

2E2001	Roll No. _____	[Total No. of Pages : 3]
	2E2001	
	B.Tech. II Semester (Main & Back) Examination, June/July - 2016 201 Communication Techniques	

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I

1. a) Describe the meaning and process of communication (8)
- b) Describe the advantages and limitations of oral and written communication. (8)

OR

1. a) 'Communication is a two - way process'. Discuss. (8)
- b) Describe the various media of communication. (8)

Unit - II

2. a) Describe the 'Kinesics' and 'Haptics' mode of non - verbal communication. (8)
- b) Describe the major factors that determine the effectiveness of communication. (8)

OR

2. a) Describe different channels of communication. (8)
- b) Describe 'Proxemics' and 'vocalics' mode of communication. (8)

Unit - III

3. a) Describe environmental and language barriers (8)
 b) Describe interpersonal communication. (8)

OR

3. a) Discuss sender oriented barriers and methods of overcoming sender oriented barriers. (8)
 b) Describe the ways of enhancing effectiveness of professional communication. (8)

Unit - IV

4. a) Fill in the blanks with suitable verbs :
 i) Nobody _____ (know/knows) the trouble I have seen.
 ii) The students and teachers each _____ (hope/hopes) for a new facility by next year.
 iii) The books borrowed from the library _____ (is/are) on my desk.
 iv) The girl or her classmates _____ (watch/watches) television everyday. (8)
- b) Insert suitable conjunctions :
 i) Promise me that you will phone me _____ (until/though/as soon as) you reach to the hospital.
 ii) She cuts the cake into small pieces _____ (but/ unless/sothat) there would be enough for everyone.
 iii) The train had already left _____ (so/because/and) Rani had to walk to work.
 iv) I shall be in the office _____ (unless/until/as) 6 O'clock, but after that I'll be at home. (8)

OR

4. a) Insert suitable relative pronoun and complete the sentence.
 i) Ramsingh is a friend of mine _____ lives in Bhopal.
 ii) There is the bridge _____ we have to cross.
 iii) The castle is a place _____ a king or queen lives.
 iv) A lady _____ sister was crying tried to calm her. (8)

b) Correct the following sentences :

- i) Have you packed your luggages?
- ii) I who is standing here wrote that letter.
- iii) I, him and you must help that poor man.
- iv) John keats was a much learned man. (8)

Unit - V

5. a) Assume that recently you have purchased a washing machine from Nima Electrical Equipments, Delhi. The appliance has not performed upto your expectations. Draft an e-mail informing the company about the cause of your dissatisfaction and seek an appropriate replacement in this regard. (8)
- b) Wanted a civil Engineer for Mahima Industries Pvt. Ltd. Apply for this post with resume. (8)

OR

5. a) Assuming yourself as the sports officer of your college, place an order to Zima sports for 30 cricket kits and request to supply at earliest convenience. (8)
- b) What do you mean by telephone etiquettes? What are the do's and don'ts of telephonic conversation? (8)

2E1021	Roll No. _____	[Total No. of Pages : 4]
	2E1021	
	B.Tech. I Year II Semester (Old Back) 2007 - 08 & 2008 -09 Batch	
	Examination, June/July - 2016	
Common to All Branches of Engg.		
201 (O) Communication Techniques		

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I**1. a) Fill in the blanks :**

1. Every Monday, Sally (drive) her kids to football practice.
2. I hate living in Seattle because it (rain, always)
3. Shhhhh! Be quiet ! John (sleep)
4. Don't forget to take your umbrella. It (rain)

b) Change the following sentences into passive voice :

1. Somebody cleans the office every day.
2. Somebody sends emails.
3. He is cutting the grass.
4. She preferred chocolate. (8+8)

OR**1. a) Put in the correct question tags. (8+8)**

1. She is collecting stickers,
2. We often watch TV in the afternoon,
3. You have cleaned your bike,
4. John and Max don't like Maths,

b) Change the following sentences into passive voice :

1. Somebody often steals cars.
2. He played loud music.
3. He is cleaning the table.
4. She is cooking dinner

Unit - II

2. a) Finish the sentences using Reported speech. Always change the tense, although it is sometimes not necessary. (8+8)

1. Christopher : "Do you want to dance?"
Christopher asked me _____
2. Betty : "When did you come?"
Betty wanted to know _____
3. Mark : "Has John arrived?"
Mark asked me _____
4. Ronald : "Where does Maria park her car?"
Ronald asked me _____

b) Choose There is or There are to complete the sentences. Mind singular or plural of the nouns :

1. _____ a bag on the table
2. _____ a calendar on the wall.
3. _____ two posters in my room.
4. _____ a banana in this basket.

