begin{cases} 1 & \text{for } |x| \leq 1 \\ 0 & \text{for } |x| \geq 1 \end{cases}$ as a Fourier integral.
Hence evaluate $\int_0^{\infty} \frac{\sin \lambda \cos \lambda x}{\lambda} d\lambda$.
6. (a) Form the partial differential equation by eliminating the arbitrary constants a, b and c from $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$.
(b) Solve the PDE by the method of separation of variables
 $y^3 z_x + x^2 z_y = 0$.
7. (a) Prove that Z-transform is linear.
(b) Find (i) $Z(na^n)$.
(ii) $Z(n^2 a^n)$.
8. (a) Fit a straight line to the following data

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.5

by the method of least squares.

- (b) For the following data, find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.2$

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0256

B.TECH. I Year(R09) Regular Examinations, May/June 2010

MATHEMATICAL METHODS

(Common to Computer Science & Engineering, Electronics & Communication Engineering, Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Computer Engineering, Electronics & Control Engineering, Information Technology, Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. (a) Apply elementary transformations to find the rank of $A = \begin{pmatrix} 1 & -7 & 3 & -3 \\ 7 & 20 & -2 & 25 \\ 5 & -2 & 4 & 7 \end{pmatrix}$

(b) Compute the inverse of $A = \begin{pmatrix} 1 & 2 & 3 \\ -1 & 3 & -2 \\ 2 & 0 & -4 \end{pmatrix}$ by Gauss-Jordan method.

2. (a) Prove that the eigen values of a Hermitian matrix are all real.
(b) Reduce the following quadratic form to canonical form by Lagrange's reduction $x^2 - 14y^2 + 2z^2 + 4xy + 16yz + 2zx$ and hence find the index, signature and nature of the quadratic form.
3. (a) Find and approximate value of the real root of $x^3 - x - 1 = 0$ using the Bisection Method.
(b) Find the root of the equation $x \log_{10}(x) = 1.2$, using false position method.
4. Using modified Euler's method, find an approximate value of y when $x=0.3$, given that $\frac{dy}{dx} = x + y, y(0) = 1$.
5. (a) Obtain the Fourier series to represent $f(x) = \frac{1}{4}(\pi - x)^2$ in $0 < x < 2\pi$.
(b) Express $f(x) = \begin{cases} 1 & \text{for } 0 \leq x \leq \pi \\ 0 & \text{for } x > \pi \end{cases}$ as a Fourier sine integral.
6. (a) Form the partial differential equation by eliminating the arbitrary constants a and b if $4(1 + a^2)z = (x + ay + b)^2$.
(b) Solve by the method of separation of variables $4u_x + u_y = 3u$ and $u(0, y) = e^{-5y}$.
7. (a) State and prove damping rule for Z-transform.
(b) Find $z^{-1} \left\{ \frac{z}{z^2 + 11z + 24} \right\}$.
8. (a) Fit the straight line to the following data

x	0.0	0.2	0.4	0.6	0.8	1.3
y	-1.85	-1.20	-0.55	0.15	0.80	1.35

by the method of least squares.

- (b) A slider in a machine moves along a fixed straight rod. Its distance x cm along the rod is given below for various values of the time t seconds. Find the velocity of the slider and its acceleration when $t = 0.3$ seconds.

t	0	0.1	0.2	0.3	0.4	0.5	0.6
x	30.13	31.62	32.87	33.64	33.95	33.81	33.24

B.TECH. I Year(R09) Regular Examinations, May/June 2010

MATHEMATICAL METHODS

(Common to Computer Science & Engineering, Electronics & Communication Engineering, Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics & Computer Engineering, Electronics & Control Engineering, Information Technology, Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. (a) Find the rank of the matrix $A = \begin{pmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{pmatrix}$

(b) If $A = \begin{pmatrix} 4 & -1 & 1 \\ 2 & 0 & -1 \\ 1 & -1 & 3 \end{pmatrix}$, find A^{-1} .

2. (a) Prove that the eigen values of a real symmetric matrix are all real.
(b) Reduce the following quadratic form to canonical form by Lagrange's reduction.
 $xy + y^2 + 4xz + z^2$ and hence find the index, signature and nature of the quadratic form.
3. (a) Find out the square root of 25 given $x_0 = 2.0$, $x_1 = 7.0$ using bisection method.
(b) Find out the roots of the equation $x^3 - x - 4 = 0$ using false position method.
4. (a) Obtain Picard's second approximate solution of the initial value problem
 $\frac{dy}{dx} = \frac{x^2}{y^2+1}$, $y(0) = 0$.
(b) Using the Taylor's series method, solve $\frac{dy}{dx} = x^2 - y$, $y(0) = 1$ at $x = 0.1$.
5. (a) Obtain the Fourier series to represent $f(x) = e^{ax}$ in $0 < x < 2\pi$.
(b) If $F(s)$ is the complex Fourier transform of $f(x)$, then prove that
 $F\{f(x) \cos ax\} = \frac{1}{2}\{F(s+a) + F(s-a)\}$.
6. (a) Obtain the partial differential equation by eliminating the arbitrary functions from $z = yf(x) + xg(y)$.
(b) Solve by the method of separation of variables $\frac{du}{dx} = 2\frac{du}{dt} + u$, given $u(x, 0) = 6e^{-3x}$.
7. (a) Find $z \left\{ \frac{1}{(n+1)(n+2)} \right\}$.
(b) Solve the difference equation using Z-transform $u_{n+2} - 3u_{n+1} + 2u_n = 0$, given that $u_0 = 0, u_1 = 1$.
8. (a) If P is the pull required to lift a load W by means of a pulley block, find a linear law of the form $P = mW + c$ connecting P and W using the following data:

P	12	15	21	25
W	50	70	100	120

Where P and W are taken in kg-wt. Compute P when $W = 150$ Kg.

- (b) For the following data, find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.1$

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

B.TECH. I Year(R09) Regular Examinations, May/June 2010
MATHEMATICAL METHODS

(Common to Computer Science & Engineering, Electronics & Communication Engineering,
 Electrical & Electronics Engineering, Electronics & Instrumentation Engineering, Electronics
 & Computer Engineering, Electronics & Control Engineering, Information Technology,
 Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
 All questions carry equal marks

- (a) Find the constants 'l' and 'm' such that the rank of the matrix $\begin{pmatrix} 1 & -2 & 3 & 1 \\ 2 & 1 & -1 & 2 \\ 6 & -2 & l & m \end{pmatrix}$ is (i) 3 (ii) 2

(b) Find A^{-1} when $A = \begin{pmatrix} 2 & 3 & 4 \\ 1 & -1 & 1 \\ -3 & 2 & 1 \end{pmatrix}$ by Gauss-Jordan method.
- (a) Prove that the eigen values of a skew Hermitian matrix are either purely imaginary or zero.

(b) Reduce the following quadratic form to canonical form by the diagonalisation method. Write also the corresponding linear transformation. Find the index, signature and nature of the quadratic form
 $6x_1^2 + 3x_2^2 + 3x_3^2 - 4x_1x_2 - 2x_2x_3 + 4x_1x_3$.
- (a) By using bisection method, find an approximate root of the equation $\sin x = \frac{1}{x}$ that lies between $x=1$ and $x=1.5$ (measured in radians). Carry out computation upto 7th stage.

(b) Find the root of the equation $2x - \log_{10}x = 7$, which lies between 3.5 and 4 by Regula - falsi method. (or) Find the real root of the equation $2x - \log x = 7$, by successive approximate method.
- Solve by the Taylor's series method of third order problem
 $\frac{dy}{dx} = (x^3 + xy^2)e^{-x}$, $y(0) = 1$ for $x = 0.1, 0.2, 0.3$.
- (a) Find a Fourier series to represent $f(x) = x - x^2$ in $-\pi \leq x \leq \pi$.
 Hence show that $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots = \frac{\pi^2}{12}$.

(b) If $F(s)$ is the complex Fourier transform of $f(x)$, then prove that $F\{f(x - a)\} = e^{isa}F(s)$.
- (a) Form the PDE by eliminating the arbitrary function ϕ from the relation
 $\phi(x^2 + y^2 + z^2, lx + my + nz) = 0$.

(b) Solve by the method of separation of variables
 $u_x = 4u_y$, $u(0, y) = 8e^{-3y}$.
- (a) Find $z \{(\cos \theta + i \sin \theta)^n\}$. Hence evaluate $Z(\cos n\theta)$ and $Z(\sin n\theta)$.

(b) Find $z^{-1} \left\{ \frac{3z^2 + z}{(5z-1)(5z+2)} \right\}$.
- (a) Fit a straight line to the following data.

x	4	6	8	10	12
y	13.72	12.90	12.01	11.14	10.31

- (b) Evaluate approximately, by trapezoidal rule, $\int_0^1 (4x - 3x^2) dx$.

