Hall Ticket Number :										

Code: 4GC14

R-14

B.Tech. I Year Supplementary Examinations May 2017

Mathematics-I

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Solve $(x+1)\frac{dy}{dx} - y = e^{3x}(x+1)^2$. 7M

   b) Solve $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 2y = x + e^x cosx$. 7M

OR

2. a) A body originally at 80^0c cools down to 60^0c in *20* minutes, the temperature of the air being 40^0c. What will be the temperature of the body after 40 minutes from the original? 7M

   b) Using the method of variation of parameters Solve $\frac{d^2y}{dx^2} + 4y = tan\,2x$. 7M

UNIT–II

3. a) Verify Lagrange's mean value theorem for the $f(x) = (x-1)(x-2)(x-3)$ in $(0,4)$, and find the appropriate value of 'c'. 7M

   b) If $x + y^2 - z^3, v = x^2yz, w = z^2 - xy$, then evaluate $\frac{\partial(u,v,w)}{\partial(x,y,z)}$ at $(1,-1,0)$. 7M

OR

4. a) Discuss the maxima and minima of $f(x,y) = x^3y^2(1-x-y)$. 7M

   b) Expand e^{sinx} by Maclaurin's series upto the term containg x^4. 7M

UNIT–III

5. a) Trace the curve $a^2y^2 = x^2(a^2 - x^2)$. 7M

   b) Change the order of integration in $I = \int_0^{4a}\int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy\,dx$ and hence evaluate. 7M

OR

6. a) Evaluate $\int_0^c\int_0^b\int_0^{x+y} e^{x+y+z}\,dz\,dy\,dx$. 7M

   b) Evaluate $\int_0^\infty\int_0^\infty e^{-(x^2+y^2)}\,dx\,dy$ by changing to polar co-ordinates and hence show that $\int_0^\infty e^{-x^2}dx = \frac{\sqrt{\pi}}{2}$. 7M

UNIT–IV

7. a) If a periodic function of period '2a' is defined by $f(x) = \begin{cases} t, & 0 \le t \le a \\ 2a - t, & a \le t \le 2a \end{cases}$, then show that $L\{f(t)\} = \frac{1}{s^2}tanh\left(\frac{as}{2}\right)$. 7M

   b) Find $L\left\{\frac{cosat - cosbt}{t} + t\,sint\right\}$. 7M

OR

8. a) Apply convolution theorem to evaluate $L^{-1}\left\{\frac{s}{(s^2+a^2)^2}\right\}$. 7M

   b) Use Laplace transform method to solve $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = e^t$, given $y(0) = 2, y'(0) = -1$. 7M

UNIT–V

9. a) Find $div\,\vec{F}$ and $curl\,\vec{F}$, where $\vec{F} = grad(x^3 + y^3 + z^3 - 3xyz)$. 7M

   b) Verify Green's theorem for $\int_C (xy + y^2)dx + x^2dy$, where C is the curve bounded by $y = x$ and $y = x^2$. 7M

OR

10. a) Verify Divergence therom for $\vec{F} = (x^2 - yz)\hat{i} + (y^2 - zx)\hat{j} + (z^2 - xy)\hat{k}$ taken over the rectangular parallelepiped $0 \le x \le a,\ 0 \le y \le b,\ 0 \le z \le c$. 7M

    b) Show that $div(grad\,r^n) = n(n+1)r^{n-2}$. 7M

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Hall Ticket Number :										

R-14

Code: 4G113

B.Tech. I Year Supplementary Examinations May 2017

Programming in C and Introduction to Datastructures

(Common to CE, EEE, ME and ECE)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1	a)	Define i) Algorithm. ii) Flowchart	4M
	b)	Explain the structure of a C program with example	4M
	c)	Write a C program to find average of six subject marks.	6M

OR

2	a)	Explain in details about computing environments	7M
	b)	Write a C program to swap two integer numbers.	7M

UNIT–II

3	a)	Explain in detail about switch statement.	7M
	b)	Write a C program to generate multiplication table.	7M

OR

4	a)	How do you declare a one dimensional array? Write a C program to find sum the sum of elements initialized in one dimensional array.	7M
	b)	Describe the purpose of break and continue statements in C	7M

UNIT–III

5	a)	Define Pointer. List the features of Pointers	7M
	b)	Explain in detail about call by value and call by reference.	7M

OR

6	a)	List the names of the functions supported in the header file “stdio.h” and specify the purpose of at least three functions.	8M
	b)	Explain about malloc() and calloc()	6M

UNIT–IV

7	a)	Write a program in C to search for an element using binary search technique	7M
	b)	Define Structures. Explain with an example how structure members are initialized and accessed	7M

OR

8	a)	Explain merge sort with an examples	8M
	b)	Differentiate between structures and unions.	6M