OR

2. a) Use much or many. Mind countable and uncountable nouns :

1. How _____ players are in a handball team?
2. How _____ pocket money do you get per week?
3. How _____ time is left?
4. How _____ sisters does Ella have?

b) Select the correct word a/an or some.

1. I have _____ good idea.
2. That's _____ interesting job !
3. They have found _____ gold in that old mine.

4. Do the Smiths have _____ yellow van? (8+8)

Unit - III

3. a) Fill in the blanks with suitable conjunctions :
1. I need an office to myself _____ I can get some work done.
 2. Write it down _____ you don't forget.
 3. I need to get to work early _____ I can finish the report before the meeting.
 4. Anil _____ his friend are coming.
- b) Re - write the sentences so that they have the same meaning as the original. You must use a relative clause.
1. I bought a house. It was advertised in the local paper.
 2. Mary works in our office. Her husband is a plastic surgeon.
 3. Venice is a wonderful place. We spent our last holiday there.
 4. He showed us how to create a computer - based game. It was very interesting. (8+8)

OR

3. a) Fill in the blanks with suitable linking words :
1. Things were different _____ I was young.
 2. I do it _____ I like it.
 3. Let us wait here _____ the rain stops.
 4. You cannot be a lawyer _____ you have a law degree.
- b) Re - write the sentences so that they have the same meaning as the original. You must use a relative clause.
1. That's the boy. I told you about him last night.
 2. They've sold the house. I wanted to buy it.
 3. Helen has just arrived. She had a car accident.
 4. They've sold the grocery. I used to go shopping there. (8+8)

Unit - IV

4. a) You are Rahul, the President of Creative Public Club, Kota, Recently your college hosted the Regional Level Science Exhibition. Write a report of this event for your newsletter in about 125 words.
- b) Write an essay on Importance of Communication Skills for Engineers. (8+8)

OR

4. a) The International Book Fair was inaugurated by the Chairman of Children's Book Trust, Dr. Kumar. The theme this year was Illustrated Works of Children. You are Akshay/Akanksha a student. You visited the exhibition and were impressed with the range of books on display. Write a report in about 125 words.
- b) Write an essay on Indian Politics. (8+8)

Unit - V

5. a) Read the passage carefully. Write a precis. Give a suitable title.

There is an old saying that we should always tell the truth because that way we don't have to remember what we said. Honesty is a virtue. At one time or another, you might find yourself in a situation that requires you to tell one or two lies to avoid trouble. For some people, being honest is not that easy and such people might find themselves lying almost every day. Honesty is the best policy because no matter how good you are at telling lies, the truth will always come out.

Honest people are respected and trusted upon because they are known to stand by their truth. Without honesty, the world would be a bad and sad place to live in. That's why we need to always tell the truth no matter what. People who constantly lie not only lose their friends but their reputation since no one likes associating with dishonest characters.

- b) Write a letter to the Editor of a newspaper, complaining about the bad condition of water supply in your locality. You are Prabhu Dayal living at H - 19 Dayal Bagh Colony, New Delhi. (8+8)

OR

5. a) What is a precis. What are the qualities of a good precis.
- b) You are Keerti/Krishna of 56, Indrapuram, Bangalore. You bought a new "VIP" Washing Machine from M/s Rama Electronic, Commercial Street, Bangalore last week. Now you find that the machine makes an unbearable noise and motor tears delicate fabrics. Write a letter to the dealer complaining about the same and requesting him to change the machine as early as possible. (8+8)

Roll No. _____

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2E2002

2E2002

B.Tech. II Semester (Main/Back) Examination, June/July - 2016
202 Engg. Mathematics - II

