

Hall Ticket Number :

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**R-14**

**Code: 4G113**

B.Tech. I Year Supplementary Examinations December 2017

**Programming in C and Introduction to Data Structures**

( 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 computer system and explain different components in brief. 7M
- b) What is meant by a computer language? Explain briefly about the computer languages used over the years 7M

**OR**

2. a) Mention the steps involved in Creating and Running the Program? Explain each step in detail. 7M
- b) Describe standard C input and output functions with suitable C program. 7M

**UNIT-II**

3. a) Explain the switch case control structure in C with syntax and flow chart. 7M
- b) Develop and implement an algorithm for reversing the digits of an integer. 7M

**OR**

4. a) How do you declare a one dimensional array? Give its memory representation 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) List and explain the storage classes in C 7M

**OR**

6. a) What do you mean by functions? Give the structure of the functions and explain about the arguments and their return values. 7M
- b) Discuss passing pointer to a function with example 7M

**UNIT-IV**

7. a) Write a program in C to search for an element using linear search technique 7M
- b) What is a structure? Explain how to declare, initialize and access the structure elements. 7M

**OR**

8. Explain about any two sorting techniques with example. 14M

**UNIT-V**

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

**OR**

10. Define queue and write the applications of queue. Explain the insert and delete operation of queue 14M

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Code: 4GC13

B.Tech. I Year Supplementary Examinations December 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 the principle of EDTA titration? Briefly describe the estimate of hardness of water by EDTA method. 10M
- b) What are the advantages of break-point chlorination? 4M

**OR**

2. a) Explain the boiler troubles, scale and caustic embrittlement in details. 8M
- b) Why is calgon conditioning better than phosphate conditioning? 6M

#### UNIT-II

3. a) How is NICAD battery constructed? Explain with cell reaction. 7M
- b) Write a brief note on H<sub>2</sub>-O<sub>2</sub> fuel cell. 7M

**OR**

4. a) Discuss the mechanism of chemical and electrochemical corrosion. 7M
- b) Write a brief note on cathodic protection methods. 7M

#### UNIT-III

5. a) What is synthetic rubber? Is vulcanization essential for all synthetic rubbers? 7M
- b) Distinguish thermoplastics and thermosetting plastics. 7M

**OR**

6. a) Discuss the preparation, properties and uses of Buna-S rubbers. 7M
- b) What are conducting polymers? Discuss possible categories of conducting polymers with suitable examples. 7M

#### UNIT-IV

7. a) Calculate the gross and net calorific values of coal having the following compositions, carbon = 85%, hydrogen = 8 %, Sulphur = 1 %, nitrogen = 2 %, ash = 4 %, latent heat of steam = 587 cal/gm. 6M
- b) Describe the Otto-Hoffman method of coke manufacture and the recovery of various by product. 8M

**OR**

8. a) What is synthetic petrol? How is it manufactured by Bergius process? 7M
- b) With a neat diagram explain the analysis of flue gas by Orsat apparatus and mention the precautions to be followed during the analysis. 8M

#### UNIT-V

9. a) Explain the different raw materials and mixing of the raw materials by the dry process during the manufacture of cement. 7M
- b) What are Refractories? Explain Thermal spalling, strength and porosity of the refractories. 7M

**OR**

10. a) Write short notes on the following properties of lubricants:
- (i) Cloud and Pour point
- (ii) Flash and Fire point. 7M
- b) Explain the classification of explosive.
- (i) Primary or initiating explosives,
- (ii) Low explosives or propellants. 7M

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Hall Ticket Number :									
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<b>R-14</b>
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**Code: 4G512**

B.Tech. I Year Supplementary Examinations December 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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<b>UNIT-I</b>
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- 1. a) Draw a parabola when the distance between its focus and directrix is 50mm. Also draw a tangent and a normal at a point 70mm from the directrix. 7M
- b) Two pegs are fixed on a wall are 4.5 meters apart. The distance between the pegs measured parallel to floor is 3.6 meters. If one peg is 1.5meters above the floor, find the height of the second floor and the inclination of the line joining the two pegs, with the floor 7M