UNIT–V

9	a)	Write a program in C to evaluate postfix expression.	7M
	b)	Define Stack. Explain the push and pop operation of Stack	7M

OR

10	a)	When we will use circular queues instead of queues. Explain the insert and delete operation of circular queue	9M
	b)	What are the applications of queues?	5M

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Hall Ticket Number :										

R-14

Code: 4G512

B.Tech. I Year Supplementary Examinations May 2017

Engineering Graphics

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. A Cricket ball is thrown vertically up, it reaches a maximum height of 15 meters and falls on the ground at a distance of 30 meters from point of projection of the ball till it reaches the ground. Draw the path followed by the cricket ball and name the curve. 14M

OR

2. a) Draw the projections of the following points on the same reference line, keeping the projectors 30mm apart
   (i) A, 30 mm above HP and 30 mm infront of VP
   (ii) B, 45 mm below HP and 30 mm behind VP
   (iii) C, 40 mm above HP and in the VP
   (iv) D, 40 mm infront of VP and in HP 7M

   b) Draw the projections of a line EF 40 mm long parallel to HP and inclined at 35^0 to VP. E is 20 mm above HP and 15 mm infront of VP. 7M

UNIT–II

3. A 100 mm long line PQ has its end P at 10 mm above H.P. and 70 mm in front of the V.P. The line is inclined at 60^0 to the H.P. and 30^0 to the V.P. Draw its projections. 14M

OR

4. Draw the projections of a rhombus having diagonals 125mm and 50mm long, the smaller diagonal of which is parallel to both the principal planes while the other is inclined at 30^0 to HP. 14M

UNIT–III

5. a) Draw the projections of a pentagonal prism, base 25 mm side and axis 50 mm long, resting on one of its rectangular faces on the H. P., with the axis inclined at 45^0 to the V. P. 7M

   b) Draw the projections of a cylinder, base 25 mm radius and axis 70 mm long, resting on one of its generator on the H. P., with the axis inclined at 45^0 to the V. P. 7M

OR

6. A pentagonal pyramid of base side 20mm and altitude 55mm rests on its base on HP with one base edge being perpendicular to VP. It is cut by plane inclined at 50^0 to base. The cutting plane meets the axis at 15mm above the base. Draw the front view, sectional top view and true shape of the section. 14M

UNIT–IV

7. A pentagonal pyramid of base edge 25 mm and height 50 mm rests on its base on the ground with one of its base edges being perpendicular to the VP. A Circular hole of diameter 30 mm is made in the pyramid whose axis is perpendicular to the VP and 20 mm above the base of the pyramid. The axis of the hole intersects the axis of the pyramid at right angles to it. Draw the development of the surface of the pyramid. 14M

OR

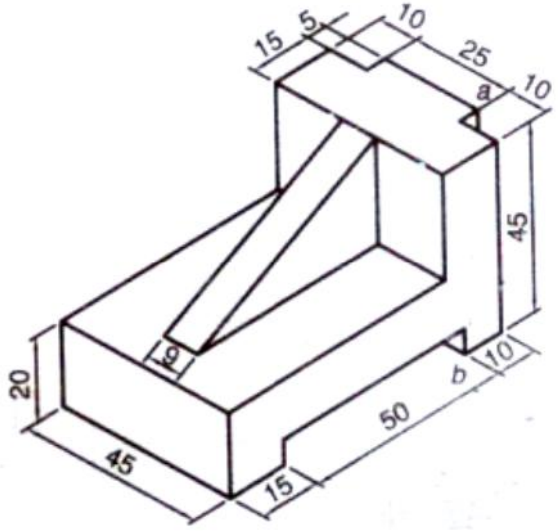
8. A horizontal cylindrical pipe 40mm diameter is joined with a vertical cylindrical pipe of same diameter. The axes of the pipes are parallel to VP. Neglecting the pipe thickness draw the projections showing the curves of intersection, when their axes intersect each other at right angles. 14M

UNIT–V

9. A hexagonal prism of base edge 30 mm and height 70mm long is resting on its rectangular face on the ground with its axis parallel to the VP. A square prism of 20 mm base edge and height 40 mm rests on its base on the top rectangular face of the hexagonal prism. The axis of the square prism intersects and bisects the axis of the hexagonal prism when produced. One of the base edges of the square prism is parallel to the VP. Draw an isometric projection of the set up. 14M

OR

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



14M

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Hall Ticket Number :										

R-14

Code: 4GC13

B.Tech. I Year Supplementary Examinations May 2017

Engineering Chemistry

(Common to all Branches)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) What is meant by hardness of water? Give its units 7M

   b) What is meant by carbonate and non-carbonate hardness of water? Explain with examples. 7M