Time : 3 Hours

Maximum Marks : 80
 Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I

1. a) A plane passes through a fixed point (a,b,c) and cut the axis in A,B,C. Show that the locus of the centre of the sphere OABC is (8)

$$\frac{a}{x} + \frac{b}{y} + \frac{c}{z} = 2$$

- b) Two spheres of radii r_1 and r_2 cut orthogonally, prove the radius of their common circle is (8)

$$\frac{r_1 r_2}{\sqrt{r_1^2 + r_2^2}}$$

OR

1. a) Define right circular cone. Find the equation of the right circular cone whose vertex is origin, axis is x - axis and semi vertical angle is α . (2+6=8)
- b) Define right circular cylinder. Find the equation of a right circular cylinder whose axis is

$$\frac{x-2}{2} = \frac{y-1}{1} = \frac{z}{3}$$

and which passes through (0,0,1)

(2+6=8)

Unit - II

2. a) Find the rank of the following matrix by reducing it to the normal form :

$$\begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix} \quad (8)$$

- b) Test the consistency of the following system of equations and if possible solve it:

$$\begin{aligned} 2x - 3y + 7z &= 5 \\ 3x + y - 3z &= 13 \\ 3x + 19y - 47z &= 32 \end{aligned} \quad (8)$$

OR

2. a) Find the eigen values and eigen vectors of the following matrix :

$$\begin{bmatrix} -2 & 1 & 1 \\ -11 & 4 & 5 \\ -1 & 1 & 0 \end{bmatrix} \quad (8)$$

- b) State Cayley Hamilton Theorem, verify it for the matrix.

$$A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix} \text{ and find } A^{-1}. \quad (2+6=8)$$

Unit - III

3. a) A particle moves on the curve $x = 2t^2$, $y = t^2 - 4t$, $z = 3t - 5$, where t denote time. Find the components of velocity and acceleration at $t = 1$ in the direction of vector $\hat{i} - 3\hat{j} + 2\hat{k}$. (8)

- b) Prove that :

i) $\nabla^2(r^n) = n(n+2)r^{n-2}$, if $r = |\vec{r}| = \sqrt{x^2 + y^2 + z^2}$ and $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$.

ii) $\text{Curl}(\vec{a} \times \vec{r}) = 2\vec{a}$, if $\vec{a}$ is a constant vector. (4+4=8)

OR

3. a) If $\vec{a}$ and $\vec{b}$ are differentiable vector functions, then show that :

i) $\text{div}(\vec{a} \times \vec{b}) = \vec{b} \cdot \text{curl} \vec{a} - \vec{a} \cdot \text{curl} \vec{b}$

ii) $\text{div} \text{curl} \vec{a} = 0$

(5+3=8)

- b) Evaluate $\int_C \vec{F} \cdot d\vec{r}$, where $\vec{F} = (x^2 + y^2)\hat{i} - 2xy\hat{j}$, curve c is rectangle in the xy - plane bounded by $x = 0$; $x = a$; $y = 0$; $y = b$.

(8)

Unit - IV

4. a) Evaluate $\iiint_V \vec{F} \cdot \hat{n} ds$ by using Gauss's divergence theorem for $\vec{F} = xy\hat{i} + z^2\hat{j} + 2yz\hat{k}$ on the tetrahedron $x = y = z = 0$, $x + y + z = 1$.

(8)

- b) State stoke's theorem. Verify Green's theorem in the plane for $\oint_C [(xy + y^2)dx + x^2dy]$, where c is the closed curve of the region bounded by $y = x^2$ and $y = x$.

(2+6=8)

OR

4. a) Obtain the Fourier series for the function $f(x) = x^2$ in the interval $-\pi < x < \pi$ and deduce the following :

i) $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \dots = \frac{\pi^2}{6}$

ii) $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \dots = \frac{\pi^2}{12}$

(5+3=8)

- b) Express $f(x)$ in a fourier series upto the second harmonic for the following data :

x :	0	$\pi/3$	$2\pi/3$	π	$4\pi/3$	$5\pi/3$	2π
f(x) :	1.98	2.15	2.77	-0.22	-0.31	1.43	1.98

(8)

Unit - V

5. a) Solve the following differential equation in series.

