

Code: 1G512

B.Tech. I Year Supplementary Examinations Nov/Dec 2019

Engineering Graphics

(Common to CE & ME)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questionsAll Questions carry equal marks (**14 Marks** each)

1. a) Bisect an angle AOB given angle AOB = 45° and angle AOB = 125°
b) Construct a Heptagon of side 30mm
2. Draw the projections of the following points on the same ground line, keeping the projections 30mm apart.
 - i) A, in the H.P & 30mm, behind the V.P
 - ii) B, 30mm above the H.P & 15mm in front of the V.P.
 - iii) C, in the V.P & 50mm above the H.P.
 - iv) D, 25mm below the H.P & 25mm behind the V.P.
 - v) E, 10mm above the H.P & 45mm behind the V.P.
 - vi) F, 35mm below the H.P & 25mm in front of the V.P.
 - vii) G, in both the H.P & the V.P.
3. A square plane ABCD of side 30mm is parallel to H.P. and 20mm away from it. Draw the projections of the plane, when two of its sides are
 - i) Parallel to V.P.
 - ii) Inclined at 30° to V.P.
4. a) Draw the projections of a cone of base 30mm diameter and axis 50mm long, when it is resting on HP on its base.
b) Draw the projections of a cylinder of base 30mm diameter and axis 50mm long, when it is resting on HP on its base.
5. A square prism of side of base 40 and axis 80 long is resting on its base on H.P. such that, a rectangular face of it is parallel to V.P. Draw the development of the prism.
6. a) Draw the isometric view of a square prism with the side of the base 40mm and length of the axis 70mm when its axis is vertical.
b) Draw the isometric view of an equilateral triangle of 60mm side with a side horizontal and the plane of the triangle being vertical.
7. A vertical square prism of base 50 side is penetrated by a horizontal square prism of base 40 side such that the axes intersect. The axis of the horizontal prism is parallel to V.P. and the faces of both the prisms are equally inclined to V.P. Draw the projections of the two prisms, showing the lines of intersection.
8. Draw the perspective of a horizontal circular lamina of 50mm diameter resting on the ground. The center of the plane is 35mm behind P.P. The station point is in the central plane, passing through the center of the circular plane and 80 in front of P.P. and 60mm above the ground.

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Engineering Mechanics

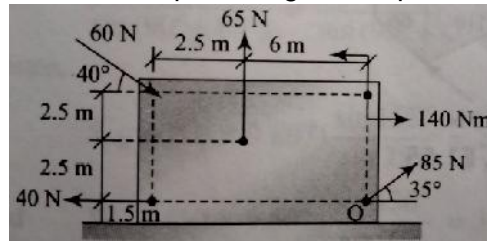
(Common to CE & ME)

Max. Marks: 70

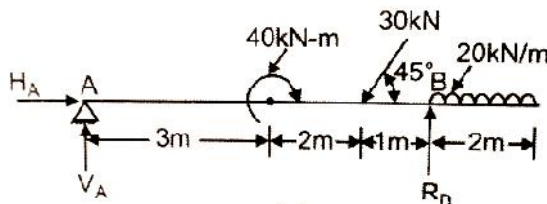
Time: 3 Hours

Answer any **five** questionsAll Questions carry equal marks (**14 Marks** each)

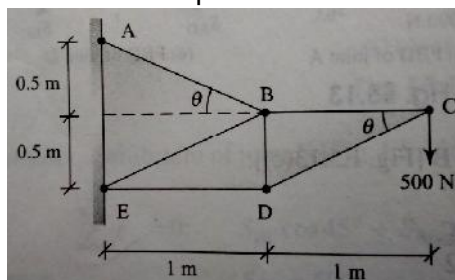
1. Determine the resultant of the forces and couple acting on the plate as shown in **fig.**



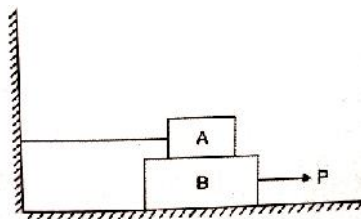
2. Determine the reactions at A and B of the over-hanging beam shown in **fig.**



3. Compute the axial forces in the members of the plane truss as shown in **fig.**



4. Block-A weighing 1000N rests over block B which weighs 2000N as shown in **fig.** Block A is tied to wall with a horizontal string. If the coefficient of friction between blocks A and B is 0.25 and between B and floor is $1/3$, what should be the value of P to move the block B.



5. Derive an expression for coordinates of centroid of semicircular lamina of radius R.
6. State and prove the parallel axis theorem.
7. A flywheel is rotating at 200rpm and after 10seconds it is rotating at 160rpm. If the retardation is uniform, determine the number of revolutions made by the flywheel before it comes to rest from the speed of 200rpm.
8. Two weights 800N and 200N are connected by a thread and they move along a rough horizontal plane under the action of a force of 400N applied to the 800N weight as shown in **fig.** The coefficient of friction between the sliding surface of the weights and the plane is 0.3. Using D'Alembert's principle determine the acceleration of the weight and tension in the thread.



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R-11 / R-13

Code: 1GC12

B.Tech. I Year Supplementary Examinations Nov/Dec 2019

Engineering Physics

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. a) Define interference and explain conditions of constructive and destructive interference 7M
 b) Describe the theory of Newton's rings experiment 7M
2. a) Define space lattice, basis and unit cell 7M
 b) Describe seven crystal systems with neat diagrams 7M
3. a) Derive Schrödinger's time independent wave equation 7M
 b) describe importance of Schrödinger's wave equation 7M
4. a) Compare direct and indirect band gap semiconductors 7M
 b) Outline the working of LCD 7M
5. Explain ionic, electronic and orientation polarizations 14M
6. a) Define superconductivity and write general properties 7M
 b) Explain Meissner's effect in superconductors 7M
7. a) Explain the principle of working of optical fiber 7M
 b) Write a note on optical fiber communication system 7M
8. a) Elaborate CNT's construction and properties 7M
 b) summarize the CNT's in technology 7M

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R-11 / R-13

Code: 1GC14

B.Tech. I Year Supplementary Examinations Nov/Dec 2019

Mathematics-I

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. a) Solve $(x+1)\frac{dy}{dx} - y = e^{3x}(x+1)^2$. 7M
 b) The rate at which bacteria multiply is proportional to the instantaneous number present. If the original number doubles in 2 hours, in how many hours will it be triple? 7M
2. Solve $\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = (1 - e^x)^2$ 14M
3. Prove that if $0 < a < b < 1$, $\frac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{1+a^2}$. Hence show that $\frac{f}{4} + \frac{3}{25} < \tan^{-1} \frac{4}{3} < \frac{f}{4} + \frac{1}{6}$. 14M
4. a) Trace the curve $y^2(2a-x) = x^3$ 7M
 b) Trace the curve $x^3 + y^3 = 3axy$ 7M
5. Evaluate $\iint xy(x+y)dx dy$ over the area between $y=x^2$ and $y=x$. 14M
6. a) Find the Laplace transform of $\left(\sqrt{t} - \frac{1}{\sqrt{t}}\right)^3$ 7M
 b) Find the Laplace transform of $t^2 \sin at$ 7M
7. Solve $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} - 3y = \sin t$, $y = \frac{dy}{dt} = 0$ when $t = 0$. 14M
8. Find $\text{div } \bar{F}$ and $\text{Curl } \bar{F}$ when $\bar{F} = \text{grad}(x^3 + y^3 + z^3 - 3xyz)$. 14M