OR

2 a) Write brief account on Priming and foaming. 7M

   b) 0.5 g of $CaCO_3$ was dissolved in dil.HCl and diluted to 1000 mL. 50 mL of this solution required 48 mL of EDTA solution for titration. 50 mL of hard water sample required 15 mL of EDTA solution for titration. 50 mL of same water sample on boiling, filtering etc, required 10 mL of EDTA solution. Calculate the di□erent kinds of hardness in ppm. 7M

UNIT–II

3. Define galvanic cell. Why the anode of galvanic cell is –ve and cathode is +ve. Write the different electrode reactions occur at the electrodes. 14M

OR

4. a) Discuss the how the nature of the metal influences the rate of corrosion. 7M

   b) Explain the rusting of iron with the help of electrochemical theory of corrosion. 7M

UNIT–III

5. Write notes on

   (a) Tacticity

   (b) Vulcanization of rubber. 14M

OR

6. What are the polymers? Explain the applications of polymers in different fields. 14M

UNIT–IV

7. a) Explain the difference between gross calorific value and net calorific value. 7M

   b) What is the difference between proximate analysis and ultimate analysis of coal? 7M

OR

8. a) What are the major constituent of LPG and Natural gas? 7M

   b) Why excess air is required for complete combustion? 7M

UNIT–V

9. Define refractories? What are the characteristics of good refractory? Give the classification of refractories with examples. 14M

OR

10. Define Viscosity? How is it determined by Redwood Viscometer? 14M

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Hall Ticket Number :										

R-14

Code: 4GC12

B.Tech. I Year Supplementary Examinations May 2017

Engineering Physics

(Common to all Branches)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Write few applications of lasers 4M

   b) Describe the newton's rings formation experiment. 10M

OR

2 a) Explain the characteristics of lasers. 4M

   b) Explain the construction and working of optical fibre 10M

UNIT–II

3. a) What are Miller indices? Explain the procedure for finding Miller indices. Give one example 10M

   b) Draw the planes (211), (100) and and (220) 4M

OR

4. a) What are properties of ultrasonics? 4M

   b) Describe any one method for the detection of ultrasonics. 10M

UNIT–III

5. a) State and explain Heisenberg uncertainty principle 6M

   b) Define de-Broglie dual nature of energy and derive its wavelength 8M

OR

6. a) Give the salient features of Kronig-Penny model. 10M

   b) Discuss the origin of formation of energy bands 4M

UNIT–IV

7. a) With symbol explain the construction and working of Photo diode. Discuss its characteristics. 10M

   b) Explain the role of LED & Photo diode in optical fibre communication systems. 4M

OR

8. a) Describe different types of magnetic materials in terms of their spin dipole alignment and its temperature dependence. 10M

   b) Define magnetic dipole moment. List out various sources of magnetic dipole moment in magnetic materials. 4M

UNIT–V

9. a) What is Meissner effect? 4M

   b) Explain about the flux exclusion principle exhibited by the superconductors 10M

OR

10. a) What are nanomaterials? Why do they exhibit different properties? 8M

    b) Explain the types of nanomaterials based on dimensionalities 6M

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Hall Ticket Number :										

R-14

Code: 4G511

B.Tech. I Year Supplementary Examinations May 2017

Engineering Mechanics

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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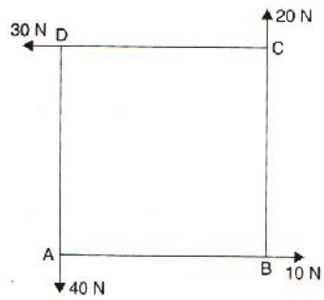
UNIT–I

1. a) State and prove Lamis theorem 3M

   b) Four forces of magnitudes 10 N, 20 N, 30 N and 40 N are acting respectively along the four sides of a square ABCD as shown in Figure. Determine the magnitude, direction and position of the resultant force

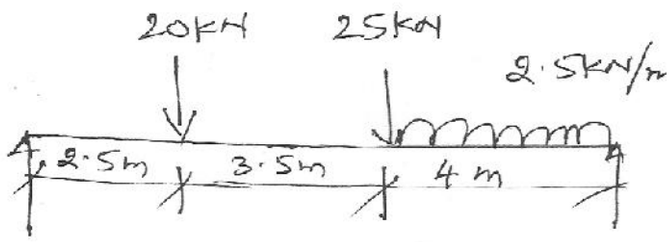


11M

OR

2. a) Explain various types of supports 3M

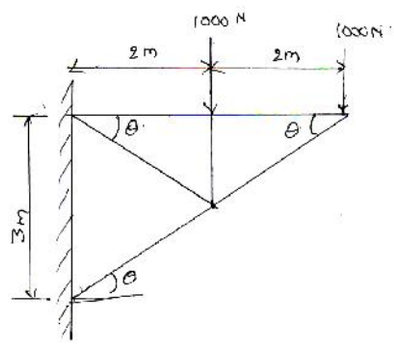
   b) Determine the reactions of the following beam system