$$\frac{d^2y}{dx^2} + x^2y = 0 \quad (8)$$

- b) Solve :

$$x(y^2 - z^2)q - y(z^2 + x^2)q = z(x^2 + y^2) \quad (8)$$

OR

5. a) Solve :

$$x^2p^2 + y^2q^2 = z^2 \quad (8)$$

- b) Find a complete integral of

$$q = (z + px)^2$$

by using charpit's method. (8)

2E1022	Roll No. _____	[Total No. of Pages : 4]
	2E1022	
	B.Tech. I Year II Semester (Old Back) 2007 - 08 & 2008 -09 Batch Examination, June/July - 2016 Common to all Branches of Engg. 202 (O) Engineering Mathematics - II	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).

Unit - I

1. a) A sphere of constant radius r passes through the origin O and cuts the coordinate axes in A, B, C . Prove that locus of foot of perpendicular drawn from O to the plane ABC is given by $(x^2 + y^2 + z^2)^2 (x^{-2} + y^{-2} + z^{-2}) = 4r^2$ (8)
- b) Obtain the equation of right circular cone with vertex $(1, -2, -1)$, semi vertical angle 60° and the axis $\frac{x-1}{3} = \frac{y+2}{-4} = \frac{z+1}{5}$ (8)

OR

1. a) Find the equation of the sphere that passes through the circle $x^2 + y^2 + z^2 - 2x + 3y - 4z + 6 = 0$, $3x - 4y + 5z - 15 = 0$, and cuts the sphere $x^2 + y^2 + z^2 + 2x + 4y - 6z + 11 = 0$ orthogonally. (8)
- b) Find the equation of right circular cylinder of radius 2 whose axis is the line $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-3}{2}$ (8)

Unit - II

2. a) Find the inverse of the given matrix A by elementary column transformations

$$A = \begin{bmatrix} 2 & 5 & 3 \\ 3 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix} \quad (8)$$

- b) State Cayley Hamilton theorem. Verify it for the matrix $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$ Hence, find A^{-1} (8)

OR

2. a) Test consistency for the following system of equations and if possible, solve them

$$\begin{aligned} 5x + 3y + 7z &= 4 \\ 3x + 26y + 2z &= 9 \\ 7x + 2y + 10z &= 5 \end{aligned} \quad (8)$$

- b) Find the rank of the matrix A by reducing it into normal form

$$A = \begin{bmatrix} -1 & 2 & 3 & -2 \\ 2 & -5 & 1 & 2 \\ 3 & -8 & 5 & 2 \\ 5 & -12 & -1 & 6 \end{bmatrix} \quad (8)$$

Unit - III

3. a) If $\vec{r} = xi + yj + zk$, show that $\text{div} \left(\frac{\vec{r}}{r^3} \right) = 0$ (8)

- b) Evaluate by Green's theorem

$$\int_c (x^2 - \cosh y) dx + (y + \sin x) dy$$

Where c is the rectangle with vertices (0,0), (π ,0), (π ,1), (0,1) (8)

OR

3. a) Show that $\vec{F} = (2xy + z^3)\mathbf{i} + x^2\mathbf{j} + 3z^2x\mathbf{k}$ is a conservative field. Find its scalar potential. (8)
- b) Evaluate $\int_c \vec{F} \cdot d\vec{r}$ by stoke's theorem, where $\vec{F} = y^2\mathbf{i} + x^2\mathbf{j} - (x+z)\mathbf{k}$ and c is the boundary of the triangle with vertices at $(0,0,0)$, $(1,0,0)$, and $(1,1,0)$. (8)

Unit - IV

4. a) A small bead slides with constant speed v on a smooth wire in the shape of a cardioid $r = a(1 + \cos \theta)$. Show that the angular velocity is $(v/2a)\text{Sec } \frac{\theta}{2}$ and that the radial Component of the acceleration is constant. (8)
- b) A particle of mass m is projected vertically under gravity, the resistance of the medium being mk times the velocity. Show that the greatest height attained by the particle is

$$\frac{v^2}{g} [\lambda - \log(1 + \lambda)]$$

and the corresponding time is $\frac{v}{g} \log(1 + \lambda)$ (8)