**OR**

- 2. a) Inscribe ellipse in a parallelogram having sides 150mm and 100mm long and an included angle of 120°. 8M
- b) The end A of a line AB is in H.P and 25 mm behind V.P. The end B is in the V.P. and 50mm above H.P. The distance between the end projectors is 75 mm. Draw the projections of AB and determine true length 6M

<b>UNIT-II</b>
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- 3. The top view of a 75mm long line AB measures 65mm, while the length of its front view is 50mm. It's one end A is in the H.P and 12mm in front of V.P. Draw the projections of AB and determine its inclinations with H.P. and V.P 14M

**OR**

- 4. a) A semicircular plate of 80mm diameter, has its straight edge on V.P and inclined at 30° to H.P, while the surface of the plate is inclined at 45° to V.P. Draw the projections of the plate 7M
- b) A 60° set square of 125 mm longest side is so kept that the longest side is in the HP making an angle of 30° with the VP and the set square itself is inclined at 45° to the HP. Draw the projections of the set square 7M

<b>UNIT-III</b>
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- 5. A pentagonal pyramid, with side of base 25mm and 50mm long axis has a triangular face on V.P and the edge of the base contained by that face is inclined at 30° to H.P. Draw the projections. 14M

**OR**

- 6. A Right regular hexagonal Pyramid, edge of base 25mm and height 55mm, rests on its base on HP with one of the base edges parallel to VP. A sectional plane perpendicular to VP and inclined to HP at 30°, cuts the pyramid and passes through the Centre of its axis. Draw its front view, sectional top view and True shape of the section. 14M

UNIT-IV

7. A cone of base 50mm diameter and 60mm long, is resting on its base on H.P. Section plane perpendicular V.P, cuts the cone at a distance of 10 from the axis. Draw the development of the cut solid. 14M

OR

8. A Square prism, edge of the base 30 mm and height 60 mm, resting on its base in the HP. It is completely penetrated by another square prism, edge of base 20 mm and 70 mm long, such that the axes of the two prisms bisect each other at right angles and the faces of both the prisms are equally inclined to VP. Draw the projections of solids showing lines of intersection 14M

UNIT-V

9. Figure:1 shows the orthographic projections of a Solid. Draw the Isometric view of the given solid.

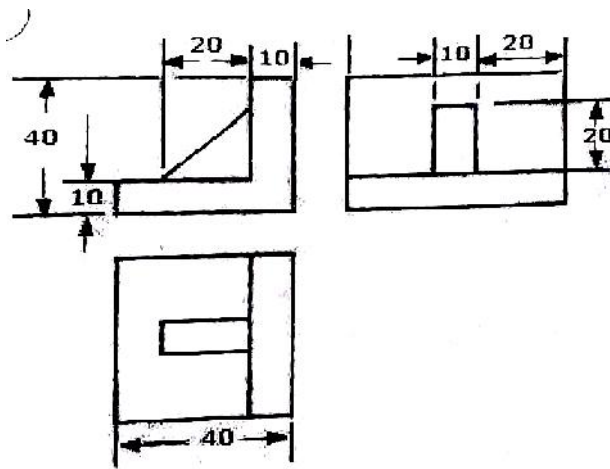


FIG : 1

14M

OR

10. Draw the following views of the object shown pictorially: (i) Front view. (ii) Top view. (iii) Side view. **Fig – 2**

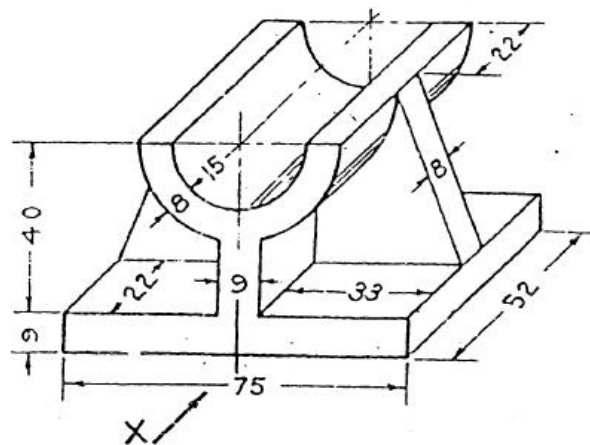


FIG:2

14M

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Code: 4G511

I B.Tech. I Year Supplementary Examinations December 2017

**Engineering Mechanics**

( Common to CE &amp; ME )

