

**MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)**(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)  
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**I B.TECH SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018**Subject: **MATHEMATICS-I**Branch: **CE, ME, ECE & CSE****Time: 3 hours****Max. Marks: 75**Answer any **FIVE** Questions of the following**5x15M=75M**

1. a) Solve  $(x^2y^2 + xy + 1)y dx + (x^2y^2 - xy + 1)x dy = 0$  8M  
 b) A body is heated to  $105^\circ\text{C}$  and placed in air at  $15^\circ\text{C}$ . After 1 hr its temperature is  $60^\circ\text{C}$ . How much additional time is required for it to cool to  $37\frac{1}{2}^\circ\text{C}$ . 7M
2. a) Solve  $(D^2 - 4D)y = e^x + \sin 3x \cos 2x$  8M  
 b) Solve  $(D^2 + 1)y = x \sin x$  by the method of variation of parameters. 7M
3. a) Verify Rolle's theorem for the following function  $f(x) = \frac{\sin x}{e^x}$  in  $(0, \pi)$  (8)  
 b) If  $U = x^2 - y^2$ ,  $V = 2xy$  where  $x = r \cos \theta$ ,  $y = r \sin \theta$ , show that  $\frac{\partial(u,v)}{\partial(r,\theta)} = 4r^3$  (7)
4. a) Find the Radius of curvature at any point on the curve  $y = c \cosh \frac{x}{c}$  [5+10M]  
 b) Trace the curve  $r = a(1 + \cos \theta)$
5. a) Find the length of the arc of the parabola  $x^2 = 4ay$  measured from the vertex to one extremity at the latus-rectum. 7M  
 b) Change the order of integration and hence evaluate  $I = \int_0^a \int_{\sqrt{ax}}^x \frac{y^2}{\sqrt{y^2 - a^2x^2}} dx dy$  8M
6. a) Find the total work done in moving a particle in the force field  $F = (2y+3)i + xyj + (yz-x)k$  when it moves a particle from  $(0,0,0)$  to  $(2,1,3)$  along the curve  $x=2t^2$ ,  $y=t$ ,  $z=t^3$  [7M]  
 b) Evaluate  $\int_S F \cdot N ds$  where  $F = 4xi - 2y^2j + z^2k$  and  $S$  is the surface bounding the region  $x^2 + y^2 = 4$ ,  $z=0$  and  $z=3$ , using the Gauss Divergence theorem [8M]
7. a) Find the Laplace transform of i)  $e^{-3t} [2 \cos 5t - 3 \sin 5t]$  ii)  $e^{2t} + 4t^3 - 2 \sin 3t + 3 \cos 3t$  [7+8M]  
 b) Solve  $y^{(11)} + 2y^{(10)} - y^{(9)} - 2y = 0$  write  $y(0) = y'(0) = y''(0) = 6$  Using Laplace transforms
8. a) Test for convergence the series  $\frac{1}{1.2.3} + \frac{3}{2.3.4} + \frac{5}{3.4.5} + \dots \dots \dots \infty$  [7+8M]  
 b) Examine the series  $\frac{1}{2^3} - \frac{1}{2^3}(1+2) + \frac{1}{4^3}(1+2+3) - \frac{1}{5^3}(1+2+3+4) + \dots \dots \infty$  convergence