By taking $n = 10$. Compute the exact integral and find the absolute and relative error.

B.TECH. I Year(R09) Regular Examinations, May/June 2010

ENGINEERING DRAWING

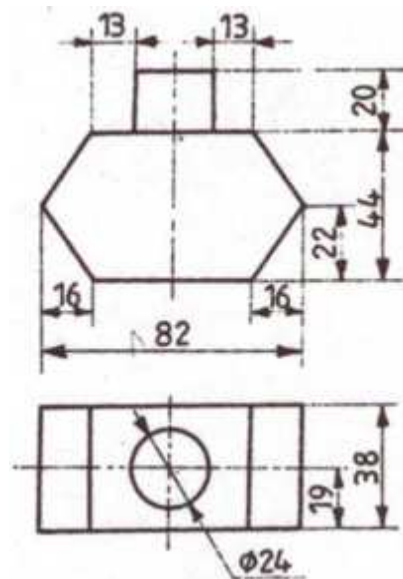
(Information Technology, Biotechnology, Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- Divide a given line 125 mm in 9 equal parts.
 - Inscribe a pentagon in a circle of 50 mm diameter.
 - Construct an ellipse, with distance of the focus from the directrix as 50 and eccentricity as $2/3$. Also draw normal and tangent to the curve at a point 40 from the directrix.
- 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° to HP and 40° VP. Draw its projections.
- A regular hexagonal lamina of 30 mm side rests on H.P with its plane surface vertical and inclined at 45° to V.P. Draw its projections of the plane.
 - A square plate of side 30 mm is perpendicular to V.P and inclined at 30° to H.P Draw it projections.
- 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° to ground, and parallel to V.P. Draw projections.
 - 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.
- A cylinder of base diameter 50 mm and axis length 70 mm has a co-axial square hole of the side 20 mm. It is resting on HP on its base with the faces of the hole equally inclined to VP. The cutting plane is inclined at 45° to HP and perpendicular to VP and is bisecting the axis of the solid. Draw its front view, sectional top view and true shape of section.
 - A cone base 60 mm diameter and axis 70 mm long is lying on the HP on one of its generators with the axis parallel to the VP. A vertical section plane parallel to the generator which is tangent to the ellipse (for the base) in the plan, cuts and bisects the axis and removing the portion containing the apex. Draw its sectional elevation and true shape of section.
- A cylindrical boiler is 2m in diameter and has a cylindrical dome 0.8m diameter and 0.6m high. The axis of the dome intersects the axis of the boiler. Draw three views of the arrangement. Also develop the surface of the dome. Take a scale of 1 cm = 0.2 m.
- Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm).



- 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.

B.TECH. I Year(R09) Regular Examinations, May/June 2010

ENGINEERING DRAWING

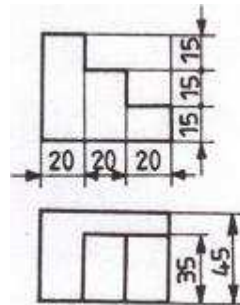
(Information Technology, Biotechnology, Computer Science & Systems Engineering)

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 and axis 30 long. Also draw a tangent to the curve at a point 25 from the base.
(b) The major and minor axis of an ellipse are 120&80 mm. Draw an ellipse by arcs of circles method.
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 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) 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) Draw the projection of a cylinder of 40 mm diameter and axis 60 mm long, when it is lying on HP, with its axis inclined at 45^0 to HP and parallel to VP.
(b) Draw the projections of a cone of diameter of base 40 mm and axis 60 mm long, when it is lying on a point of the base on HP, with its axis inclined at 45^0 to HP and perpendicular to VP. Follow the auxiliary method.
6. A cylinder of 60 mm diameter and 100 mm height, stands on its base on the ground. It is penetrated centrally by a cylinder of 40 mm diameter and 100 mm long, whose axis is parallel to HP, but inclined at an angle of 30^0 to VP. Draw the projections showing the curves of intersection. Also draw the development of the penetrating cylinders.
7. Two views of a model are shown below. Draw the isometric projection of the model (dimensions are in mm)



8. A man stands at a distance of 5 m from a flight of four stone steps having a width of 2m, tread 0.3m and rise 0.2m. The flight makes an angle of 30^0 with the picture plane and touches the same at a distance of 2 m to the right of the center of vision. Take horizon level to be 1.5m above the ground level. Draw the perspective projection of the flight.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING DRAWING

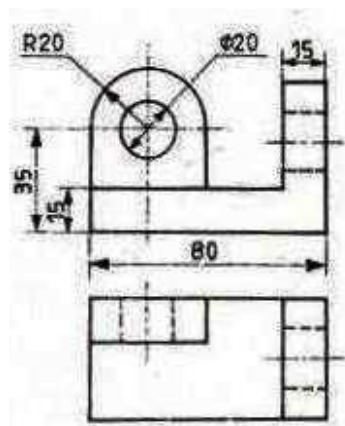
(Information Technology, Biotechnology, Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
 All questions carry equal marks

- The asymptotes of a hyperbola are inclined at 70° to each other. Construct the curve when a point P on it is at a distance of 20 and 30 from the two asymptotes.
 - The major axis of an ellipse is 120 long and the foci are at a distance of 20 from its ends. Complete the ellipse and draw a tangent at a distance of 35 from focus.
- The distance between the projectors of two end of straight line is 60 mm. One end is 15 mm above HP and 50 mm in front of VP. The other end is 60 mm above HP and 10 mm in front of VP. Draw the projections and find true length of the line.
- An equilateral triangular lamina of 30 mm side with the surface inclined at 60° to H.P. lines with one of its sides on H.P. The edge on which it rests is inclined to V.P. at 60° to V.P. and its surface making an angle of 45° with H.P.
 - A rectangular plane of 60mmX40mm is resting on shorter edge on the ground and inclined at 45° to V.P. The plane surface is inclined at 30° to H.P. Draw its projections.
- 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° to V.P. Draw its projections.
 - 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.
- A hexagonal prism of side of side of base 25 mm axis 60 long is freely suspended from a corner of the base. Draw the projections.
 - A square pyramid of base 35 mm side and axis 50 mm long, is resting on one of its triangular faces on HP, with the edges of the base containing that faces inclined at 45° to VP. Draw the projections of the pyramid. Follow the auxiliary plane method.
- A square prism of base 50 mm side and height 125 mm stands on the ground with its side of base inclined at an angle of 30° to VP. It is penetrated by a cylinder of diameter 50 mm and axis 125 mm long. The axis of the cylinder is parallel to both HP and VP and bisects the axis of the prism. Draw the projection showing fully the curves of intersection.
- Two views of a bracket are given below. Draw the isometric view of the bracket (dimensions are in mm).



- Draw a perspective view of a square plane with a 60 mm side resting on the GP with one of its corners touching PP and a side right to the corner inclined at 30° to it. The station point is 50 mm in front of PP, 60 mm above GP and lies in a CP which is 40 mm towards right of the corner touching the PP.

B.TECH. I Year(R09) Regular Examinations, May/June 2010

ENGINEERING DRAWING

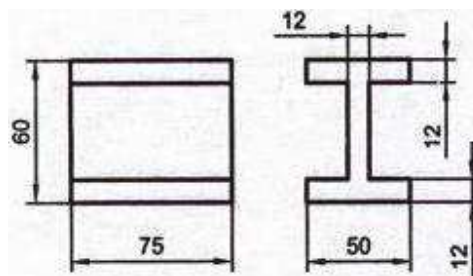
(Information Technology, Biotechnology, Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. (a) A circle of 40 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.
(b) Two concentric discs of 40 mm and 50 mm diameters roll on the horizontal line AB 150 mm long. Both discs start at the same point and roll in the same direction. Plot the curves for the movement of the points lying on their circumferences.
2. Draw the projections of a 75 mm long straight line, in the following positions:
 - i) Parallel to the both the H.P. and the V.P. and 25 mm from each.
 - ii) Parallel to 30 mm above H.P. and in the V.P.
 - iii) Parallel to 40 mm in front of V.P. and in the H.P.
3. (a) A rectangular lamina of sides 40X60 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° . 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° to V.P and its surface making an angle of 60° to H.P.
4. (a) A hexagonal prism base 30 mm side and axis 75 mm long, as an edge of the base parallel to the H.P. and inclined at 45° to the V.P. Its axis makes an angle of 60° with the H.P.
(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 pentagonal prism of side of base 25 mm and axis 40 mm long, is resting on HP on a corner of its base. Draw the projections of the prism, when the base is inclined at 60° to HP and the axis appears to be inclined at 30° to VP.
(b) A hexagonal prism of base 25 mm side and axis 45 mm long, is positioned with one of its base edges on HP such that, the axis is inclined at 30° to HP and 45° to VP. Draw its projections.
6. 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° to HP and 30° to VP.
Draw the projections of the solids, showing the lines of intersection.
7. Two views of a piece are given below. Draw the isometric view of the piece (dimensions are in mm).