Max. Marks: 70

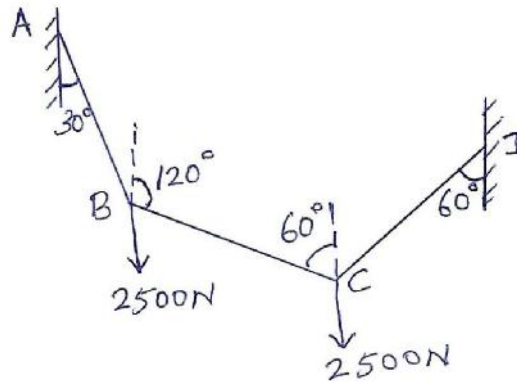
Time: 3 Hours

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

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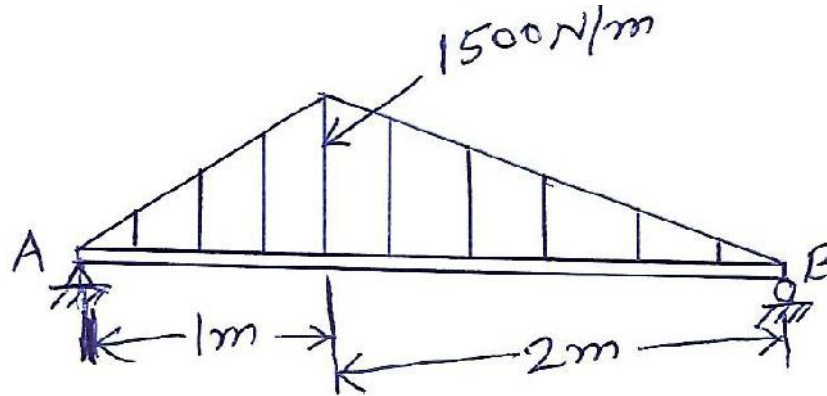
**UNIT-I**

1. a) Two equal loads of 2500N are supported by a flexible string ABCD at points B and C. Find the tensions in the portions AB, BC and CD of the string.



7M

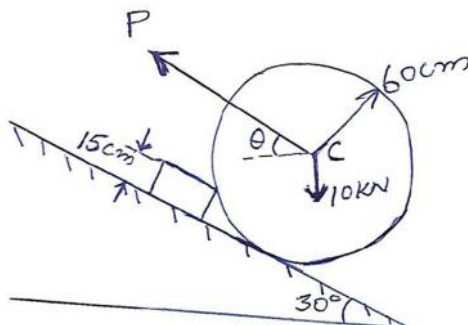
- b) A simply supported beam carries a distributed load as shown in Fig. Find the reactions at the supports.



7M

OR

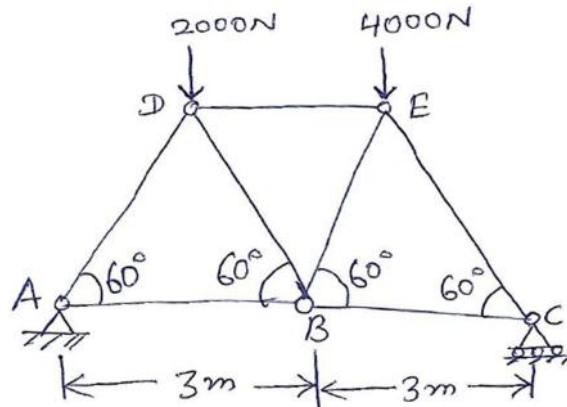
- 2 Determine the magnitude and direction of the smallest force P required to start the wheel over the block as shown in Fig.