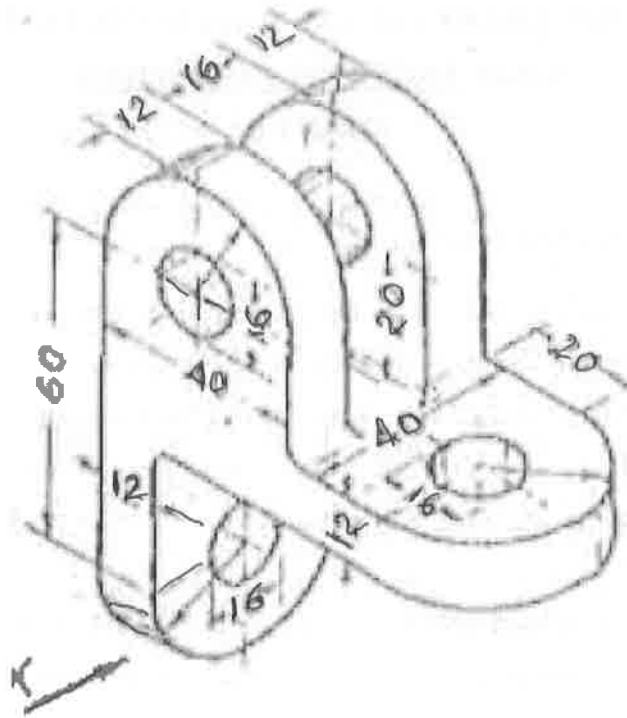
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**I B.TECH SUPPLEMENTARY EXAMINATIONS, JANUARY - 2019**Subject: **ENGINEERING GRAPHICS**Branch: **CE****Time: 3 hours****Max. Marks: 75**Answer any **FIVE** Questions of the following**5x15M=75M**

1. a) Construct a diagonal scale to read meters, decimeters and centimeters for a R.F of 1/50 and long enough to measure up to 5 meters. Indicate a length of 2.89m on it.  
b) A circle of 50mm diameter rolls along a straight line without slipping. Draw the curve traced out by a point 'P' on the circumference for one complete revolution of the circle. Name the curve. Draw the tangent to the curve at a point on it 40mm from the line. (6+9)
2. A line AB, 75mm long is inclined at  $45^\circ$  to the H.P and  $30^\circ$  to the V.P. Its end B is in the H.P and 40 mm in front of the V.P. Draw its projections and determine its traces. (15M)
3. Draw the projection of a cone, base 45mm diameter and axis 50mm long, when it is resting on the ground on a point on its base circle with the axis making an angle of  $30^\circ$  with the H.P and  $45^\circ$  with the V.P. (15M)
4. A pentagonal pyramid with edge of base 25mm and axis 65mm long, is resting on H.P. on its base with an edge nearer to the observer, parallel to the V.P. It is cut by a section plane, inclined at  $60^\circ$  to V.P. and at a distance of 6mm from the axis. Draw the projections and obtain the true shape of the section. (15M)
5. A cylinder of 50mm and 75 mm long, standing on its base on H.P is completely penetrated by another cylinder of same size. The axis of the penetrating cylinder is parallel to both H.P and V.P and is 8mm away from the axis of the vertical cylinder. Draw the projections of the solids showing curves of penetration. (15M)
6. Draw the isometric view of a cone, base 40mm diameter and axis 55mm long, when its axis is vertical.

7. Draw the following views for the given component as shown in the figure below. All dimensions are in mm. (i) Front view (ii) Top view and (iii) Right side view (15M)



8. Draw the perspective of a cylinder of 40 mm diameter and 50 mm height, lying on the ground, with its axis perpendicular to P.P and one of its ends touching P.P. The eye is 35 mm to the left of the axis of the cylinder, 50 mm in front of P.P and 60 mm above the ground. (15M)

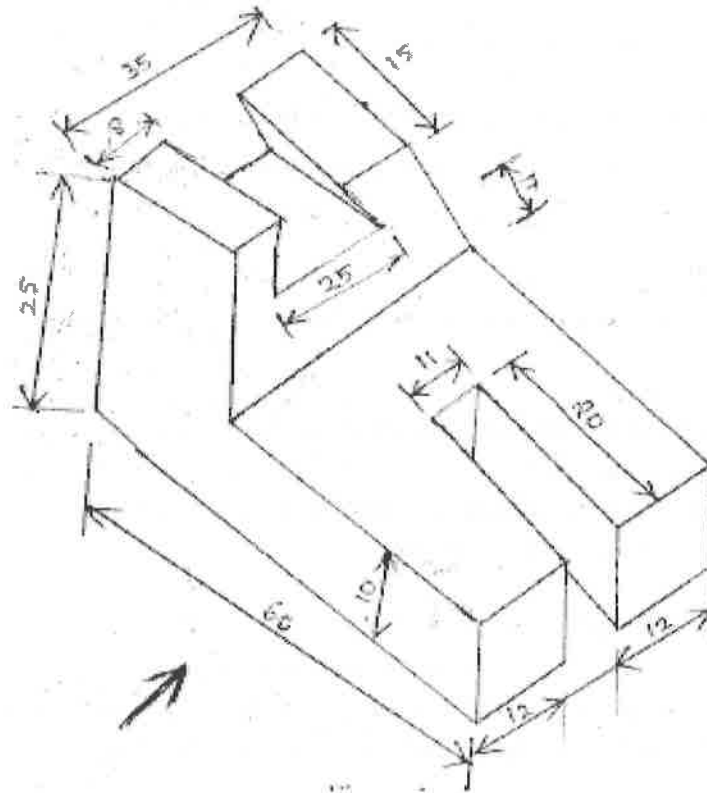
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**I B.TECH SUPPLEMENTARY EXAMINATIONS, JANUARY - 2019**Subject: **ENGINEERING DRAWING**Branch: **Common EEE, ECE & IT****Time: 3 hours****Max. Marks: 75**Answer any **FIVE** Questions of the following**5x15M=75M**