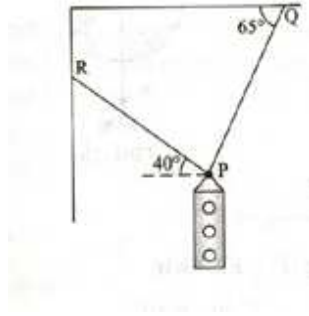
8. A square plane with a 60 mm side lies on the GP with the edge nearer to the observer lying in the PP. The station point is 50 mm in front of pp, 60 mm above GP and lies in a CP which is 50 mm towards right of the centre of the object. Draw its perspective view.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING MECHANICS

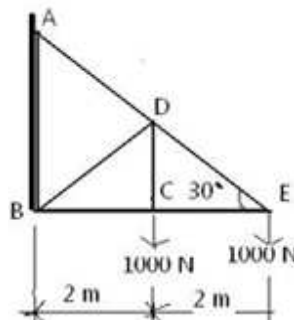
(Common to Aeronautical Engineering, Biotechnology, Civil Engineering, Mechanical Engineering)
 Time: 3 hours Max Marks: 70

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

1. A traffic signal of mass 50kg is hung with the help of two strings, as shown in fig. below. Find the forces induced in both the strings.



2. For the frame AEDCB as shown in the below figure, determine the induced axial forces in members AE, BE and BC.



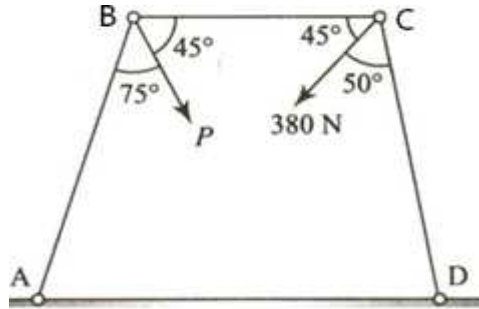
3. (a) Explain the principles of operation of a screw-jack with a neat sketch.
 (b) Outside diameter of a square threaded spindle of a screw jack is 40mm. The screw pitch is 10mm. If the coefficient of friction between the screw and the nut is 0.15, neglecting friction between the nut and collar, determine
 i. Force required to be applied at the screw to raise a load of 2000N,
 ii. The efficiency of screw jack,
 iii. Force required to be applied at pitch radius to lower the same load of 2000N and
 iv. Efficiency while lowering the load,
 v. What should be the pitch for the maximum efficiency of the screw and what should be the value of the maximum efficiency.
4. (a) Determine the centroid of the quarter circle whose radius is R.
 (b) Determine centroid of semicircle whose radius is R.
5. (a) Define the terms centroid, moment of inertia and radius of gyration.
 (b) Find the area moment of inertia of an equilateral triangle of side 'a' with respect to one of its side.
6. (a) A stone dropped into well is heard to strike the water in 3.5 sec. Find the depth of the well assuming the velocity of the sound is 335 m/sec.
 (b) Maximum range of a field gun is 2000 m. If a target at a distance of 1200 m is to be hit, what should be the angle of projection?
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) 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.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING MECHANICS

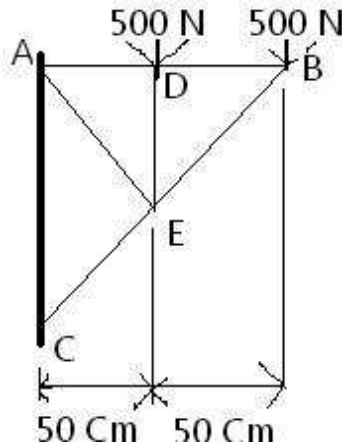
(Common to Aeronautical Engineering, Biotechnology, Civil Engineering, Mechanical Engineering)
 Time: 3 hours Max Marks: 70

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

1. In the four bar mechanism ABCD, as shown in fig. below, determine the force P for equilibrium.



2. Find the axial forces in each member of the loaded frame ADBEC as shown in the below figure.



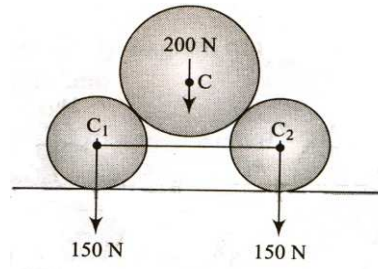
3. (a) Explain the types of friction with examples.
 (b) Two equal bodies A and B of weight 'W' each are placed on a rough inclined plane. The bodies are connected by a light string. If $\mu_A = 1/2$ and $\mu_B = 1/3$, show that the bodies will be both on the point of motion when the plane is inclined at $\tan^{-1} (5/12)$.
4. (a) Determine centroid for the rectangle lamina, having a width of "b" and height of "h".
 (b) Determine the centroid for triangular lamina, having a base "b" and height "h".
5. (a) Explain the terms:
 (i) Moment of inertia
 (ii) Polar moment of inertia
 (iii) Product of inertia
 (b) Find the maximum and minimum moments of inertia with respect to axes through the centroid of the 9 cm by 6 cm triangular area.
6. (a) A particle under a constant deceleration is moving in a straight line and covers a distance of 20 m in first two seconds and 40 m in the next 5 seconds. Calculate the distance it covers in the subsequent 3 seconds and total distance covered, before it comes to rest.
 (b) Deduce the general expression to determine the maximum height and horizontal range of projectile.
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 ' θ ' will it rotate after the driving force is removed.
8. Derive an expression for the equation of motion of a simple pendulum employing the principle of conservation of energy. Also find the frequency and time period.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING MECHANICS

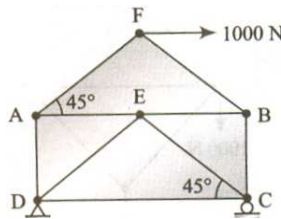
(Common to Aeronautical Engineering, Biotechnology, Civil Engineering, Mechanical Engineering)
 Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. Two identical iron spheres each of radius 5cm and weight 150 N is connected with a string of length 16cm, and rest on a horizontal smooth floor. Another sphere of radius 6cm and weight 200N rest over them. Determine the tension in the string and reaction at all contact surfaces [shown in below figure]



2. Determine the induced axial force in the bottom tie member DC of loaded frame.



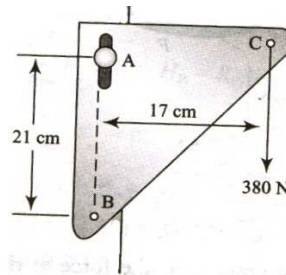
3. A screw jack has square threads 50 mm mean diameter and 10 mm pitch. The load on the jack revolves with the screw. The coefficient of friction at the screw threads is 0.05.
- Find the tangential force required at the end of 300mm lever to lift a load of 6000N.
 - State whether the jack is self locking. If not, find the torque which must be applied to keep the load from descending.
4. A steel ball of diameter 150 mm rests centrally over a concrete cube of size 150mm. Determine the center of gravity of the system, taking weight of concrete = 25000 N/m^2 and that of steel 80000 N/m^2 .
5. (a) State and prove parallel axis theorem.
 (b) Derive the expression to determine moment of inertia of a semicircular area about its diametral axis.
6. (a) Explain the terms displacement, velocity and acceleration connected to rectilinear translation.
 (b) An auto is accelerated from rest to top speed of 100 Kmph. And then immediately decelerated to a stop if the total elapsed time is 20 seconds, Determine the distance covered. The acceleration and deceleration are both constant, but not necessarily of the same magnitude.
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. (a) Differentiate between free and damped vibrations.
 (b) The amplitude of a simple harmonic motion is 0.5 m and the period is 1 sec. Determine the maximum velocity and maximum acceleration.

**B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING MECHANICS**

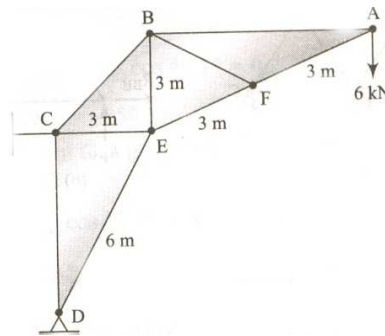
(Common to Aeronautical Engineering, Biotechnology, Civil Engineering, Mechanical Engineering)
Time: 3 hours Max Marks: 70

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

1. In the triangular bracket as shown in fig, the bolt A fits loosely in a vertical slot. Determine the reaction at A and B.