14M

**UNIT-II**

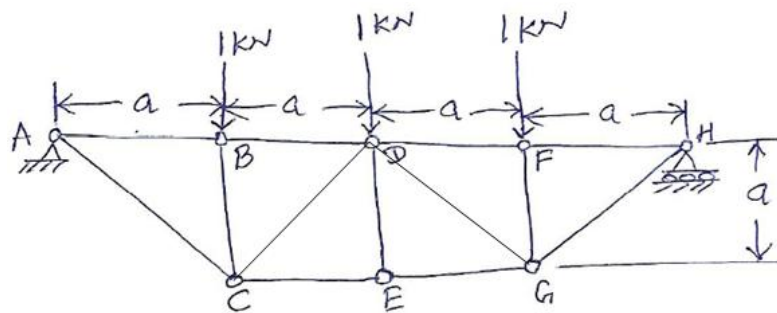
3. Using the method of joints, find the axial forces in all the members of a truss with the loading as shown in Fig.



14M

**OR**

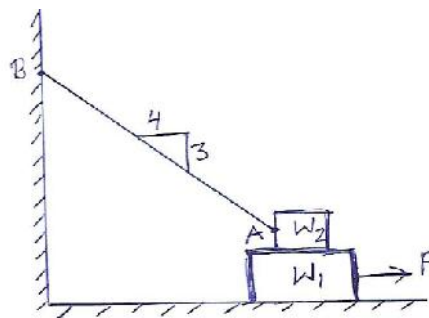
4. A truss is loaded and supported as shown in Fig. Find the axial forces in the member BD, CD and CE.



14M

**UNIT-III**

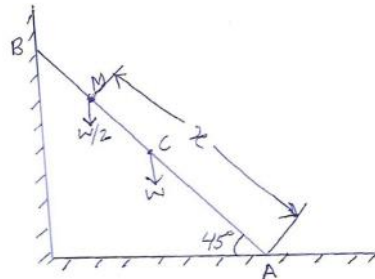
5. A block of weight  $W_1=1000\text{N}$  rests on a horizontal surface and supports on its top another block of weight  $W_2=250\text{N}$ . The weight  $W_2$  is attached by an inclined string to the vertical wall. Find the magnitude of the horizontal force  $P$  applied to the lower block to cause slipping to impend. The coefficient of friction for all contacting surfaces is 0.3.



14M

OR

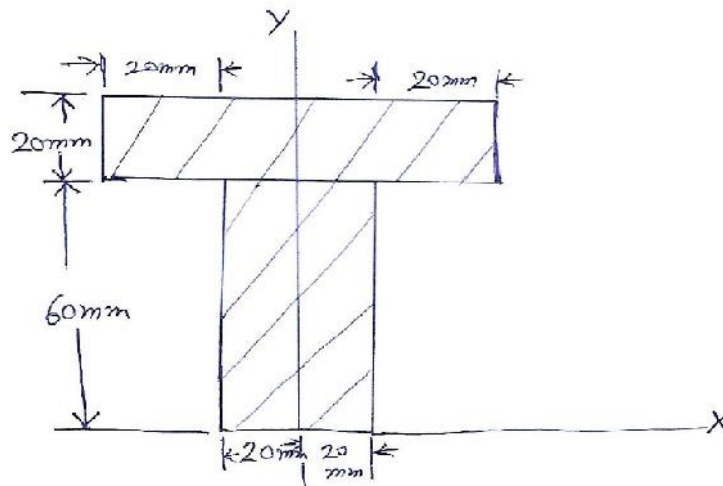
6. A uniform ladder AB of length  $l=20\text{m}$  and weight  $W$  is supported by the horizontal floor at A and by a vertical wall at B. It makes an angle  $45^\circ$  with the horizontal. If a man, whose weight is one-half that of the ladder, ascends the ladder, how much length  $X$  of the ladder he shall climb before the ladder slips.



14M

## UNIT-IV

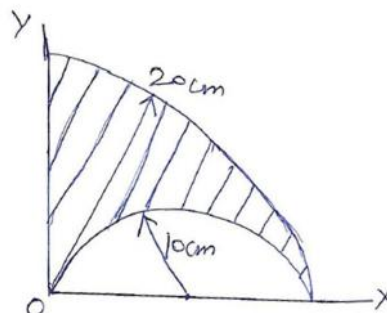
7. Determine the moment of inertia of the area of T-section as shown in Fig. with respect to centroidal X-axis and Y-axis.



14M

OR

- 8 a) Determine the coordinates of the centroid of the shaded area as shown in Fig.



