

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. I Sem. (R15) Supple. Examinations of November/December 2018**  
**SUB: ENVIRONMENTAL STUDIES (EEE, ECE & CSE)**

Time : 3 Hours

Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**  
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Discuss in detail the different components of environment. 7 M  
(b) Explain the overgrazing impacts on environment. 7 M  
(OR)
2. (a) Give details of the effects of over utilization of natural resources. 7 M  
(b) "Environmental study is very useful for public awareness" Explain? 7 M

**UNIT – II**

3. (a) Discuss on characteristics of an ecosystem with neat illustration. 7 M  
(b) Explain about the energy flow through an ecosystem. 7 M  
(OR)
4. (a) What are the roles of producers, consumers and decomposers in a food chain? 7 M  
(b) Give the details about the structure and functions of Desert ecosystem. 7 M

**UNIT – III**

5. (a) Explain what is the value of biodiversity is and what are the different types of values of biodiversity. 7 M  
(b) Give the dissimilarity between endemic and endangered species. 7 M  
(OR)
6. (a) What is ex-situ and in-situ conservation? Explain them. 7 M  
(b) What are the major threats to biodiversity? 7 M

**UNIT – IV**

7. (a) Explain the effects and control measures of air pollution. 7 M  
(b) What are the control measures of urban and industrial solid wastes? 7 M  
(OR)
8. (a) What is soil pollution? What are the causes? 7 M  
(b) What are the objectives of disaster management plan? 7 M

**UNIT-V**

9. (a) Write about watershed management leading to water conservation. 7 M  
(b) Describe the problems created by the growing population of the earth. 7 M  
(OR)
10. (a) Write short notes on causes and effects of Global Warming. 7 M  
(b) What are the aim and objectives of a Family Welfare Program? 7 M

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. I Sem. (R15) Supple. Examinations of November/December 2018**  
***SUB: PROGRAMMING IN C (EEE, ECE & CSE)***

Time: 3 Hours

Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**  
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) List and explain briefly about the different computer languages. 7M  
(b) Write about built-in, derived, user-defined and void data types. Give the example for each. 7M

(OR)

2. (a) What is flow chart? Explain the different symbols of flow chart. Draw the flow chart to find the sum of n natural numbers. 7M  
(b) What do you understand by identifiers and keywords? Give the examples. 7M

**UNIT - II**

3. (a) Write short notes on operators available C language. 7M  
(b) Write a c program to find the greatest of given 3 numbers using else - if ladder. 7M

(OR)

4. (a) Differentiate between Type casting and type conversion. Give the suitable examples 7M  
(b) With Suitable C programs, describe Two Way Selection and Multi way Selection. Explain the differences between them. 7M

**UNIT - III**

5. (a) Differentiate between pretest control and posttest control loops with an example. 7M  
(b) What is function? Explain the structure of a function. Write a function to swap two integer elements. 7M

(OR)

6. (a) Write the syntax for do-while loop. Write the program to check the given number is palindrome or not, using do-while. 7M  
(b) Differentiate between call by value and call by reference with suitable examples. 7M

**UNIT - IV**

7. (a) Explain the bubble sort technique. Write a program to implement the bubble sort algorithm. 7M  
(b) Define string. Write short notes on string operations. 7M

(OR)

8. (a) What is an array. Write the syntax for declaration and initialization of arrays. How is an array represented in memory. 7M  
(b) Write a program to compare two strings without using standard string library function. 7M

**UNIT-V**

9. (a) What is structure? Explain the definition of structure and declaration of structure variable? Write a short note on nested structures. 7M  
(b) Explain FILE structure in detail. 7M

(OR)

10. (a) Write a program to read, display and add two complex numbers. (using structures) 7M  
What is pointer? Explain the significance of pointers. Write the syntax for declaration  
(b) and assignment to the pointer variable. Write a program to demonstrate the use of pointers. 7M

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. I Sem. (R15) Supple. Examinations of November/December 2018**  
**SUB: ENGINEERING GRAPHICS (EEE, ECE & CSE)**

Time : 3 Hours

Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**  
**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Construct a conic when the distance of any point P between focus and the directrix is constant and is equal to 50mm and its eccentricity is  $\frac{3}{2}$ . Name the curve. Draw a tangent and a normal at any point on the curve.  
(b) A stone is thrown from a building of 7m high and at its highest flight it just crosses a plam tree 14m high. Trace the path of the stone, if the distance between the building and the tree measured along the ground is 3.5m.