OR

4. a) One point describes the diameter AB of a circle with constant velocity and another the semi - circumference AB, from rest with constant tangential acceleration. They start together at A and arrive together at B. Show that their velocities at B are as $1:\pi$ (8)
- b) A particle is projected horizontally in a medium whose resistance varies as the cube of the velocity with no other force acting on it. If d be the distance moved in time t in which the velocity decreases from v_1 to v_2 , show that

$$\frac{d}{t} = \frac{2v_1v_2}{v_1 + v_2} \quad (8)$$

Unit - V

5. a) Solve in series

$$x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} + (x^2 - 4)y = 0 \quad (8)$$

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b) Solve $\left(\frac{y^2 z}{x}\right)p + (zx)q = y^2$ (8)

OR

5. a) Find the complete integral of

$$z(p^2 - q^2) = x - y \quad (8)$$

b) Solve by charpit's method.

$$2zx - px^2 - 2qxy + pq = 0 \quad (8)$$

2E2003	Roll No. _____	[Total No. of Pages : 3]
	2E2003	
	B.Tech. II Semester (Main & Back) Examination, June/July - 2016 203 Engineering Physics - II	

Time : 3 Hours

 Maximum Marks : 80
 Min. Passing Marks : 26
Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) Obtain an expression for shift in wavelength of scattered photon by Compton scattering and show that Compton shift depends only on scattering angle. What is Compton wavelength? (8)
- b) Derive one dimensional time dependent Schrodinger's wave equation and also explain the physical significance of wave function. (8)

OR

1. a) Write down the Schrodinger's time independent wave equation for a free particle confined in a one dimensional box of size 'a'. Obtain eigenvalues and normalized wave function for this particle. (8)
- b) Explain the followings :
 - i) Why Compton Effect is not observed experimentally for visible rays?
 - ii) What is the basic difference between Photoelectric effect and Compton Effect? (4+4)

Unit - II

2. a) What is the density of energy state in metals? Obtain the expression for density of states for free electron as in a metal and find the expression for Fermi energy. (8)

- b) Find the lowest energy and energy of first excited state of a neutron confined in a nucleus, considering it as a 3 - dimensional cubical box of size 10^{-14} meter. (8)

OR

2. a) Solve 3- dimensional Schrodinger's equation for a free particle confined in an infinitely deep cubical potential well of side 'a' to obtain energy eigenvalues and eigenfunction. (8)
- b) What do you understand by quantum mechanical tunneling? With help of suitable diagrams explain the phenomenon of quantum mechanical tunneling in α - decay process. (8)

Unit - III

3. a) What is coherence? Explain temporal and spatial coherence. Give example of one experiment each which demonstrate temporal and spatial coherence. (8)
- b) In a highly stabilized He - Ne Laser, the wavelength $\lambda = 6328 \text{ \AA}$ and line width $\Delta\nu = 10^3$ Hz. What is the coherence length, coherence time and quality factor for this laser? (8)

OR

3. a) Show that the numerical aperture of a step index fiber is given by $NA = n_1 \sqrt{2\Delta}$, where symbol have their usual meaning. (8)
- b) A step index fiber has numerical aperture 0.16, a core refractive index of 1.42. Calculate,
- I) i) The maximum acceptance angle of fiber in air.
 - ii) The refractive index of cladding
 - II) i) If the fiber is immersed in water (refractive index = 1.33), will the maximum acceptance angle change? What will be its value?
 - ii) Will the numerical aperture change? Explain the answer. (8)

Unit - IV

4. a) Explain the term absorption, spontaneous emission and derive the relation between Einstein's coefficients for laser action and discuss the results. (8)
- b) What are the basic requirements of semiconductor laser? Draw its label diagram and explain its working with necessary theory. Write down the applications of semiconductor laser. (8)

OR

4. a) What is the fundamental principle of a hologram? How it is produced and how is image constructed from it? (8)
- b) Explain Laser action and give the reasons for the following basic properties of a laser
- i) High intensity
 - ii) High directionality (8)