11M

UNIT–II

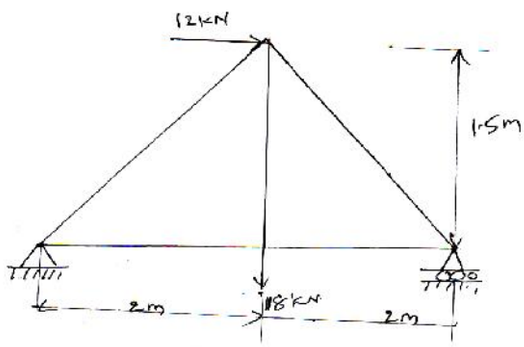
3. Determine the forces in each member of the following frame structure



14M

OR

4. Determine the forces in each member of the following frame structure

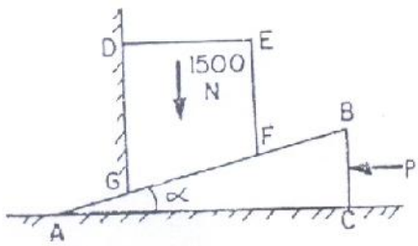


14M

UNIT–III

5. a) What are the types of frictions? Explain 3M

   b) A block overlying a 10^o wedge on a horizontal floor and leaning against a vertical wall and weighing 1500 N is to be raised by applying a horizontal force to the wedge. Assuming coefficient of friction between all the surfaces in contact to be 0.3, determine the minimum horizontal force to be applied to raise the block

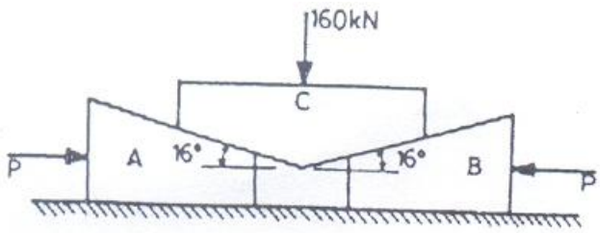


11M

OR

6. a) Explain law of friction 3M

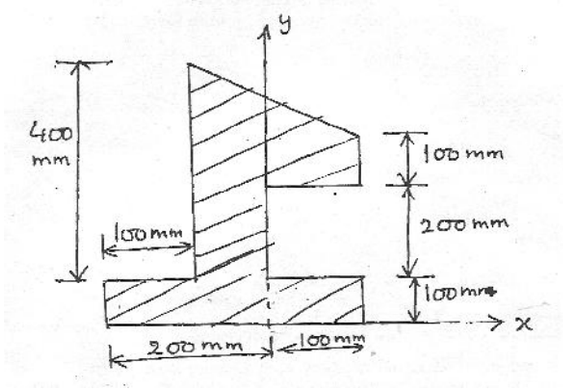
   b) A weight of 160 kN is to be raised by means of the wedges A and B as shown in figure. Find the value of force P for impending motion of block C upwards, if coefficient of friction is 0.25 for all surfaces. Weights of the block C and the wedges may be neglected.



11M

UNIT–IV

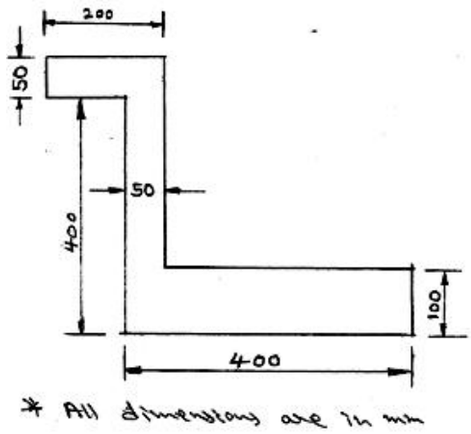
7. Determine the centroid of the following figure. All dimensions are in mm



14M

OR

8. Determine MI of the following section with respect to centroidal axis. All dimensions are in mm



14M

UNIT–V

9. a) The acceleration of a particle in rectilinear motion is defined by the relation $a = 25 - 4s^2$ where 'a' is expressed in m/sec^2 and 's' is position coordinate in metres. The particle starts with no initial velocity at the position s = 0. Determine
   i. the velocity when s = 3metres
   ii. the position where the velocity is again zero
   iii. the position where the velocity is maximum. 7M

   b) The acceleration of a particle is defined by the relation, a = Kt – 4. Knowing that v = 4 m/s when t = 2 sec and v = 1 m/s when t = 1 sec, determine the constant 'K'. Write the equations of the motion when x = 0 at t = 3 sec 7M

OR

10. a) What is the advantage of work-energy theorem? 2M

    b) An automobile moving with a uniform velocity of 40 kmph is accelerated by increasing the traction force by 20%. If the resistance to motion is constant, find the distance traveled before it acquires 50 kmph. Use work-energy method. 12M

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