1. a) A forward reading vernier scale gives the following details 1 msd = 40 cm. 1 vsd = 25 cm. RF = 1:100. The scale is to be able to read up to 10 meters. Construct and mark on the scale a distance of 7.85 m and 8.15 m. **(8M)**
2. b) In a triangle ABC, AB, AC and BC are 100 mm, 55 mm and 70 mm respectively. Draw an ellipse and that A and B are foci and C is a point on the curve. Find the directrix and eccentricity of ellipse. **(7M)**
3. Two pillars P and Q 10m and 5m high are separated by a distance of 80m as seen in the view from the front as measured parallel to XY. In the view from the left they appear to be separated by a distance of 5m as measured perpendicular to XY. A wire is tightly tied to the top ends of the poles P and Q. Find the TL of the wire.
4. The altitude of a regular pentagonal pyramid is 75mm long. The distance between the centre of the base to one of its corners is 30mm. The apex of the pyramid is touching the HP, the VP and the right profile plane. One of the triangular faces is facing the ground. The axis is inclined at  $45^\circ$  to the VP and  $60^\circ$  to the ground. Draw the projections of the solid.
5. A pentagonal prism of base edge 30mm and height 60mm is cut in such a manner that the development of the lateral surface has a rectangular hole 70mm×30mm with its longer edge parallel to the base. The centre of the hole and the centre of the developed surface both coincide. Draw the view of the object from the front when one of the base edges is perpendicular to the VP and the object stands on its base on the ground.
6. A cylinder of base diameter 60mm is lying on one of its generators on the ground with the axis perpendicular to the VP. A cone with base diameter 60mm and height 80mm penetrates the cylinder with its axes parallel to both the HP and the VP. Both the axes intersect each other. Draw the views with the curves of interpenetration.
7. The paper weight consists of three portions. The bottom-most portion is a cylinder of 60 mm diameter and 20 mm height. The middle portion is a frustum of cone of height 20 mm and bottom is 60 mm diameter and top is 30 mm diameter. The top-most part is a hemi-sphere of 15 mm radius. Draw the isometric projection, of the paper weight.

8. Draw the front view, top view and side view of the object whose isometric view is shown in figure below (All dimensions are in mm).



8. A circular lamina of 30mm diameter is lying on GP and touching PP. The station point is at a height of 60mm and is on the central plane which passes through the centre of the circle and 80mm in front of PP. Draw the perspective view.