Unit - V

5. a) Explain the principle of particle detection. Draw $\log n - V$ graph showing different regions and discuss the significant physical processes taking place in these regions. (8)
- b) A GM counter counts 815 counts per minute when 1000 charged particles are incident per minute on it. Find the efficiency of GM counter. (4)
- c) Calculate the electric field at the surface of the wire of a proportional counter with wire of radius 0.1 mm and a cylinder (cathode) of radius 1 cm, when 600 volt is applied between the two electrodes. (4)

OR

5. a) Draw a neat diagram of a Geiger - Muller counter. Show its voltage characteristics graph and label the plateau region. Explain the term Dead time, Recovery time and Paralysis time? (8)
- b) Give construction of Photomultiplier tube. (4)
- c) What are the advantages of proportional counter over GM counter? (4)

2E1003	Roll No. _____	[Total No. of Pages : 2]
	2E1003	
	B.Tech. II Semester (Old Back) Examination, June/July - 2016 Common for All Branch 203 (O) Physics	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I

1. a) What you understand by normalized wave function. If ψ is normalized wave function, write down expression for
 - i) Probability of finding the particle in certain volume range.
 - ii) The expectation value of x-component of linear momentum.
 - iii) The expectation value of potential energy. (12)
- b) What is the lowest energy that a neutron (mass = 1.67×10^{-27} kg) can have if confined to move along the edge of an impenetrable box of length 10^{-14} meter? (4)

OR

1. a) Write down the Schrödinger's time independent wave equations. Give physical significance of wave function. (8)
- b) What do you mean by particle in box? Show that the energy of e^- in the box varies as the square of natural numbers. (8)

Unit - II

2. a) Explain the essential requirements for production of laser action. How are these requirements obtain in case of He - Ne laser? Draw a diagram to represent the component of He - Ne laser. (10)

- b) Find the ratio of populations of the two states in a He-Ne laser that produces light of wavelength $6328 \text{ \AA}$ at 27°C . (6)

OR

2. Explain the construction and working of semiconductor laser. Describe the transition which gives the laser. (16)

Unit - III

3. a) Explain clearly, the propagation of an electromagnetic wave inside an optical fiber. Use proper diagram. Derive the expression of maximum acceptance angle of optical fiber in air (12)
- b) A fiber cable has an acceptance angle of 30° and a core refractive index 1.4. Calculate the refractive index of the cladding. (4)

OR

3. a) What is the purity of a spectral line? How it is useful for study of coherent length? Derive a relation between coherent length and line width. (10)
- b) Briefly describe the construction of fiber optic cable. (6)

Unit - IV

4. Explain the construction of Geiger - Muller counter and working. Give its important application. (16)

OR

4. a) Describe construction and working of scintillation counter. (12)
- b) What is Quenching & Photomultiplier tube. (4)

Unit - V

5. State Ampere's law in integral and differential form. Why it is modified by Maxwell's. (16)

OR

5. Deduce Maxwell's equations for free space and prove that the E.M. waves are transverse. (16)

2E2004	Roll No. _____	[Total No. of Pages : 3]
	2E2004	
	B.Tech. II Semester (Main & Back) Examination, June/July - 2016 Common to All Branch 204 Chemistry & Environmental Engg.	

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Explain break point chlorination with diagram and also write it's advantages. (6+2=8)
- b) Define degree of hardness. A Standard hard water solution contain 30g CaCO_3 per litre 30 ml. of this required 25 ml. of EDTA Solution on titration 30 ml. of water sample required 20 ml. of EDTA solution. The sample after boiling required 15 ml. EDTA solution. Calculate temporary, permanent and total hardness of water Sample. (2+6=8)

OR

1. a) What is the basic principle of complexometric titration and Clark's method also give chemical reaction? (3+3=6)
- b) What do you understand by coagulation and sedimentation process? (6)
- c) Calculate temporary, permanent hardness and total hardness present in hard water sample from following data obtained in Soap titration method when 40 ml. of water is titrated with soap solution
 - i) Lather factor = 0.8 ml. Soap solution
 - ii) Total hardness = 14.6 ml. Soap solution
 - iii) Permanent hardness = 7.5 ml. Soap solution
 - iv) Standard hardwater (SHW) = $(250 \text{ mg/L } \text{CaCO}_3) = 30.8 \text{ ml soap solution}$ (4)

