Hall Ticket Number :										

R-17

Code: 7G511

I B.Tech. I Semester Supplementary Examinations May / June 2019

Engineering Graphics-I

(Common to CE and ME)

Max. Marks: 70 Time: 4 Hours

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

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UNIT–I

1. Two fixed points A and B are 100 mm apart. Trace the complete path of a point P moving in such a way that the sum of its distances from A and 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. 14M

OR

2. Two straight lines OA and OB make an angle of 90 between them. P is a point 40 mm from OA and 50 mm from OB. Draw a curve passing through P with OA and OB as asymptotes and marking atleast 10 points. Name the curve. 14M

UNIT–II

3. A hypocycloid is in the form of 120 mm long straight line. Construct the curve and determine the diameters of the rolling and the directing circles. 14M

OR

4. Construct path of the end of string when it is wound on a circle of 40 cm diameter without slipping. The length of the string is 150 cm long. Name the curve. 14M

UNIT–III

5 a) Two pegs fixed on a wall are 4.5 metres apart. The distance between the pegs measured parallel to the floor is 3.6 metres. If one peg is 1.5 metres above the floor, find the height of the second peg and the inclination of the line joining the two pegs, with the floor. 7M

b) A point P is 50 mm from both the reference planes. Draw its projections in all possible positions. 7M

OR

6. A line AB 90 mm long is inclined at 45° to the H.P. and its top view makes an angle of 60° with the V.P. The end A is in the H.P. and 12 mm in front of the V.P. Draw its front view and find its true inclination with the V.P. 14M

UNIT–IV

7. A rectangular plane of sides 70 mm and 35 mm has a shorter side on the H.P. The surface of the plane is inclined at 60° to the H.P. and perpendicular to the V.P. Draw its projections. 14M

OR

8. Draw a rhombus of diagonals 100 mm and 60 mm long, with the longer diagonal horizontal. The figure is the top view of a square of 100 mm long diagonals, with a corner on the ground. Draw its front view and determine the angle which its surface makes with the ground. 14M

UNIT–V

9. The projectors of the ends of a line AB are 5 cm apart. The end A is 2 cm above the H.P. and 3 cm in front of the V.P. The end B is 1 cm below the H.P. and 4 cm behind the V.P. Determine the true length and traces of AB and its inclinations with the two reference planes using auxiliary plane method. 14M

OR

10. A thin isosceles triangular plane ABC of base 60 mm and altitude 50 mm has its base in the H.P. and inclined at 30° to the V.P. The corners A and C are in the V.P. Draw its projections using auxiliary plane method and find its inclination with the H.P. 14M

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Hall Ticket Number :										

R-17

Code: 7GC14

I B.Tech. I Semester Supplementary Examinations May / June 2019

Engineering 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) Reduce the matrix $A=\begin{bmatrix}1 & -1 & 2 & -1\\ 4 & 2 & -1 & 2\\ 2 & 2 & -2 & 0\end{bmatrix}$ into its Echelon form and hence find its rank. 7M

   b) Test for Consistency of the following equations and if possible find the solution $2x+2y+4z=18$; $x+3y+2z=13$; $3x+y+3z=14$. 7M

OR

2. a) Find the Eigen values and Eigen vectors of the matrix $A=\begin{bmatrix}1 & 1 & 3\\ 1 & 5 & 1\\ 3 & 1 & 1\end{bmatrix}$. 7M

   b) Verify Cayley-Hamilton theorem for the matrix $A=\begin{bmatrix}2 & -1 & 1\\ -1 & 2 & -1\\ 1 & -1 & 2\end{bmatrix}$ and hence find its inverse. 7M

UNIT–II

3. a) Reduce the quadratic form $x_1^2+3x_2^2+3x_3^2-2x_2x_3$ into canonical form and also write the nature of the quadratic form. 7M

   b) Show that $B=\begin{bmatrix}3i & 2+i\\ -2+i & -i\end{bmatrix}$ is Skew-Hermitian. Find its Eigen values. 7M

OR

4. a) Find a matrix P which diagonalizes the matrix $A=\begin{bmatrix}4 & 1\\ 2 & 3\end{bmatrix}$.