2. Find the forces induced in the each members of plane frame as shown in the below figure



3. A screw jack raises a load of 40 kN. The screw is square threaded having 3 threads per 20 mm length and 40 mm in diameter. Calculate the force required at the end of a lever 400 mm long measured from axis of screw, if coefficient of friction between screw and nut is 0.12.
4. Determine the center of gravity of solid hemisphere of radius 'r' from the diametral axis.
5. (a) State and prove the perpendicular axis theorem of moment of inertia.
(b) From basic principles, determine the moment of inertia of a rectangle about the centroidal x-axis as well as centroidal y-axis.
6. (a) An electric train which starts from one station is uniformly accelerated for the first 10 seconds during which period it covers 150 m. It then runs with constant speed until it is finally retarded uniformly in the last 40 m. Calculate the maximum speed and the time taken over the journey to the next stopping station which is 600 m from the previous station.
(b) A flywheel which is at rest attains a constant speed of 300 rpm after accelerating uniformly for 10 seconds; determine the number of revolutions made by the flywheel during the speed.
7. A wagon weighing 500 kN starts from rest runs 30 m down one percent grade and strikes the bumper post. If the rolling resistance of the track is 5 N/kN, find the velocity of the wagon when it strikes the post. If the bumper spring which compresses 1 mm for every 15 kN, determine by how much this spring will be compressed.
8. A vertical shaft 100 mm in diameter and 1 m in length has its end fixed to the ceiling. At the other end, it carries a disc of mass 500 kg having a radius of gyration of 450 mm. The modulus of rigidity for the material of shaft is 80 GPa. Determine the frequency of torsional vibrations.

B.TECH. I Year(R09) Regular Examinations, May/June 2010

ENGINEERING DRAWING

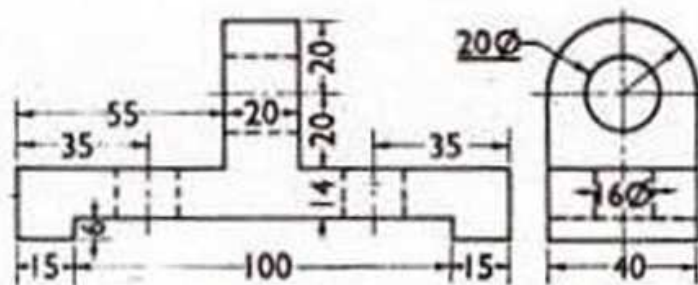
(Electrical & Electronics Engineering, Aeronautical Engineering & Civil Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- A ball thrown up in the air reaches maximum height of 45 meters and travels a horizontal distance of 75 metres. Trace the path of the ball, assuming it to be parabolic.
 - Inscribe an ellipse in a parallelogram having sides 150 mm and 100 mm long and an included angle of 120° .
- A 90 mm long line is parallel to and 25 mm in front of the V.P. Its one end is in the H.P. while other end is 50 mm above the H.P. Draw the projections of the line and determine its inclination with the H.P.
 - The length of the top view of a line parallel to the V.P. and inclined at 45° to the H.P. is 5 cm. One end of the line is 1.2 cm above the H.P. and 2.5 cm in front of the V.P. Draw the projections of the line and determines its true length.
- 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.
 - A square lamina of 40 mm is perpendicular to both planes. Draw projections with lamina 25 mm above H.P and 40 mm in front of V.P.
 - An equilateral triangle lamina of side 60 mm is perpendicular to H.P and inclined to V.P at an angle of 30° . Draw its projections.
- 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.
 - 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.
- A cube 35 mm long edges is resting on the HP on one of its faces with a vertical face inclined at 30° to the VP. It is cut by a section plane parallel to the VP and 9 mm away from the axis. Draw its sectional front view and the top view.
 - A pentagonal pyramid, base 30 mm side and axis 65 mm long, has its base horizontal and an edge of the base parallel to the VP. A horizontal section plane cuts it at a distance of 25 mm above the base. Draw its front view and sectional top view.
- A vertical square prism, base 50 mm side has its faces equally inclined to the V.P. It is completely penetrated by another square prism of base 30 mm side, the axis of which is parallel to both the planes and is 6 mm away from the axis of the vertical prism. The faces of the horizontal prism also are equally inclined to the V.P. Draw the projections of the solids showing lines of intersection.
- Three views of a casting are shown below. Provide isometric view of the casting (dimensions are in mm)



- A circular lamina of diameter 50 cm is lying on the ground plane touching the picture plane. The station point is 50 cm above the ground plane, 60 cm in front of the picture plane and contained in the central plane which passes at a distance of 40 cm from the center of the circle. Draw the perspective projection of the circle.

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ENGINEERING DRAWING

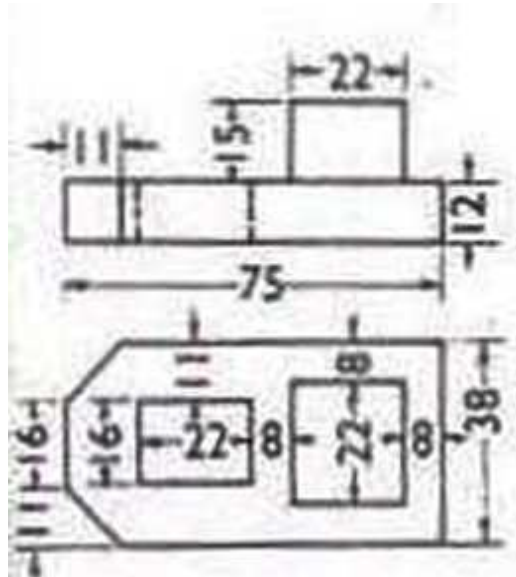
(Electrical & Electronics Engineering, Aeronautical Engineering & Civil Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- The major and minor axis of an ellipse is 120&80 mm. Draw an ellipse by arcs of circles method.
 - The asymptotes of a hyperbola are inclined at 70° to each other. Construct the curve when a point p on it is at a distance of 20 mm and 30 mm from the two asymptotes.
- Two pegs fixed on a wall are 4.5metres apart. The distance between the pegs measured parallel to the floor is 3.6 meters. If one peg is 1.5 meters above the floor, find the height of the second peg and the inclination of the line joining the two pegs, with the floor.
- A circular lamina of 42 mm diameter has its surface parallel to HP and perpendicular to VP. Its center is 15 mm above HP and 30 mm in front of VP. Draw its projections.
 - An equilateral triangular lamina of side 50 mm is perpendicular to both planes. Draw its projections.
- Draw the projections of cylinder of base 40 mm diameter, axis 50mm long, resting on ground on its base.
 - Draw the projections of a hexagonal pyramid axis 60 mm long, base 30 mm side having base on the ground and one of edges of base inclined at 45° to V.P.
- A pentagonal pyramid, base 30 mm side and axis 60 mm long, is lying on one of its triangular faces on the HP with the axis parallel to the VP. A vertical section plane, whose HT bisects the top view of the axis and makes an angle of 30° with the reference line, cuts the pyramid, removing its top part. Draw the top view, sectional front view, true shape of the section development of the surface of the remaining portion of the pyramid.
- Two equal prisms whose ends are equilateral triangles of 40 mm side and axes 100 mm long, intersect at right angles. One face of each prism is on the ground. The axis of one of the prisms makes 30° with the V.P. Draw three views of the solids.
- Draw the isometric view of the casting whose views are given below. (dimensions are in mm)



- A square pyramid of side of base 30 mm and axis 40 mm long rests with its base on the ground plane such that one of its base sides is parallel to the picture plane and 10 mm in front of it. The station point is 50 mm in front of the picture plane, 25 mm to the left of the axis of the pyramid and 55 mm above the ground. Draw the perspective projection.