Unit - II

2. a) Calculate the amount of lime and soda needed for softening 1,00,000 litres of water containing $\text{HCl} = 8.3 \text{ mg/L}$, $\text{Al}_2(\text{SO}_4)_3 = 36.2 \text{ mg/L}$, $\text{MgCl}_2 = 11.5 \text{ mg/L}$, $\text{NaCl} = 29.30 \text{ mg/L}$. Purity of lime is 90% and that of soda is 98%.
10% chemicals are to be used in excess in order to complete the reaction quickly. (6)
- b) Describe carry over and caustic embrittlement. How can they be prevented? (5+5=10)

OR

2. a) Write short notes on Permutite method compare the lime - soda, Zeolite and Ion - exchange method. (6+4=10)
- b) A sample on analysis gave the following results - $\text{H}_2\text{SO}_4 = 198 \text{ mg/L}$, $\text{CaSO}_4 = 274 \text{ mg/L}$, $\text{MgSO}_4 = 28 \text{ mg/L}$ and $\text{NaCl} = 28 \text{ mg/L}$ water is to be supplied to the town of the population of one lakh only. The daily consumption of water is 60 litre per head. Calculate the cost of lime and soda required for the softening the hardwater for town for the month may 2004. If the cost is Rs. 10/- per kg and soda is Rs. 8/- per kg. (6)

Unit - III

3. a) What is Environmental Impact Assessment (EIA)? Discuss the methodology of EIA. (10)
- b) Explain the hydrological cycle with neat diagram. (6)

OR

3. a) Define Ecosystem. Discuss energy flow in ecosystems. (8)
- b) Discuss the following in brief:
i) Biodiversity
ii) Renewable sources of energy. (4+4=8)

Unit - IV

4. Write short notes on following :

- i) Acid rain
- ii) Green house effect
- iii) Ozone depletion
- iv) Sanitary landfill

(4×4=16)

OR

4. a) What is solid waste management? Write its classification and also write various method of solid waste disposal. (10)
- b) Explain the adverse effect of air pollution on climate. (6)

Unit - V

5. a) What is corrosion? Discuss the mechanism of electrochemical corrosion. (8)
- b) What do you understand by rain water harvesting? Discuss the rain water harvesting techniques. (8)

OR

5. a) Discuss the various methods of disposal of waste water and treatment of waste water. (10)
- b) Discuss the cathodic protection methods from corrosion. (6)
-

2E1024	Roll No. _____	[Total No. of Pages : 2]
	2E1024	
	B.Tech. II Semester (Old Back) Examination, June/July - 2016 204(O) Environmental Engg. & Disaster Mgmt.	

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I

1. a) What do you understand by Renewable source of Energy? Describe various sources of renewable energy in India. (10)
- b) Discuss Malthusian theory of population Growth. Also state the reasons and consequences of population growth. (6)

OR

1. a) What is Bio - diversity? Describe the ecological significance of bio - diversity. (8)
- b) What do you understand by "Environmental Pollution". Discuss the strategies to control the environmental pollution. (8)

Unit - II

2. a) What are the common impurities found in surface water? Discuss the ill effects on these impurities on mankind? (8)
- b) Describe the sources of water along with their characteristics. (8)

OR

2. a) Enumerate the various techniques of wastewater treatment? Write the different steps of domestic waste water treatment. (8)

b) Write notes on the following :-

i) Septic tank

ii) Environmental Impact Assessment (EIA)

(4+4=8)

Unit - III

3. a) Explain noise pollution. What are the sources of noise pollution? Explain various measures to control noise pollution. (8)

b) What is "Global warming"? Explain how it is formed along with adverse effects and control methods. (8)

OR

3. a) What is air pollution? What are the adverse effects of air pollution on human health? (8)

b) Describe the various steps involved in solid waste management in detail. (8)

Unit - IV

4. a) What is Disaster? Describe the classification of various types of disasters. (10)

b) Briefly discuss the vulnerability of Indian sub - continent to drought. (6)

OR

4. a) Write the do and don'ts for the safety related to earth quake, drought, nuclear hazards and fire hazards. (8)

b) Write note on disaster management cycle and its components. (8)