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**I B.TECH SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018**Subject: ENGINEERING PHYSICS

Branch: CSE

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions of the following

5x15M=75M

1. a) Define i) Reverberation ii) Reverberation time iii) absorption coefficient of a material.[6M]  
b) Derive Sabine's formula for reverberation time. [5M]  
c) An auditorium has a volume of  $800 \text{ m}^3$ . What should be the total absorption in the auditorium if the reverberation time of 1.0 second is to be maintained? [4M]
2. a) What are the basic principles of X-ray diffraction?  
b) Explain Bragg's law of X-ray diffraction.  
c) When a monochromatic X-ray beam of wavelength 0.154 nm is incident on a crystal of lattice parameter 0.432 nm. Find the Bragg angle for the first order reflection from (1 0 1) Plane. (4+6+5)
3. a) State and explain Heisenberg's uncertainty principle. [3+8+4]  
b) Derive Schrodinger's time independent wave equation.  
c) What is the minimum energy of an electron in a one-dimensional potential box of width  $1.0 \times 10^{-8} \text{ m}$ ?
4. a) Distinguish between intrinsic and extrinsic semi conductors?  
b) Derive an expression for carrier concentration of intrinsic semi conductors.  
c) Mention what are direct gap and indirect gap semiconductors? (3+8+4)
5. a) Explain ferroelectricity and piezoelectricity.  
b) Mention the characteristics of ferroelectric materials.  
c) Write a note on the applications of ferroelectric and piezoelectric materials. [4+5+6M]
6. a) Define magnetic dipole moment, permeability and magnetic susceptibility.  
b) Distinguish between ferro, ferri and antiferro magnetic materials.  
c) Explain hysteresis behavior of ferromagnetic materials. (3+6+6)
7. a) What are optical fibers? Explain single mode, multimode and graded index fibers.  
b) Derive an expression for numerical aperture of an optical fibre.  
c) The refractive index of core and cladding are 1.565 and 1.496 respectively. Calculate the numerical aperture and acceptance angle. (6+5+4)
8. a) What are nanomaterials? Why their properties are different from bulk materials?  
b) Describe sol-gel method of preparing nanomaterials.  
c) Describe the important applications of nanomaterials. (5+6+4)





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**I B.TECH SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018**Subject: **ENGINEERING CHEMISTRY**

Branch: IT

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions of the following

5x15M=75M

1. a) Write note on scale & sludge.  
b) Calculate the lime and soda requirement for 50,000 litres of water having the following dissolved salts in mg/l.  
 $\text{CaSO}_4 = 22.5$ ,  $\text{MgCl}_2 = 18.5$ ,  $\text{Mg}(\text{HCO}_3)_2 = 8.5$ ,  $\text{Ca}(\text{HCO}_3)_2 = 8.6$ ,  $\text{NaCl} = 6.9$  and  $\text{MgSO}_4 = 12.0$
2. a) Explain the electrochemical mechanism of rusting of iron in humid atmosphere. Mention any two metallic factors affect the rate of corrosion.  
b) Write note on dry corrosion.  
c) Explain the type of corrosion occurs for the following cases  
i) Bolt and nut made from different metals are in contact with each other.  
ii) Deposition of small particles of dust on Iron surface.
3. a) How are the following polymers prepared? What are their uses? i) Bakelite ii) Teflon  
b) Explain the mechanism involved in addition polymerization.  
c) What is Vulcanization? How does it improve the properties of rubber?
4. a) Explain the phenomenon of P-doping and n-doping with one example in each case for, conducting polymers. Show the possible transitions that occur from valence band to conduction band in each case.  
b) What are the applications of conducting Polymers?  
c) What are intrinsic semiconductors? Explain with an example
5. a) Distinguish between absorption and adsorption.  
b) Explain Langmuir adsorption isotherm, what are the advantages and limitations of Langmuir adsorption theory?  
c) Explain any two preparation methods of preparation of Nano materials
6. a) Write note on refining of petroleum by fractional distillation.  
b) How do you prepare synthetic petrol by Fischer Tropsech synthesis.
7. a) Determine the number of components, number of phases and degrees of freedom on the following equilibrium.  
i)  $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$   
ii)  $\text{NH}_4\text{Cl}(\text{s}) \rightleftharpoons \text{NH}_3(\text{g}) + \text{HCl}(\text{g})$   
When  $P(\text{NH}_3) = P(\text{HCl})$   
b) Define the following with an example  
i) Reduced phase rule ii) Triple point iii) Meta stable equilibrium  
c) Discuss the properties of Copper alloys.
8. a) What are acidic refractories and how these differ from basic refractories?  
b) Write applications of super conductors.  
c) Explain cloud and pour points of lubricants.