(OR)

2. Draw an Epicycloid of rolling circle of diameter 40mm which rolls outside another circle (base circle) of 150mm diameter for one revolution. Draw a tangent and normal at any point on the curve.

**UNIT – II**

3. (a) A line AB of 25mm long is perpendicular to H.P and parallel to V.P. The end points A and B of the line are 35mm and 10mm above H.P respectively. The line is 20mm in front of V.P. Draw the projections of the line.  
(b) Draw the projections of straight line AB 60mm long parallel to H.P and inclined at an angle of  $40^{\circ}$  to V.P. The end A is 30mm above H.P. and 20mm in front of V.P.

(OR)

4. A top view of a 75mm long line AB measures 65mm, while the length of its front view is 50mm, its one end A is in the H.P. and 12mm in front of the V.P. Draw the projections of AB and determine its inclination with H.P and the V.P

**UNIT – III**

5. A hexagonal prism with side of base 25mm and 150mm long is resting on a corner of its base on H.P. Draw the projections of the prism when its axis is making  $30^{\circ}$  with H.P and parallel to V.P.

(OR)

6. A cone with base 30mm diameter and axis 45mm long lies on a point of its base on V.P such that the axis makes an angle  $45^{\circ}$  with V.P. Draw the projections of the cone.

**UNIT – IV**

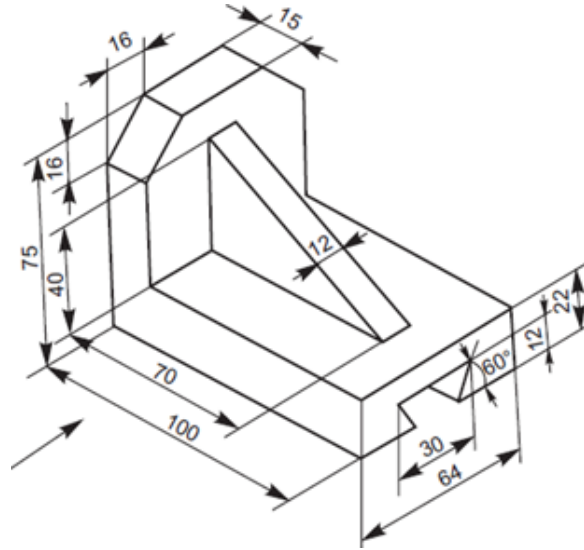
7. A hexagonal prism of base side 30mm and axis length 60mm is resting on H.P on one of its bases with two of the vertical faces perpendicular to V.P. It is cut by a plane inclined at  $60^{\circ}$  to H.P and perpendicular to V.P and passing through a point at a distance 12mm from the top base. Draw its front view , sectional top view and true shape of section

(OR)

8. A cylinder of base diameter 40mm and height 60mm rests on its base of H.P. It is cut by a plane perpendicular to V.P and inclined at  $30^{\circ}$  to H.P and meets the axis at a distance 30mm from base. Draw the front view, sectional top view, and the true shape of section.

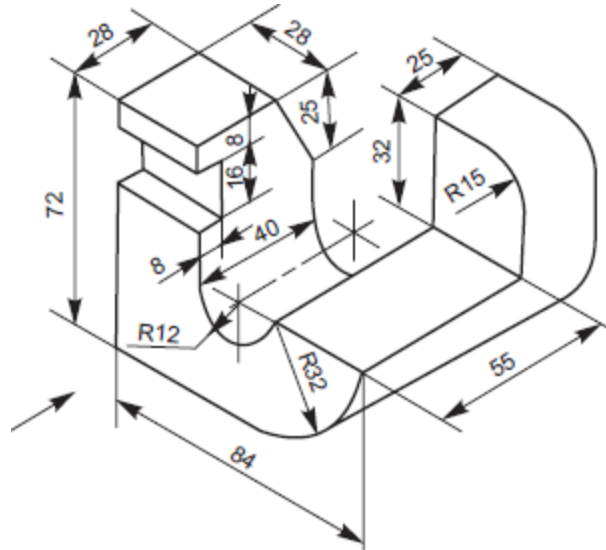
**UNIT-V**

9. Draw front view, top view and right side view of the following figure.



(OR)

10. Draw front view, top view and right side view of the following figure.



K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. I Sem. (R15) Supple. Examinations of November/December 2018

SUB: MATHEMATICS-II (Common to EEE, ECE and CSE)

Time : 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

## UNIT - I

1. (a) Find the angle between the surfaces  $x^2 + y^2 + z^2 = 9$  and  $z = x^2 + y^2 - 3$  at the point  $(2, -1, 2)$ .