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ENGINEERING DRAWING

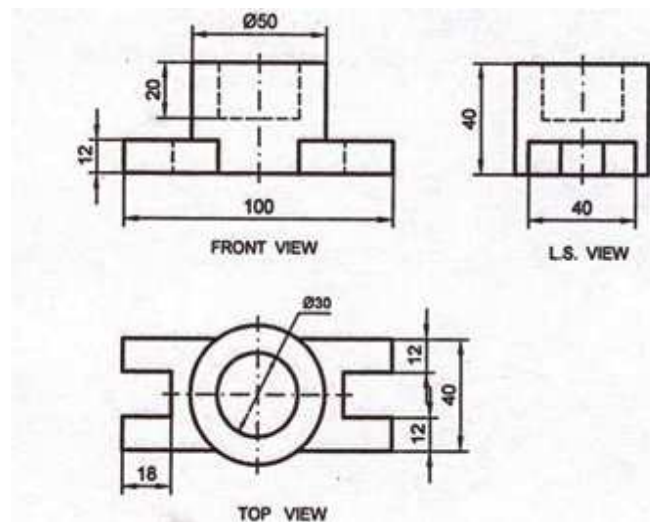
(Electrical & Electronics Engineering, Aeronautical Engineering & Civil Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- Two fixed points A&B are 100 mm apart. Trace the complete path of a point P moving (in the same plane as that of A&B)in such a way that, the sum of its distances from A&B is always the same and equal to 125 mm. Name the curve. Draw another curve parallel to and 25 mm away from this curve.
- A line PQ, 9cm 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.
 - 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.
- A rectangular lamina of sides 40 mm X 30 mm is perpendicular to both HP and VP. Draw its projections
 - 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 HP and perpendicular to VP.
- Draw the projections of a pentagonal pyramid, base 30 mm edge and axis 50 mm long, having its base on the H.P. and an edge of the base parallel to the V.P.
 - Draw the projections of cone of base 50 mm diameter, axis 60mm long, resting on ground on its base.
- A hexagonal pyramid side of the base 30 mm and altitude 70 mm rests with its base on HP and with a side 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.
 - 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.
- A square prism of base 50 mm side and height 125 mm stands on the ground with a side of the base inclined at 30^0 to the V.P. It is penetrated by a cylinder, 50mm diameter and 125 mm long, whose axis is parallel to both the H.P. and the V.P. and bisects the axis of the prism. Draw the projections showing fully the curves of intersection.
- Three views of a machine part are shown below. Draw the isometric view of the part (dimensions are in mm)



- Draw the perspective projection of a cube of side 45 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 15mm to the left of the station point which is 70 mm above the ground and 55mm in front of the picture plane.

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ENGINEERING DRAWING

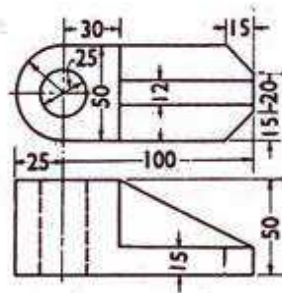
(Electrical & Electronics Engineering, Aeronautical Engineering & Civil Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- The foci of an ellipse are 90 mm apart and the minor axis is 65 mm long. Determine the length of the major axis and draw half the ellipse by concentric-circles method and other half by oblong method.
- The top view of a 75 mm long line measures 55 mm. The line is in the V.P., its one end being 25 mm above H.P. Draw its projections.
 - The front view of a line, inclined at 30° to the V.P. is 65 mm long. Draw the projection of the line, when it is parallel to and 40 mm above the V.P., its one end being 30 mm in front of the V.P.
- 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° to VP perpendicular to HP.
 - A thin square plate ABCD of side 40 mm is perpendicular to both HP and VP. Draw its projections.
- Draw the projections of a triangular prism base 40 mm side and axis 50 mm long, resting on one of its bases on the H.P. with a vertical face perpendicular to the V.P.
 - Draw the projections of a pentagonal pyramid axis 60 mm long, base 30 mm side having base on the ground and one of edges of base inclined at 45° to V.P.
- A cone of base diameter 50 mm and axis length 75 mm is resting on HP on its base is cut by a plane inclined at 45° 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.
 - A pentagonal prism of base of 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° 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.
- A cylinder of 75 mm diameter and 125 mm height, stands on its base on the ground. It is penetrated centrally by a cylinder, 50 mm diameter and 125 mm long, whose axis is parallel to the H.P. but inclined at 30° to the V.P. Draw the projections showing curves of intersection. Draw also the development of the surface penetrated cylinder.
- Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)



- A cylinder 30 mm diameter and axis 40 mm long is lying on the ground plane with its axis perpendicular to the picture plane. The nearest point of contact with the ground is 60 mm on the left of the station point and 10 mm from the picture plane. The station point is 40 mm above the ground and 60 mm in front of the PP. Draw the perspective projection of the cylinder.

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ENGINEERING DRAWING

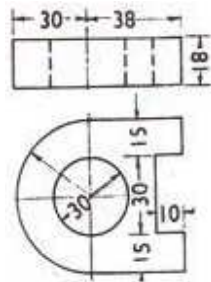
(Electronics & Communication Engineering, Electronics & Control Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- A fixed point is 75 mm from a fixed straight line . Draw the locus of a point P moving such a way that its distance from the fixed straight line is
 - twice its distance from the fixed point
 - equal to its distance from the fixed point.
 Name the curves.
- The distance between the projectors of two points A and B is 70 mm. Point A is 10 mm above HP and 15 mm in front of VP. Point B is 50 mm above HP and 40 mm in front of VP. Find the shortest distance between A and B. Measure true inclination of the line AB with HP and VP.
- An equilateral triangular lamina of side 30 mm is perpendicular to H.P and parallel to V.P. One of its edges is 15mm above H.P and 25 mm in front of V.P. Draw its projections.
 - A rectangular plate of negligible thickness and having 40X60 mm dimensions is perpendicular to both planes. It's longer side is perpendicular to V.P and is in H.P and 20 mm in front of V.P. Draw its projections.
- Draw the top and front views of a cube of 40 mm side resting its one of its square faces on H.P. such that one of its vertical faces is parallel to and 10 mm in front of V.P.
 - Draw the projections of square prism of side of base 30 mm and height 50 mm resting with its base on H.P. such that one of its rectangular faces is perpendicular to V.P. the nearest edge parallel to V.P. is 5 mm in front it.
- 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° 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.
 - 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° 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.
- A right circular cylinder of 75 mm diameter penetrates another of 100 mm diameter, their axes being at right angles to each other but 10 mm apart. Draw the projections of the curves of intersection on a plane parallel to the axes of the cylinders.
- Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)



- A frustum of a square pyramid, base 28 mm side, top 22mm side and 36mm height is resting on its base on the GP such that the sides of base are equally inclined to the picture plane. The axis of the frustum is 30 mm to the right of the station point. The station point is 45 mm in front of the PP and 50 mm above the GP. The nearest base corner is 10 mm behind the PP. Draw the perspective projection.

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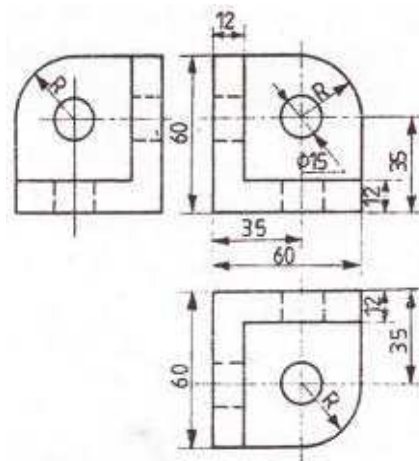
(Electronics & Communication Engineering, Electronics & Control Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- Two points A&B are 100 mm apart. A point C is 75mm from A and 60mm from B. Draw the ellipse passing through A,B and C.
 - A ball thrown up in the air reaches maximum height of 45 metres and travels a horizontal distance of 75metres. Trace the path of the ball, assuming it to be parabolic.
- 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 its inclination with HP.
 - A line AB 60mm long is parallel to HP. The point P is 20mm above HP and 35 mm in front of VP. The length of the front view is 50mm. Determine its true inclination with VP.
- A rectangular lamina of sides 30 mm X 40 mm is perpendicular to HP and inclined at 30° to VP. Draw its projections.
 - A square lamina ABCD of side 40 mm is perpendicular to HP and parallel to VP. Draw its projections.
- A rectangular prism side of base 40 mm X 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.
 - 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.
- A cone of base diameter 50 mm and axis length 60 mm is resting on HP on its base. It is cut by a perpendicular to HP and parallel to VP and 15 mm in front of the axis. Draw its top view, sectional front view.
 - A pentagonal pyramid of base side 30 mm and axis length 50 mm lies on one of its triangular faces on HP and with its axis parallel to VP. It is cut by a horizontal section plane whose VT passes through the centre of the base on the pyramid. Draw the sectional plan.
- Two circular pipes of 75 mm and 50 mm diameters (inside) meet at 30° . The axes of both the pipes are in one plane and the 75mm pipe is vertical. The thickness of the pipes is 6 mm in both cases. Draw the projections showing curves of intersection.
- Three views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)



- Draw the perspective projection of a rectangular block of 3m x 2 m x 1.5 m resting on a horizontal plane with one side of the rectangular plane making an angle of 45° with VP. The observer is at a distance of 6 m from the picture plane. Assume eye level as 1.5 m.