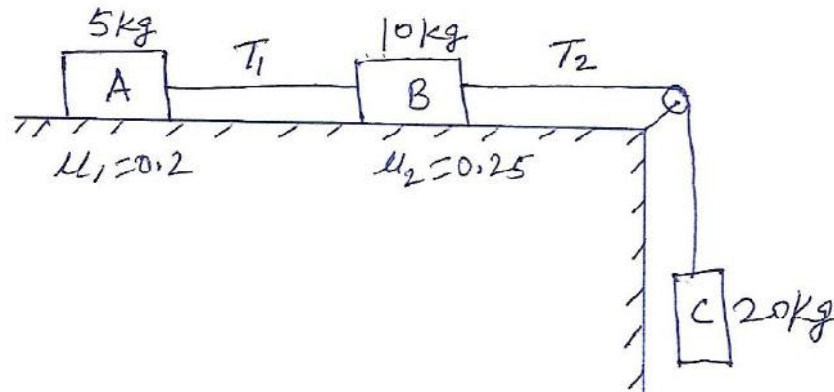
7M

- b) Derive the mass moment of inertia of thin disk about its centroidal axis.

7M

## UNIT-V

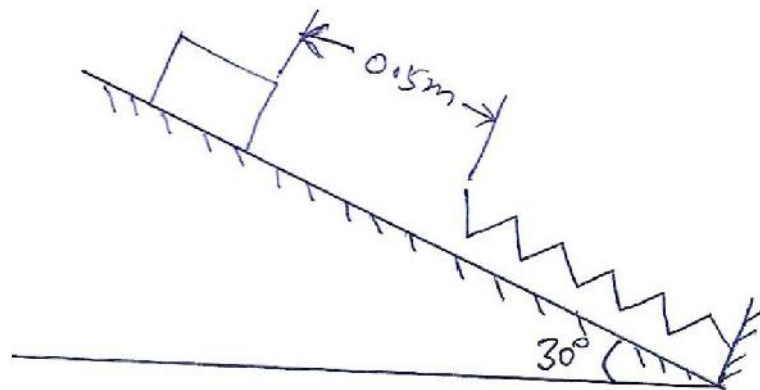
9. a) A motorist is travelling on a curved road of radius 20m at a speed of 72Km/hour. Find the normal and tangential components of acceleration. 4M
- b) Three blocks A, B and C are connected as shown in Fig. Find the acceleration of the masses and the tension  $T_1$  and  $T_2$  in the strings. Given  $\mu_1=0.2$  and  $\mu_2=0.25$ .



10M

OR

- 10 A block of mass 5Kg resting on a  $30^\circ$  inclined plane is released. The block after travelling a distance of 0.5m along the inclined plane hits a spring of stiffness 15N/cm as shown in Fig. Find the maximum compression of spring. Assume the coefficient of friction between the block and the inclined plane as 0.2.



14M

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Hall Ticket Number :

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**R-14**

**Code: 4GC12**

B.Tech. I Year Supplementary Examinations December 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) Explain Newton's rings experiment by reflection to calculate the wavelength of a monochromatic light. 5M
- b) Derive Einstein's coefficients in LASERS. 5M
- c) Write the applications of optical fibers in industries and in medical field. 4M

**OR**

2. a) Give the theory of Fraunhofer diffraction due to single slit. 5M
- b) Explain population inversion. Mention important applications of LASERS 4M
- c) Derive the expression for acceptance angle and Numerical Aperture of an Optical fiber. 5M

**UNIT-II**

3. a) Derive an expression for inter-planar spacing in cubic system. 5M
- b) Define Miller Indices and mention the steps involved. Sketch (110) & (001) the planes in a cube. 5M
- c) Define point defects? Explain different types of point defects. 4M

**OR**

4. a) Describe with suitable diagram the Laue method of X-ray diffraction and give the consequences 5M
- b) Explain different types of line defects. How the burger's vector is used to find the edge and screw dislocations? 5M
- c) Write note on production of ultrasonics by piezoelectric method. 4M

**UNIT-III**

5. a) What are matter waves? Explain their properties. 4M
- b) Show that the energies of a particle in 1-D potential box are quantized. Explain the physical significance of wave function. 7M
- c) Calculate the de Broglie wavelength associated with an electron when it is raised to a potential of 1600 V. 3M