- (b) Prove That  $\text{div}(r^n \bar{r}) = (n+3)r^n$ . Hence Show that  $\frac{\bar{r}}{r^3}$  is solenoidal.

(OR)

2. Verify Gauss divergence theorem for  $\bar{F} = (x^2 - yz)\bar{i} + (y^2 - zx)\bar{j} + (z^2 - xy)\bar{k}$  taken over the rectangular parallelepiped  $0 \leq x \leq a, 0 \leq y \leq b, 0 \leq z \leq c$

## UNIT - II

3. (a) Find the Laplace transform of  $te^{2t} \sin 3t$

- (b) Evaluate  $\int_0^{\infty} e^{-t} \frac{\sin t}{t} dt = \frac{\pi}{4}$

(OR)

4. Find the Laplace Transform of  $F(t) = \begin{cases} t & 0 < t < \pi \\ \pi - t & \pi < t < 2\pi \end{cases}$  by using periodic function.

## UNIT - III

5. (a) Find the Inverse Laplace Transform  $\frac{s}{(2s-1)(3s-1)}$

- (b) Using Convolution Theorem  $L^{-1}\left\{\frac{1}{(s^2+1)(s^2+9)}\right\}$

(OR)

6. Solve  $\frac{d^2x}{dt^2} + 9x = \cos 2t$ , if  $x(0) = 1, x(\frac{\pi}{2}) = -1$

## UNIT - IV

7. Find a fourier series for  $f(x) = \sqrt{1 - \cos x}, 0 \leq x \leq 2\pi$ . Hence Evaluate

$$\frac{1}{1 \cdot 3} + \frac{1}{3 \cdot 5} + \frac{1}{5 \cdot 7} + \dots$$

(OR)

8. (a) Express  $f(x) = x$  as half range sine series in  $0 < x < 2$   
 (b) Obtain the Fourier expansion of  $x \sin x$  as a fourier series in  $(0, \pi)$

## UNIT-V

9. (a) Eliminate arbitrary functions  $f, g$  from  $z = f(x+iy) + g(x-iy)$  and hence obtain the Partial differential equation .

- (b) Solve by the method of separation of variables  $4 \frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 3u$  given that

$$u = 3e^{-y} - 3e^{-5y} \text{ when } x = 0$$

(OR)

10. A tightly stretched string with fixed end points  $x = 0$  and  $x = l$  is initially in a position given by  $y = y_0 \sin^3\left(\frac{\pi x}{l}\right)$ . If it is released from rest from this position, find the displacement  $y(x, t)$

**Q.P. Code: 917812**

**SET - 1**

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. I Sem. (R15) Supple. Examinations of November/December 2018**  
***SUB: HUMAN VALUES AND PROFESSIONAL ETHICS (CE, ME)***

Time : 3 Hours

Max. Marks: 70

**Answer the following Questions**  
**All questions carry Equal Marks.**

1. Answer any SEVEN of the following 14M
  - (i) Meta ethics
  - (ii) State any three types of “Morality”.
  - (iii) Social Experimentation.
  - (iv) Respect for person.
  - (v) Name any four “employee rights”
  - (vi) What is a ‘patent’?
  - (vii) What is moral dilemma?
  - (viii) Accountability
  - (ix) Respect for Authority
  - (x) Business Ethics
  
2. (a) Briefly describe the use of ethical theories. 14M

(OR)

(b) Explain in detail the specific virtues of professional responsibility. 14M
  
3. (a) What does the codes of ethics express? 14M

(OR)

(b) What are the general features of morally responsible engineers? Explain briefly. 14M
  
4. (a) Discuss various examples of improved safety at product manufacturing. 14M

(OR)

(b) Explain the responsibility of engineers in the design of the product. 14M
  
5. (a) What are the implications that arise in the case of protecting privacy in computers? 14M

(OR)

(b) Write a note on the following 14M
  - (i) Moral Leadership
  - (ii) Engineers as managers