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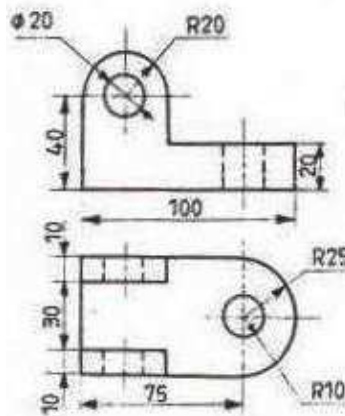
(Electronics & Communication Engineering, Electronics & Control Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- Inscribe an ellipse in a parallelogram having sides 150 mm and 100 mm long and an included angle of 120° .
 - 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.
- The length of the top view of a line MN parallel to VP and inclined at 45° 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.
 - 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.
- A circular plate of 50 mm diameter is perpendicular to both planes. Its center is 60 mm above H.P and 50 mm in front of V.P. Draw its projections.
 - A rectangular cardboard ABCD of edges AB=30 mm and BC=40 mm is placed such that the edge AB is i) perpendicular to HP and parallel to VP. ii) perpendicular to VP and parallel to HP.
- A cube of 30 mm long edges lies with one of its square faces on H.P. Such that one of its vertical faces is inclined at 30° to V.P. Draw its projections.
 - Draw the projections of a regular pentagonal prism side of base 30 mm and axis 55 mm resting with its base on H.P. such that one of its rectangular faces is perpendicular to V.P.
- 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.
 - A sphere of 60 mm diameter is cut by a section plane perpendicular to the VP, inclined at 45° to the HP and at a distance of 15 mm from its centre. Draw the sectional plan and true shape of section.
- A square hole of 35 mm side is cut in a cylindrical shaft 75 mm diameter and 125 mm long. The axis of the hole intersects that of the shaft at right angles. All faces of the hole are inclined at 45° to the H.P. Draw three views of the shaft when the plane of the two axes is parallel to the V.P.
- Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)



- A solid is in the form of a square prism of side of base 40mm up a height of 50 mm and thereafter tapers into frustum of a square pyramid whose top surface of 25 mm side. The total height of the solid is 70 mm. Draw the solid in perspective, given that one side of the base of the solid resting on the ground is inclined at 25° to the PP and the corner containing that side is 40mm to the right of the eye and is touching the PP. The eye is 100 mm from PP and 90 mm above the ground.

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ENGINEERING DRAWING

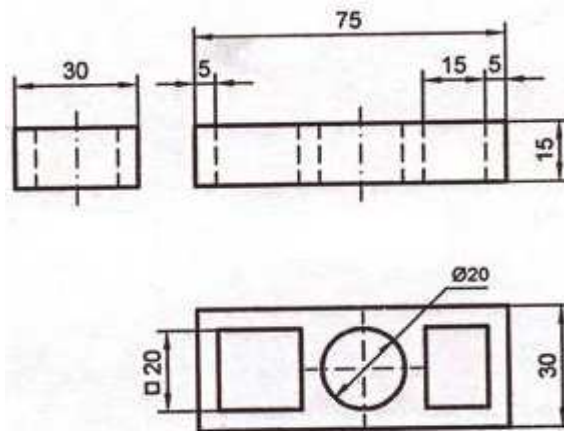
(Electronics & Communication Engineering, Electronics & Control Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- A parallelogram has sides 100 & 80 mm at an included angle of 70° . Inscribe an ellipse in the parallelogram. find the major and minor axis of the curve.
 - 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.
- Draw the projection of a line CD 50 mm long, parallel to HP and inclined to VP. The end of C is 10 mm in front of VP and D is 30 mm in front of VP. The line is 15 mm above HP.
 - A line AB is 75 mm long. A is 50 mm in front of VP and 15 mm above HP. B is 15 mm in front of VP and is above HP. Top view of AB is 50 mm long. Draw and measure the front view. Find the true inclinations.
- A square lamina ABCD of 50 mm side is perpendicular to V.P and parallel to H.P. It is 20 mm above H.P and 30 mm in front of V.P. Draw its projections.
 - A square lamina of 40 mm side has a corner on H.P. and 20 mm in front of V.P. All sides are equally inclined to H.P and parallel to V.P. Draw its projections.
- Draw the projections of a hexagonal prism of side of base 25 mm and height 50 mm resting with its base on H.P. such that one of its rectangular faces is perpendicular to V.P.
 - Square pyramid base 40 mm side, axis 65 mm long has base in V.P. one edge of base inclined to 30° to H.P. and corner contained by that edge is on H.P. Draw its projections.
- A square pyramid of base side 35 mm and axis length 60 mm is resting on HP on one of its triangular faces with its axis parallel to VP. It is cut by a plane inclined at 45° 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.
 - 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° to HP and parallel to VP. It is cut by a plane inclined 65° to HP and perpendicular to VP and is passing through the top most edge of prism. Draw the front view, sectional top view and true shape of section.
- Two equal triangular prisms whose axes intersect each other at right angles, have side of base 40 mm and altitude 100 mm. The vertical prism has one edge of its base perpendicular to VP. The horizontal prism has one of its rectangular faces vertical, making an angle of 30° with V.P.
Draw the projections showing the lines of intersection.
- Three views of a model are given below. Draw the isometric view of the model (dimensions are in mm)



- A man of 1.8m height stands at a distance of 5 m from a flight of four stone steps having a width of 2m, tread 0.3m and rise 0.2m. The flight makes an angle of 45° with the PP and touches the same at a distance of 2 m to the right of the center of vision. Draw the perspective projection of the flight.

B.TECH. I Year(R09) Regular Examinations, May/June 2010

ENGINEERING DRAWING

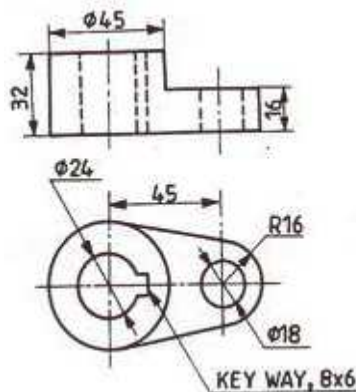
(Computer Science & Engineering, Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 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.
 - The vertex of a hyperbola is 60 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 from the directrix.
- A line CD measures 80mm is inclined at an angle of 30° to HP and 45° to VP. The point C is 20mm above HP and 30mm in front of VP. Draw the projections of the line.
 - Draw the projections of a line JK 70 mm long and touching both HP and VP. It is inclined at 40° to HP and 35° to VP.
- A circular plate is parallel to H.P Its radius is 30 mm and center is 50 mm above and 20 mm in front of V.P. Draw its projections of planes.
 - A regular pentagon of 25 mm side has one of its edge on V.P. Its plane is inclined at 45° to V.P. Draw its projections.
- 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.
 - 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° angle with H.P. projection of pyramid when its axis perpendicular to V.P and base is 15 mm from V.P.
- 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° to HP and perpendicular to VP and is 15 mm away from axis. Draw it's front view, sectional top view and true shape of section.
 - 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° 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.
- A hexagonal prism of side of base 30 mm is resting on one of its bases on HP with a face parallel to VP. The prism contains a square hole of 20 mm side. The axis of the hole is parallel to VP and inclined at an angle of 30° to the HP intersecting the axis of the prism. The faces of the hole are equally inclined to VP. Draw the lines of intersection.
- Two views of a casting are shown below. Draw the isometric projection of the casting (dimensions are in mm)



- 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.

B.TECH. I Year(R09) Regular Examinations, May/June 2010

ENGINEERING DRAWING

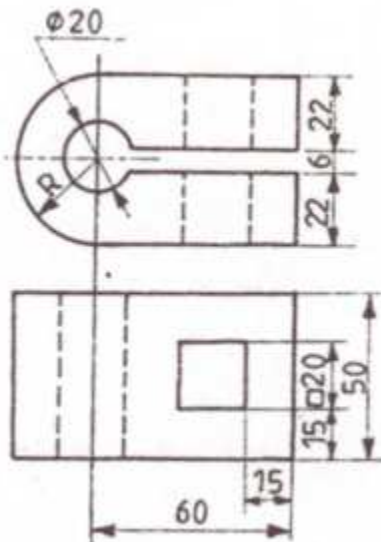
(Computer Science & Engineering, Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- The major axis of an ellipse is 100 mm long and the distance between its foci is 70 mm. Draw the ellipse.
 - Draw a hyperbola having the double ordinate of 100 mm, the abscissa of 60 mm and the transverse axis of 100 mm.
- A line CD is parallel to VP and inclined at 40° to HP. C is in HP and 25 mm in front of VP. The length of the top view is 50mm. Determine its true length.
 - A line measuring 80 mm long has one of its ends 60mm above HP and 20mm 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.
- A pentagonal plate of 35 mm side is perpendicular to V.P and parallel to H.P One of its edges is perpendicular to V.P. Draw its projections.
 - A square lamina of side 40 mm is perpendicular to VP and parallel to HP. Draw its projections.
- 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 20mm in front of V.P.
 - A pentagonal pyramid of base 25 mm side and axis 65 mm long is resting on an edge of base projections of pyramid when axis is perpendicular to V.P. Base is at 15mm from V.P.
- 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° 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.
 - 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° to VP and is 8 mm away from the axis. Draw its top view, sectional front view and true shape of section.
- 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° . All the faces of both the pipes are equally inclined to VP. Draw the projections showing the lines of intersection.
- Two views of a casting are shown below. Draw the isometric projection of the casting (dimensions are in mm)