   Verify that $P^{-1}AP=D$. 7M

   b) Prove that the Eigen values of Hermitian matrix A are real. 7M

UNIT–III

5. a) Solve $\sec^2 y\,\frac{dy}{dx}+x\tan y=x^3$. 7M

   b) Find the orthogonal trajectory of the cardioids $r=a(1-\cos^{-})$. 7M

OR

6. a) Solve $\frac{dy}{dx}+\frac{y\log y}{x-\log y}=0$. 7M

   b) Radium disintegrates at a rate proportional to its mass.When mass is 10 mgm, the rate of disintegration is 0.051 mgm per day. How long will it take for the mass to be reduced to 10 to 5 mgm? 7M

UNIT–IV

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

   b) Solve the following ODE by the method of variation of parameters:

   $\frac{d^2y}{dx^2}+a^2y=\sec ax$. 7M

OR

8. a) Solve $\frac{d^2y}{dx^2}-3\frac{dy}{dx}+2y=xe^{3x}+\sin 2x$. 7M

   b) The damped LCR circuit is governed by the equation $L\frac{d^2q}{dt^2}+R\frac{dq}{dt}+\frac{q}{C}=0$ where L,R,C ate positive constants. Find the conditions under which the circuit is over damped, under damped and critically damped. 7M

UNIT–V

9. a) Verify Lagrange's Mean value theorem for $f(x)=(x-1)(x-2)(x-3)$ in $[0,4]$. 7M

   b) Find the minimum value of $x^2+y^2+z^2$,given that $xyz=a^3$. 7M

OR

10. a) Determine whether the following functions are functionally dependent or not. If functionally dependent, find the functional relation between them:

    $u=\sin^{-1}x+\sin^{-1}y,\quad v=x\sqrt{1-y^2}+y\sqrt{1-x^2}$. 7M

    b) Find the maximum and minimum values of $f(x,y)=x^3+y^3-3axy$. 7M

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Hall Ticket Number :										

R-17

Code: 7G111

I B.Tech. I Semester Supplementary Examinations May / June 2019

Problem Solving Techniques and C Programming

(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)	Explain the various problem solving strategies with example.	7M
	b)	Write an algorithm to find the greatest number among 3 numbers	7M

OR

2.	a)	Differentiate between high level and low level language with example	7M
	b)	What do you mean by error in a program? Explain the strategies to handle the error.	7M

UNIT–II

3.	a)	Classify the operators in “C” with example.	7M
	b)	Explain the structure of a C program with an example.	7M

OR

4.	a)	Explain the primitive data types of C with example.	8M
	b)	Explain type conversion in c	6M

UNIT–III

5.	a)	Write a C program to illustrate the working of jump statements break and continue	8M
	b)	Explain the “nested if “concept of C by an example.	6M

OR

6.	a)	Write a C Program to Display Fibonacci Sequence of 8 numbers	7M
	b)	Write the concept of “do while” and “while”. When to use do while in a program explain with an appropriate example.	7M

UNIT–IV

7.	a)	Write a C Program to Find the Frequency of Characters in a String	7M
	b)	Explain the applications of String with suitable example.	7M

OR

8.	a)	Write a program to find the smallest number of an integer array. A={34, 45,6, 7,89}	7M
	b)	Write a C Program to Copy String Without Using strcpy()	7M

UNIT–V

9.	a)	Explain various type of qualifiers in C language. Write the importance of “Static” key word.	7M
	b)	Write a program using function to design an arithmetical calculator.	7M

OR

10.	a)	Explain the concept of pre-processor commands.	7M
	b)	Write a C Program to Find GCD Using Recursion.	7M

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Hall Ticket Number :										

R-17

Code: 7G512

I B.Tech. I Semester Supplementary Examinations May / June 2019

Engineering Mechanics - Statics

(Common to CE and ME)

Max. Marks: 70 Time: 4 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 Varignon's theorem 6M

   b) Determine the resultant, both in magnitude and direction, of the four forces acting on the body as shown in Fig.1.