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**B. Tech. I Sem. (R15) Supple. Examinations of November/December 2018**  
**SUB: ENGINEERING DRAWING - I (CE & ME)**

Time : 3 Hours

Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**  
**All questions carry Equal Marks.**

**UNIT – I**

1. A fixed point is 65 mm from a fixed straight line. Draw the locus of a point 'P' moving such a way that its distance from the fixed straight line is equal to its distance from the fixed point. Name the curve. Draw tangent and normal to the curve at any point on it. 14 M
- (OR)**
2. Draw an involute of a circle of 40 dia. Also draw a tangent and normal to the curve at a point 100 from the center of the circle. 14 M

**UNIT – II**

3. (a) Draw the projections of the following points on the same reference line keeping the projectors 30 apart: (i) A - 2.5 cm below HP and 25 mm behind VP  
(ii) B - 4 cm below HP and 2.5 cm in front of VP  
(iii) C - 15 above HP and 40 mm behind VP 07 M
- (b) A 90 mm long line is parallel to and 25 mm in front of VP. Its one end is in HP while the other is 50 mm above HP. Draw its projections and locate its trace. Also, find its inclination with HP. 07 M
- (OR)**
4. The midpoint of a line 80 long is 25 above HP and 30 in front of VP. The line is inclined at  $30^{\circ}$  to HP and  $40^{\circ}$  with VP. Draw the projections of the line and locate the traces. 14 M

**UNIT – III**

5. A  $30^{\circ} - 60^{\circ}$  set square of longest side 100 mm is in VP and its surface  $45^{\circ}$  inclined to VP. One end of longest side is 10 mm and other end is 35 mm above HP. Draw its projections. 14 M
- (OR)**
6. Draw the projections of a circle of 50 mm diameter resting on HP on end A of its diameter AC which is  $30^{\circ}$  inclined to HP while its TV is  $45^{\circ}$  inclined to VP. 14 M

**UNIT – IV**

7. (a) Draw the projections of a cylinder of diameter 50, axis 70 long resting with its axis perpendicular to VP and 40 above the ground and one end 20 away from VP. 07 M
- (b) Draw the projections of a Cube of side 50 with two vertical faces equally inclined to HP and a face in VP. 07 M
- (OR)**
8. Draw the projections of a cone, base diameter 30 mm and axis 50 mm long, when (a) resting on HP, on a point of its base circle with the axis makes an angle of  $45^{\circ}$  with HP and parallel to VP (b) resting with one of its generators on HP and axis parallel to V.P. 14 M

**UNIT-V**

9. A cone of base diameter 65 and axis 75 rests on the ground on a point on the circumference of the base. The axis of the cone makes  $60^{\circ}$  with the HP. It is cut by a section plane inclined at  $30^{\circ}$  to the VP and passing through the mid-point of the axis draw the sectional front view and true shape of the section. 14 M
- (OR)**
10. A triangular prism of side of base 60 and height 90 standing with its axis at  $60^{\circ}$  to the HP is cut by a section plane such that the true shape of the section is an isosceles triangle of sides 60, 75 and 75. Draw the sectional front and top views. 14 M

**Q.P. Code: 918212**

**SET - 1**

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. I Sem. (R15) Supple. Examinations of November/December 2018**  
**SUB: ENGLISH - I**