- A solid is in the form of a square prism of side of base 20 mm upto 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 solid 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.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING DRAWING

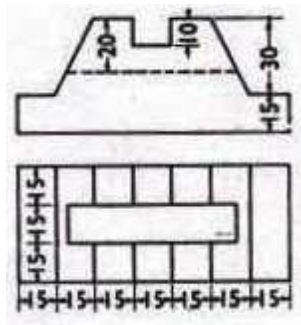
(Computer Science & Engineering, Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. (a) Construct a pentagon length of a side is 30 mm.
 (b) 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 from the directrix.
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° to the H.P. and at 60° 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° to HP and 45° to VP. Draw projections of the line.
3. (a) A square lamina of 50 mm side is inclined at 45° 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) A hexagonal prism has one of its rectangular faces parallel to the H.P. Its axis is perpendicular to the V.P.and 3.5 cm above the ground.
 (b) Draw the projection of cylinder 60 mm diameter and 90 mm long. Axis inclined at 45° to H.P. and parallel to V.P.
5. (a) A sphere of 60 mm diameter is cut by a cutting plane inclined at 55° 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° 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 cylinders each of 30 mm diameter and altitude 80 mm intersect each other at right angles. Their axes bisect each other and are parallel to VP. Determine the line of intersection of the two cylinders.
 Also, develop the lower portion of the vertical cylinder, neglecting the thickness of the metal.
7. Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)



8. A cylinder of base 50 mm diameter and axis 75 mm long, has a coaxial square hole of 25 mm side. The cylinder is resting on the ground, with its base parallel to PP and 10 mm behind it. The faces of the hole are equally inclined to GP. The station point is 50 mm to the left of the axis of the solid, 45 mm in front of PP and 70 mm above GP. Draw the perspective projection of the solid.

B.TECH. I Year(R09) Regular Examinations, May/June 2010

ENGINEERING DRAWING

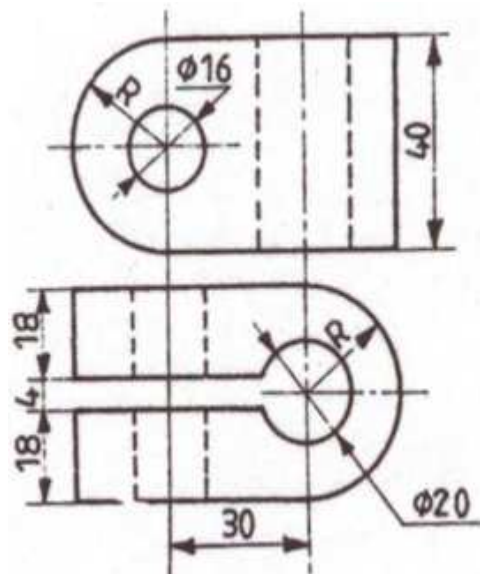
(Computer Science & Engineering, Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- Inscribe a regular octagon in a given square of 50 mm side.
 - 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.
- A line AB 120 mm long is inclined at 45° to HP and 30° 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.
- A regular pentagon of 25 mm side has one side on the ground. Its plane is inclined to H.P at 45° and perpendicular to V.P Draw its projections
 - Draw the projections of circle diameter of 5 cm having its plane vertical and inclined at 30° to the V.P Its center is 3 cm above H.P and 2 cm in front of V.P.
- 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° to ground and parallel to V.P.
 - 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° to H.P.
- A sphere of 50 mm diameter is cut by a cutting plane inclined at 50° to HP and perpendicular to VP and is 10 mm away from the center of the sphere. Draw its, front view, sectional top view and true shape of section.
 - A cone of base diameter 50 mm and axis length 60 mm is resting on HP on its base, which is cut by a plane inclined at 50° to HP and perpendicular to VP and passing through a point, on the base circle of the cone. Draw its front view, sectional top view and true shape of section.
- 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.
 - 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.
- Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)



- 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 2m 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° . Assume that the outer surfaces of the pillars are in flush with the sides of the roof at the corners.

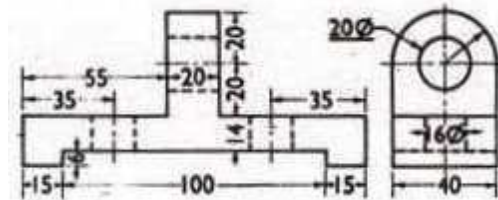
B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING DRAWING
 (Mechanical Engineering, Electronics & Instrumentation Engineering)

Time: 3 hours

Max Marks: 70

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

1. A circle of 60 mm diameter rolls on a horizontal line for a half revolution and then on a vertical line for another half revolution. Draw the curve traced out by a point P on the circumference of the circle.
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° to HP and 35° VP. Draw its projections.
3. (a) A square ABCD of 50 mm side has its corners A in H.P its diagonal AC is inclined at 30° to H.P and the diagonal BD is inclined at 45° to V.P and parallel to H.P .Draw its projections.
 (b) A thin 30° - 60° set square has its longest edge in V.P and inclined at 30° to H.P. Its surface makes an angle of 45° with V.P. Draw its projections.
4. (a) A cylinder base 35 mm diameter and axis 60 mm long lies with one of its generators on H.P. such that its axis is parallel to both H.P. & V.P.
 (b) Draw the projections of cube of 40 mm side, resting with a face on H.P. such that one of its vertical faces is inclined at 30° to V.P.
5. A cube of 50 mm long edges is resting on the H.P. with a vertical face inclined at 30° to the V.P. It is cut by a section plane, perpendicular to the V.P. inclined at 30° to the H.P. and passing through a point on the axis, 38 mm above the H.P. Draw the sectional top view, true shape of the section and development of the surface of the remaining portion of the cube.
6. A cylinder of 60 mm diameter and axis 80 mm long is standing on its base on HP. A horizontal rectangular hole of 35 mm x 25 mm sides is cut through the cylinder. Axis of the hole is parallel to VP. The axes of both cylinder and hole intersect at right angles and bisect each other. Draw the projections and show the curves of intersection.
7. Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)



8. Draw a perspective view with a square plane with a 50 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° to PP. The station point is 60 mm in front of PP, 65 mm above GP and lies in a CP which is 55 mm towards right of the centre of the plane.

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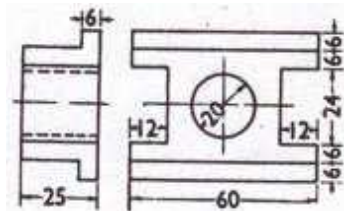
B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING DRAWING
 (Mechanical Engineering, Electronics & Instrumentation Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
 All questions carry equal marks

1. A circle of 50 mm diameter rolls on the circumference of another circle of 175 mm diameter and outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. Name the curve. Draw a tangent and normal to the curve at a point 125 mm from the center of the directing circle.
2. The distance between the projectors of two ends of straight line is 40mm. The lower end is 15 mm above HP and 10 mm in front of VP. The upper end is 40 mm above HP and 40 mm in front of VP. Find true length and true inclination.
3. Draw the projections of a regular pentagon of 40 mm side, having its surface inclined 30° to HP and a side parallel to the HP. and inclined at angle of 60° to VP.
4. (a) A hexagonal prism side of base 20 mm and axis 60 mm long lies with one of its rectangular faces on H.P. such that its axis is parallel to both H.P. & V.P.
 (b) A hexagonal pyramid, side of base 25 mm and height 50 mm rests with its base on H.P. such that one of the edges of the base is inclined at 20° to V.P. Draw the top and front views of the pyramid.
5. A hexagonal prism, side of base 35 mm and height 75 mm is resting on one of its corners on the H.P. with a longer edge containing that corner inclined at 60° to the H.P. and a rectangular face parallel to the V.P. A horizontal section plane cuts the prism in two equal halves.
 (i) Draw the front view and sectional top view of the cut prism.
 (ii) Draw another top view on an auxiliary inclined plane which makes an angle of 45° with the H.P.
6. A cylinder of 60 mm diameter and axis 80 mm long is standing on its base on HP. A horizontal hexagonal hole of 25 mm side is cut through the cylinder. Axis of the hole is parallel to VP. The axes of both cylinder and hole intersect at right angles and bisect each other. A side face of the hole is inclined at an angle of 30° to the HP. Draw the projections and show the curves of intersection.
7. Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)



8. A rectangular plane with 60 mm and 40 mm sides is lying in the GP with the longer side parallel to and 15 mm behind the PP. The station point is 50 mm in front of the PP, 60 mm above GP and lies in the CP passing through the centre of the object. Draw its perspective view.