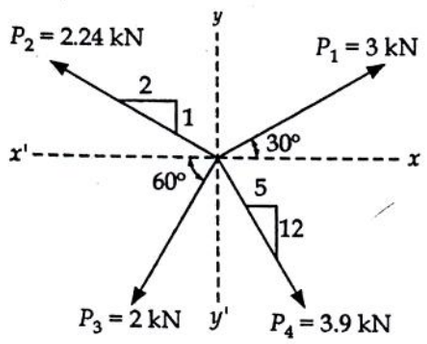

Fig.1 8M

OR

2. A load of 1500N is supported at point A by three cables AB, AC and AD as shown in Fig.2. Calculate the tensions induced in each cable.

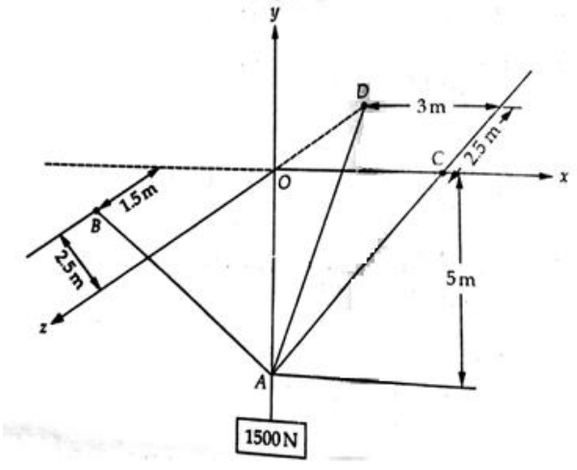

Fig.2. 14M

UNIT–II

3. a) A simply supported beam AB of span 10 m is loaded as shown in Fig.3.Calculate the reactions at A and B.

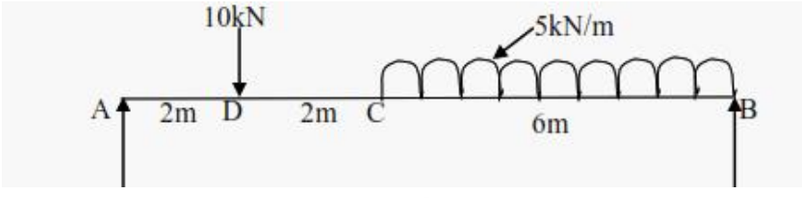

Fig.3 7M

   b) Determine the support reactions at A and B as shown in Fig.4.

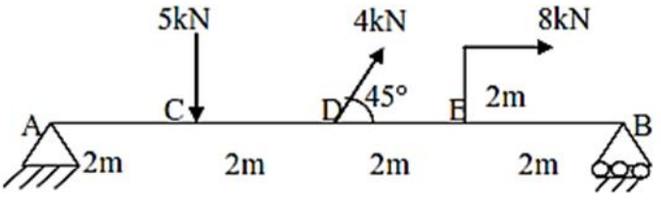

Fig.4 7M

OR

4. Determine the force in each member of the truss as shown in Fig.5.

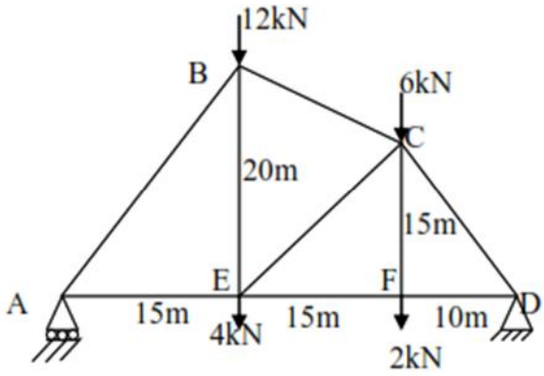

Fig.5 14M

UNIT–III

5. a) State the laws of friction. 4M

   b) A uniform ladder AB whose weight is 600 N and length 4 m rests against a smooth vertical wall making with it an angle of 30^0. The other end rests on the ground surface. Find the reactions given to the ladder by the wall and the floor and their inclination to the vertical, when a man weighing 700 N climbs the ladder by a distance 1 m long along the length of the ladder. 10M

OR

6. a) A block of weight W_1 = 200 N rests on a horizontal surface and supports on top of it another block of weight W_2 = 50 N. The block W_2 is attached to a vertical wall by the inclined string AB .Find the magnitude of the horizontal force P, applied to the lower block as shown, that will be necessary to cause slipping to impend. The coefficient of static friction for all contact surfaces is μ=0.3 as shown in figure.