Time : 3 Hours

Max. Marks: 70

**Answer any FIVE Questions.**  
**All questions carry Equal Marks.**

1. Is the title of the story “ An Astrologer’s Day “ appropriate? Give your reasons. 14M
2. How does the poem “If” talks of developing interpersonal skills 14M
3. Visveswaraya is known as the versatile genius. Describe his contributions to the development of our nation. 14M
4. According to Abdul kalam, what are the major missions that are needed to transform Jarkhand State? Explain based on the essay “ Building A New State”. 14M
5. Write a paragraph on any **TWO** of the following. 14M
  - (i) Hope for the best, but prepare for the worst.
  - (ii) There is no place like home.
  - (iii) Practice makes perfect
6. (a) Write phonemic transcription of the following sentences. 4M
  - (i) He speaks good English. (ii) She is a teacher.(b) Write the meanings of any FIVE of the following using them in the sentences of Your own. 10M
  - ( i) Once in a blue moon
  - ( ii) break in
  - ( iii) mix up
  - ( iv) optimist
  - ( v) postmortem
  - ( vi) philanthropist
  - ( vii) drought
7. Write any **FOURTEEN** of the following as directed 14M
  - ( i) The servant washes our clothes. ( change into passive voice )
  - ( ii) The exhibition was opened by the Governor. ( change into active voice)
  - ( iii) The crowd killed the mad dog. ( change into passive voice)
  - ( iv) The jug has been broken by the boy. ( change into active voice)
  - ( v) He said, “I have passed the examination”. ( change into indirect speech)
  - ( vi) He said to me, “ I don’t believe you”. ( change into indirect speech)
  - ( vii) He ordered the servant to get out of the room. ( change into direct speech)
  - ( viii)No one is as strong as Mohan in the class. ( change into comparative degree)
  - ( ix) Shakespeare is the greatest writer in English. ( change into positive degree)
  - ( x) No other metal is so useful as iron. ( change into superlative degree)
  - ( xi) He is hungry and has eaten a big dinner.( change into simple sentence)
  - ( xii) I sat down in the shady wood. I fell asleep. ( change into compound sentence)
  - ( xiii) He confessed his crime. ( change into complex sentence)
  - ( xiv) You must not be late. You will be punished. ( change into compound sentence)
  - ( xv) He gave me a glass of milk. ( change into negative sentence)
  - ( xvi) There is a doctor in the house. ( change into interrogative sentence)
  - ( xvii)The contractor did not finish the work. ( change into affirmative sentence)



8. Answer any **FOURTEEN** of the following Correct the following sentences if necessary.

14M

- ( i) Nobody accept the responsibility.
- ( ii) No one among the players are going to write the exam.
- ( iii) Neither the Ministers nor the Chief Minister have attended the party.
- ( iv) The committee have decided to expel them.
- ( v) I have visited England last August.
- (vi) Rat or cat run every day in the room.
- ( ii) Mohan repeated the advice again.
- (viii) Prof. Suresh is teaching Soil Mechanics since two years.
- (ix) He is writing since morning.
- ( x) I did not finish my work yet.
- ( xii) Mount Everest is the most highest peak in the world.
- ( xii) This photograph is the best of the two.
- ( xiii) He is senior than me by three years.
- ( xv) A box of eggs are on the table.
- ( xvi) Sachin Tendulkar marries with Anjali.
- ( xvii) Neither of his parents are Indian.

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**B. Tech. I Sem. (R15) Supple. Examinations of November/December 2018**  
***SUB: ENGINEERING CHEMISTRY (CE & ME)***

Time : 3 Hours

Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**  
**All questions carry Equal Marks.**

**UNIT - I**

1. With a neat diagram, explain ion-exchange process for purification of water. 14M  
(OR)
2. (a) What is carbonate and non-carbonate hardness of water and write disadvantages of hard water with examples. 7M  
(b) What is brackish water? Explain desalination of brackish water by electro dialysis method. 7M

**UNIT – II**

3. Explain the procedure used in the processing of natural rubber. 14M  
(OR)
4. Differentiate between addition and condensation polymerization with suitable examples. 14M

**UNIT – III**

5. Define corrosion. Explain evolution of hydrogen type of corrosion in detail 14M  
(OR)
6. With a neat sketch, explain the construction and working principal of H<sub>2</sub>-O<sub>2</sub> fuel cell. 14M  
Give the half cells reactions and advantages of these cells.

**UNIT – IV**

7. Discuss in detail about the Bergius process and Fischer-Tropsch synthesis for the manufacture of synthetic petrol. 14M  
(OR)
8. Explain thick film, thin film and extreme pressure lubrication 14M

**UNIT-V**

9. (a) Write 12 principles of green chemistry and its applications 7M  
(b) (i) Laws of Photo chemistry, (ii) Solar cells 7M  
(OR)
10. What is catalysis? Explain the types of catalysis in detail. 14M

**Q.P. Code: 918612**

**SET - 1**

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. I Sem. (R15) Supple. Examinations of November/December 2018**  
**SUB: ENGINEERING PHYSICS (CE & ME)**

Time: 3 Hours

Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**

**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Describe the construction and working of NdYAG laser 10M  
(b) Calculate the thickness of air film at 10<sup>th</sup> dark ring in a Newton's ring system viewed normally by a reflected light of  $\lambda = 500$  nm. The diameter of the 10<sup>th</sup> dark is 2 mm. 4M

(OR)