**OR**

6. a) What are drawbacks of classical free electron theory of metals? How are these are removed by the application of quantum states? 5M
- b) Show that the Kronig - Penney model leads to existence energy bands in solids. 5M
- c) Give the classification of solids into metals, semiconductors and insulators on the basis of band theory of solids. 4M

**UNIT-IV**

7. a) Describe drift and diffusion currents in a semiconductor. Derive their expressions. 6M  
b) Derive the equation of continuity equation for electrons. 5M  
c) Draw I-V characteristic curve of a PN junction diode and explain. 3M

**OR**

8. a) Explain the origin of magnetic moment in atoms. Find the magnetic dipole moment due to orbital and spin motions of an electron. 5M  
b) Explain hysteresis of a ferromagnetic materials. 4M  
c) Explain the classification of magnetic materials. 5M

**UNIT-V**

9. a) Explain Meissner effect. Write notes on magnetic levitation. 5M  
b) Describe BCS theory of superconductivity. 5M  
c) Write applications of superconductors. 4M

**OR**

10. a) Explain the basic principles of nanomaterials. 5M  
b) Describe the process of “sol-gel” and “chemical vapour deposition” method of fabrication of nanomaterials. 6M  
c) Write the applications of nanomaterials. 3M

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**Code: 4GC14**

B.Tech. I Year Supplementary Examinations December 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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<b>UNIT-I</b>
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1. a) Solve  $xy(1+xy^2)\frac{dy}{dx} = 1$  7M  
 b) A body originally at  $80^{\circ}C$  cools down to  $60^{\circ}C$  in 20 minutes, the temperature of the air being  $40^{\circ}C$ . What will be the temperature of the body after 40 minutes from the original? 7M

**OR**

2. a) Solve  $(D^3 - D)y = 2x + 1 + 4\cos x + 2e^x$  7M  
 b) Using the method of variation of parameters, solve  $\frac{d^2y}{dx^2} + 4y = \tan 2x$  7M

<b>UNIT-II</b>
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3. a) Verify Rolle's theorem for  $f(x) = (x+2)^3(x-3)^4$  in  $(-2,3)$  7M  
 b) In a plane triangle, find the maximum value of  $\cos A \cos B \cos C$  7M
4. a) Verify Lagrange's mean value theorem for  $f(x) = (x-1)(x-2)(x-3)$  in  $(0,4)$  7M  
 b) Given  $x + y + z = a$ , Find the maximum value of  $x^m y^n z^p$  7M

<b>UNIT-III</b>
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5. a) Trace the curve  $a^2y^2 = x^2(a^2 - x^2)$  7M  
 b) Find the area lying between the parabola  $y = 4x - x^2$  and the line  $y = x$ . 7M
6. a) Change the order of integration and evaluate  $\int_0^a \int_{x/a}^{\sqrt{x/a}} (x^2 + y^2) dx dy$  7M  
 b) Evaluate  $\int_{-1}^1 \int_0^z \int_{x-z}^{x+z} (x + y + z) dx dy dz$  7M

<b>UNIT-IV</b>
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7. a) Find the Laplace transform of  $f(t) = |t-1| + |t+1|$ ,  $t \geq 0$  7M  
 b) Apply convolution theorem to evaluate  $L^{-1}\left(\frac{s^2}{(s^2 + a^2)(s^2 + b^2)}\right)$  7M

**OR**

8. Solve  $\frac{d^2x}{dt^2} + 9x = \cos 2t$ , if  $x(0) = 1$ ,  $x\left(\frac{f}{2}\right) = -1$  14M

**UNIT-V**

9. a) Show that  $\nabla^2(r^n) = n(n+1)r^{n-2}$  7M  
 b) Evaluate  $\int_S F \cdot ds$  where  $F = 4xI - 2y^2J + z^2K$  and S is the surface bounding the region  $x^2 + y^2 = 4$ ,  $z = 0$  and  $z = 3$  7M

**OR**

10. Verify Green's theorem for  $\int_C (xy + y^2)dx + x^2dy$ , where C is bounded by  $y = x$  and  $y = x^2$  14M

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