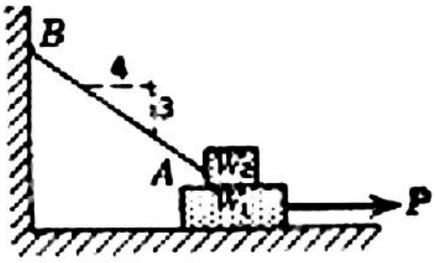

Fig.6 9M

   b) Explain the wedge friction by drawing the free body diagrams 5M

UNIT–IV

7. a) Determine the centroid of the shaded area formed by removing a semicircle of diameter 'r 'from a quarter circle of radius'r'. 5M

   b) Locate the Centroid of the shaded area bounded by a straight line and a parabola as shown in Fig.7.

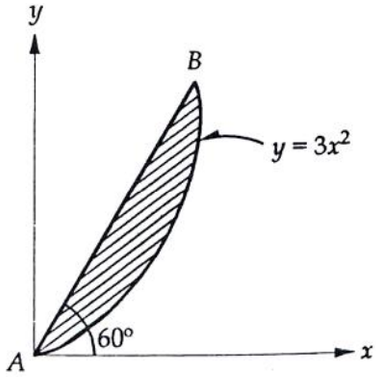

Fig.7 9M

OR

8. a) Derive an expression for the centroid of a semi-circle 5M

   b) A uniform lamina shown in Fig.8. consists of a rectangle, a circle and a triangle. Determine the centre of gravity of the lamina. All dimensions are in mm.

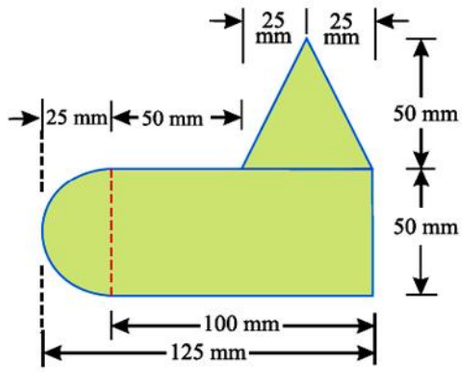

Fig.8 9M

UNIT–V

9 Find the moments of inertia of the I-Section shown in Fig.9 about the centroidal axes. Also, find the radii of gyration about the same axes.

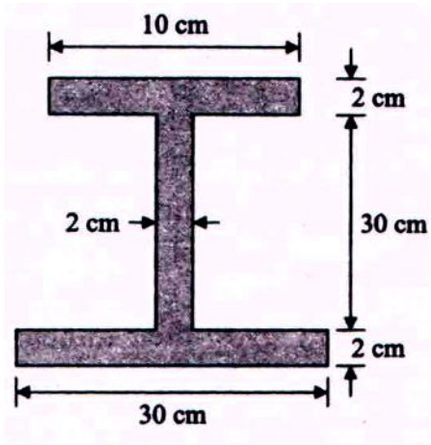

Fig.9 14M

OR

10. Find the moments of inertia of the cut section shown in Fig.10 about the centroidal axes, two semi circular portions are cut from a rectangular plate.

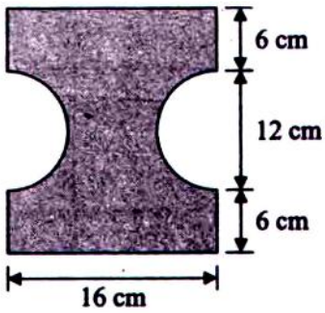

Fig.10 14M

Hall Ticket Number :										

R-17

Code: 7GC11

I B.Tech. I Semester Supplementary Examinations May / June 2019

Technical English & Professional Communication

(Common to All Branches)

Max. Marks: 70 Time: 4 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) Why does E.F.Schumacherstate that modern technology does not enrich man but empties him?

   b) Fill in the blanks in the following sentences using the hints given in brackets.

   i. He was not happy with her decision. He may _____ with her. (a word with the prefix dis_)
   ii. He enjoys_____ his friends. (to meet/ meeting)
   iii. Good sleep is _____to health. (beneficial/benificial)
   iv. Rita _____ from the shock of her uncle's death. (Phrasal verb with 'get')
   v. Anything written in a letter after it is signed is known as _____. (postscript/postdiction)

OR

2. Discuss the different elements of human communication?

UNIT–II

3. a) What are the main ways in which human development has affected climate patterns on the earth?

   b) Write a letter of application in response to an advertisement for the post of Project Manager in a reputed software company.