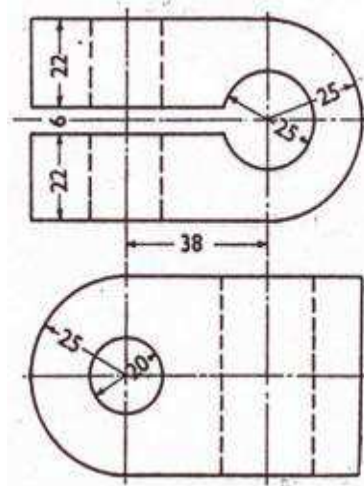
B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING DRAWING
 (Mechanical Engineering, Electronics & Instrumentation Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
 All questions carry equal marks

- 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.
 - Draw the involute of an equilateral triangular of side 20mm.
- A line PQ 40mm long is parallel to VP and perpendicular to HP. One end Q is 15 mm above HP. Another end P is 55 mm above HP and 25 mm in front of VP. Draw the projections.
- Draw the projections of a circle of 50 mm diameter resting in the H.P. on a point A on the circumference, its plane inclined at 45° to the H.P. and the top view of the diameter AB making 30° an angle with the V.P.
 - A thin rectangular plate of sides 60mmX30mm has its shorter side in the V.P. and inclined at 30° to the H.P. Project its top view if its front view is a square of 30 mm long sides.
- A pentagonal pyramid, base 40 mm side and height 75 mm rests on one edge of its base on the ground so that the highest point in the base is 25 mm above the ground. Draw its projections when the axis is parallel to the V.P. Draw another front view on a reference line inclined at 30° to the edge on which it is resting, and show that the base is visible.
- A pentagonal prism, side of base 50 mm and length 100 mm has a rectangular face on the H.P. and the axis parallel to the V.P. It is cut by a vertical section plane, the H.T. of which makes an angle of 30° with xy and bisects the axis. Draw the sectional front view, top view and true shape of the section. Develop the surface of the remaining half of the prism.
- 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° . 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.
- Two views of a grip are shown below. Draw the isometric view of the grip (dimensions are in mm)



- A pentagonal plane with a 30 mm side lies on the GP with an edge parallel to and 20 mm behind the PP. The station point is 50 mm in front of PP, 65 mm above GP and lies in a CP which is at a distance of 40 mm towards right of the centre of the object. Draw its perspective view.

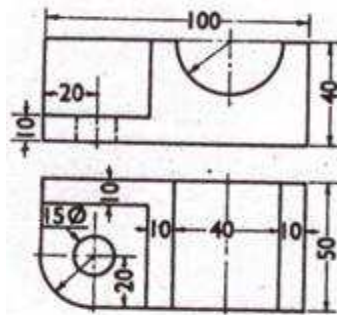
B.TECH. I Year(R09) Regular Examinations, May/June 2010
ENGINEERING DRAWING
 (Mechanical Engineering, Electronics & Instrumentation Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
 All questions carry equal marks

1. A circle of 50 diameter rolls without slipping on the outside of another circle of diameter 150. Show the path of a point on the periphery of the (generating) rolling circle, diametrically opposite to the initial point of contact between the circle.
2. The end A of a line AB is in H.P and 25 behind V.P. The end B is in V.P and 50 above H.P. The distance between the end projectors is 75. Draw the projections of AB and determine its true length, traces and inclinations with the two planes.
3. (a) An equilateral triangular plane ABC of side 40 has its plane parallel to V.P. and 20 away from it. Draw its projections of the planes. i) Perpendicular to H.P. ii) parallel to H.P. and iii) inclined to H.P at an angle of 45° .
 (b) Draw the equilateral triangle of 75 mm side and inscribe a circle in it. Draw the projections of figure , when its plane is vertical and inclined at 30° to VP and one of the sides of the triangle is inclined at 45° to HP.
4. (a) A hexagonal pyramid, side of base 25mm and axis 50mm long ,rests with one of the edges of its base on H.P and its axis is inclined at 30° 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° to H.P. and its axis is parallel to V.P. Draw its projections.
5. A hollow square prism, base 50 mm side (outside), length 75mm and thickness 9 mm is lying on the H.P. on one of its rectangular faces, with the axis inclined at 30° to the V.P. A section plane, parallel to the V.P. cuts the prism, intersecting the axis at a point 25 mm from one of its ends. Draw the top view and sectional front view of the prism.
6. A square hole of 35 mm side is cut in a cylindrical shaft of 60 mm diameter and 100 mm long. The axis of the hole intersects that of the shaft at right angles. All the faces of the hole are inclined at 45° to HP. Draw the projections of the shaft when an imaginary plane containing the two axes is parallel to VP.
7. Two views of a casting are shown below. Draw the isometric view of the casting (dimensions are in mm)



8. A pentagonal plane with a 30 mm side stands vertically on the GP on an edge and a corner touching the PP. The surface of the plane makes an angle of 30° with the PP. The station point is 60 mm in front of PP, 75mm above GP and lies in a CP which is at a distance of 40 mm towards right of the centre of the plane. Draw its perspective view.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
PROGRAMMING IN C & DATA STRUCTURES
(Common to all branches)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. Clearly Explain the steps for Software Development.
2. Explain Basic C language elements.
3. (a) Write a short note on scope of a variable.
(b) Write a program to find factorial of a given number using function with argument and with return value.
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. (a) Define structure and give the general syntax for structure.
(b) How to copy and compare structure variables. Illustrate with example.
(c) Give the differences between structures and arrays?
6. Explain the following with example.
(a) Sequential files.
(b) Random Access files.
7. Discuss with example the following with respect to singly linked list
(a) Inserting an element as the first element in the list.
(b) Inserting an element as the last element in the list.
(c) Inserting an element at the specified position in the list.
8. (a) Define sorting.
(b) What is the difference between internal and external sorting methods?
(c) Give examples for internal and external sorting methods.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
PROGRAMMING IN C & DATA STRUCTURES
(Common to all branches)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. (a) Mention the steps involved in Software Development Method.
(b) Briefly explain the need for software maintenance?
(c) What is an algorithm? Explain with suitable example?
2. (a) What is a named constant Explain with examples.
(b) What is a constant? Explain different constants in C.
(c) What is a variable? Explain with neat diagram.
3. Define an array. What are the different types of arrays? Explain.
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) Why we need structure in C. Explain?
(b) How to declare and initialize a structure with examples?
6. (a) Write a program to copy the contents of one file to another.
(b) Write a program to write data to a text file and read it.
7. Discuss insertion and deletion operation in a queue using arrays?
8. (a) Discuss the algorithm of exchange sort with an example. Give its time complexity.
(b) Write a program in C to perform selection sort in a given list of integers.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
PROGRAMMING IN C & DATA STRUCTURES
(Common to all branches)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. What is a Flow Chart? Explain Different Symbols Used for Flow Chart?
2. (a) Explain different basic data types in C with Examples.
(b) What is an identifier? What are the naming conventions used for identifiers in C.
3. Write a short notes on the following storage classes:
 - (a) automatic
 - (b) static
 - (c) register
 - (d) external.
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) What is the use of period operator? Give an example?
(b) Explain structure within structure using an example?
6. Discuss with examples the following File I/O handling function.
 - (a) fputc()
 - (b) fgetc()
 - (c) fprintf().
7. Discuss insertion and deletion operation in a queue using pointers.
8. (a) Write a program in C to perform exchange sort in a given list of integers.
(b) Discuss the algorithm of selection sort with an example. Give its time complexity.

B.TECH. I Year(R09) Regular Examinations, May/June 2010
PROGRAMMING IN C & DATA STRUCTURES
(Common to all branches)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. Explain the three categories of statements for Algorithm Development with examples.
2. (a) What is an output operation? Clearly explain the syntax of printf function with example.
(b) Write a program that asks the user to enter the radius of a circle and then computes and displays the circle's area. Use the formula $\text{Area} = \text{PI} * \text{Radius} * \text{Radius}$ where PI is the constant macro 3.14159
3. (a) Distinguish between the following:
 - i. Actual and formal arguments.
 - ii. Global and local variables.
 - iii. Automatic and static variables.(b) Write a program to find the smallest element in an array.
4. (a) Explain the concept of pointer to pointers with examples.
(b) Explain the concept of void pointers with examples.
5. (a) Write a program in C to display the size of structure elements using size of operator?
(b) Explain the different ways of defining the structure and how to access the structure members with examples?
6. (a) Explain the following file handling functions in detail with examples.
 - (i) fopen()
 - (ii) fclose()(b) Write a program in C that interchanges the contents of two files.
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) Why quick sort is said to be the most efficient sorting method? Discuss with example.
(b) Write a program in C to perform quick sort in a given list of integers.