2. (a) Obtain an expression for acceptance angle and numerical aperture in terms of the refractive indices of core and cladding. 10M  
(b) Differences between interference and diffraction. 4M

**UNIT - II**

3. (a) Show the FCC is the most closely packed of three cubic structures. 8M  
(b) State and explain the Bragg's law. 6M

(OR)

4. (a) Explain the production of ultrasonics using Piezo electric method. 10M  
(b) Calculate the frequency of ultrasonic waves using the following data. Thickness of Quartz plate =  $5.5 \times 10^{-3}$  m, Young's modulus of Quartz =  $8 \times 10^{10}$  N/m<sup>2</sup>, Density =  $2.65 \times 10^3$  kg/m<sup>3</sup>. 4M

**UNIT - III**

5. (a) Show that the energies of a particle in a potential box are quantized. 10M  
(b) An electron is bound in a 1-D box having size of  $4 \times 10^{-10}$  m. what will be its minimum energy? 4M

(OR)

6. (a) Discuss the formation of allowed and forbidden energy bands on the basis of the Kronig-Penny model. 10M  
(b) Mention the important assumptions of free electron theory of metals. 4M

**UNIT - IV**

7. (a) Based on hysteresis loop, distinguish soft and hard magnetic materials and mention their applications. 10M  
(b) Define Bohr magneton. Find its value. 4M

(OR)

8. (a) Describe BCS theory. 10M  
(b) A superconducting material has a critical temperature of 3.7K and a magnetic field of 0.0306 tesla at 0 K. Find critical field at 2 K. 4M

**UNIT-V**

9. (a) Derive an expression for drift current and diffusion current density for electrons and holes and hence find the total current density? 8M  
(b) What is Hall effect? mention its applications 6M

(OR)

10. (a) Discuss briefly Chemical vapour deposition method of nano materials preparation. 10M  
(b) What are the applications of nano materials? 4M

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. I Sem. (R15) Supple. Examinations of November/December 2018**  
**SUB: MATHEMATICS-I (Common to all Branches)**

Time: 3 Hours

Max. Marks: 70

**Answer any FIVE Questions choosing one question from each unit.**

**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Solve  $ydx - xdy = a(x^2 + y^2)dx$  7M  
 (b) Prove that the system of parabolas  $y^2 = 4a(x+a)$  is self-orthogonal, where 'a' is a parameter 7M  
 (OR)  
 2. (a) Solve  $(1+y^2)dx + (x - e^{-\tan^{-1}y})dy = 0$  7M  
 (b) If 30% of a radioactive substance disappears in 10 days, how long will it take for 90% of it to disappear? 7M

**UNIT - II**

3. (a) Solve  $(D^2 - 6D + 13)y = 8e^{3x} \sin 2x$  7M  
 (b) Solve  $(D^2 + 9)y = x \sin 2x$  7M  
 (OR)  
 4. (a) Solve  $(D^2 + 2D + 1)y = (1 + e^{-x})^2$  7M  
 (b) Solve  $(D^2 + 4)y = \sec 2x$  by the method of variation of parameters. 7M

**UNIT - III**

5. (a) Verify Taylor's theorem for  $f(x) = (1-x)^{5/2}$  with Lagrange's form of remainder up to two terms in  $[0, 1]$ . 7M  
 (b) If  $u = x^2 - y^2, v = 2xy$  and  $x = r \cos \theta, y = r \sin \theta$  then find  $\frac{\partial(u,v)}{\partial(r,\theta)}$  7M

**(OR)**

6. Find the Volume of the largest rectangular parallelepiped that can be inscribed in the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ . 14M

**UNIT - IV**

7. (a) Find the radius of curvature at any point of the curve  $xy = c^2$  7M  
 (b) Find the center of curvature at the point  $\left(\frac{a}{4}, \frac{a}{4}\right)$  to the curve  $\sqrt{x} + \sqrt{y} = \sqrt{a}$  7M  
 (OR)  
 8. Trace the curve  $y^2(a+x) = x^2(3a-x)$ . 14M

**UNIT-V**

9. (a) Example  $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dx dy}{1+x^2+y^2}$  7M

(b) Evaluate  $\int_0^{\pi} \int_0^{a \sin \theta} r dr d\theta$ . 7M

(OR)

10. By applying change of order of integration, evaluate  $\int_0^1 \int_{x^2}^{2-x} xy dy dx$ . 14M