OR

4. Discuss the different levels of communication.

UNIT–III

5. a) What are the two kinds of technologies currently used to generate solar power on a large scale?

   b) Complete the following sentences with appropriate words chosen from those in brackets:

   i. How many _____ are there in each character in MS Word? (bytes/bites)
   ii. Students are given an essay about the human _____ in the exam. (soul/sole)
   iii. We saw a_____ and a tiger when we visited the local zoo.(boar/bore)
   iv. Our _____took us through the Alps and then on to Italy. (route / root)
   v. When it's low _____ you have to walk a long way before you can swim. (tide/tied)

OR

6. Explain the different types of Non-verbal communication in brief?

UNIT–IV

7. a) What are the measures to be taken to prevent soil erosion?

   b) Correct the following sentences

   i. The second innings are going on now
   ii. Either Ramu or Somu might offer their services.
   iii. My friend sits besides me in the class
   iv. Each of the candidates were awarded a certificate.
   v. One must love his parents.

OR

8. Discuss the different types of listening.

UNIT–V

9. How the idea of 'samskara' is explained in the essay "The Secret of Work"?

OR

10. Write about Linear, Interactive and Transactional communications.

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Hall Ticket Number :										

R-17

Code: 7GC12

I B.Tech. I Semester Supplementary Examinations May / June 2019

Engineering Chemistry

(Common to CE, ME and CSE)

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 are ion exchange resins? Explain the ion exchange method of water softening 7M
   b) What is hard water? Explain the types of hardness and disadvantage of hard water 7M

OR

2. a) Determine the temporary, permanent & total hardness of a hard water sample containing $Ca(HCO_3)_2$ = 70.5 mg/L, $Mg(HCO_3)_2$ = 60.5 mg/L, $MgSO_4$=27.6 mg/L, $CaSO_4$=52.1 mg/L. 7M
   b) Write a note on
   (i) Priming and foaming (ii) Scale and sludge formation in boiler 7M

UNIT–II

3. a) Describe the construction and working of lithium ion battery 7M
   b) An electrochemical cell consists of an iron electrode, dipped in 0.1M $FeSO_4$ and silver electrode dipped in 0.05M $AgNO_3$ solution. Calculate the emf of the cell at 298K. Given SRP of Fe and Ag are -0.44 and +0.8V respectively. 7M

OR

4. a) Discuss the different types of conductometric titrations with examples 7M
   b) Explain the construction and working of Hydrogen-Oxygen fuel cell 7M

UNIT–III

5. a) Differentiate between thermoplastics and thermosetting plastics 6M
   b) Explain the preparation, properties and applications of PVC and PE 8M

OR

6. a) Write a brief note on Vulcanization and compounding of rubber 8M
   b) Explain the preparation, properties and applications of polyphosphazenes 6M

UNIT–IV

7. a) What are chemical fuels? Give the classification of fuels with examples 6M
   b) A sample of Coal on analysis was found to contain the following. C=85.0%, H_2=5.2%, O_2 = 4.0%, S = 2.1%, N_2 = 3.5%, and ash = 0.2%. Calculate the quantity of air required for complete combustion of 1 kg of this coal 8M

OR

8. Describe the Otto Hoffmann's method of manufacture of metallurgical coke with a neat labelled diagram. How do you recover the byproducts in this method 14M

UNIT–V

9. a) Describe the essential properties of a good refractory material. 8M
   b) Discuss the following properties of lubricants (i) Cloud and pour point (ii) Aniline point 6M

OR

10. a) What is cement? Explain with the help of chemical reaction setting and hardening of cement 7M
    b) What is Portland cement? Illustrate the manufacture of Portland cement by dry method with a neat labelled diagram of rotary kiln 7M

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