Unit - V

5. a) Explain the various types of seismic waves with neat sketches. (8)

b) Discuss the seismicity and concept of seismic zoning as per IS - 1893 (2002). (8)

OR

5. a) State various base isolation techniques used in construction of earthquake resistant buildings. (8)

b) Write a brief note on plate tectonic theory giving a neat sketch of the Earth's structure. (8)

2E1026	Roll No. _____	[Total No. of Pages : 2]
	2E1026	
	B.Tech. II Semester (Old Back) Examination, June/July - 2016 Engineering Chemistry - II	

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I

1. a) What are fuels and how are they classified? Give examples. (8)
- b) How is a good fuel selected and write the characteristics of a good fuel. (8)

OR

1. a) Describe how the "Calorific value" (of coal or liquid fuel) is determined by Bomb calorimeter with neat diagram of the calorimeter. (8)
- b) A Coal has the following ultimate analysis :
Carbon 84% ; Sulphur 1.5% ; Nitrogen 0.6% ; Hydrogen 5.5% and oxygen 8.4%. Find the Gross and net calorific values with the help of Dulong's formula. (8)

Unit - II

2. a) Explain the manufacturing of synthetic petrol by Bergius process. (8)
- b) Write short notes on any two
 - i) Cetane Number
 - ii) Natural Gas
 - iii) Carbonization of coal (2×4)

OR

2. a) Describe "proximate analysis" of coal for moisture, volatile matter and ash contents. (8)
- b) A furnace oil contains 80% carbon, and 20% hydrogen by weight. Determine the weight of air required per kg of oil. (8)

Unit - III

3. a) What is phase rule? Define the terms involved in phase rule with example. (8)
- b) Explain water system in details. (8)

OR

3. a) What is reduced phase rule and discuss the triple point & Eutectic point. (8)
- b) Explain Ag - Pb system in details. (8)

Unit - IV

4. a) Discuss preparation, properties & uses of fullerenes. (8)
- b) Write in details on organic polymers. (8)

OR

4. a) What are superconductors ; discuss in details their properties and uses. (10)
- b) Write Notes on optical fibres. (6)

Unit - V

5. a) What is corrosion? Explain the mechanism of chemical corrosion / dry corrosion. (10)
- b) Write notes on concentration cell corrosion. (6)

OR

5. a) Explain the factors that affect "electro - chemical corrosion". (8)
- b) Write short notes on any two
- i) Stress corrosion
 - ii) Pitting corrosion
 - iii) Galvanizing
- (2×4=8)

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2E2005**2E2005**

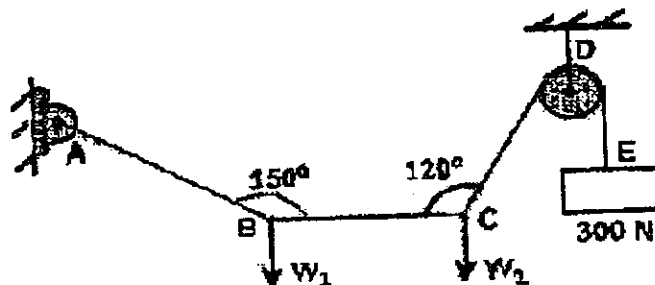
B.Tech. II Semester (Main/ Back) Examination, June/July - 2016
205 Engineering Mechanics

Time : 3 Hours**Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Describe force and State its application. Give a detailed classification of system of force. (6)
- b) A light string ABCDE whose extremity A is fixed, has weights W_1 and W_2 attached to it at B and C. It passes round a small smooth peg at D carrying a weight of 300 N at the free end E as shown in the Fig. (i) If in the equilibrium position, BC is horizontal and AB and CD make 150° and 120° with BC, find : (i) Tensions in the portions AB, BC and CD of the string and (ii) Magnitudes of weights W_1 and W_2 . (6+4)

**Fig. (i)****OR**

1. a) State and Prove Lami's Theorem. (8)

- b) Two beams AC and CD are hinged at C and are supported by rollers at A and D and a hinge support is provided at B as shown in Fig. (ii). Using principle of virtual work, determine the reactions at the hinge C and at support B, when a load of 600 N is acting at point E. (8)

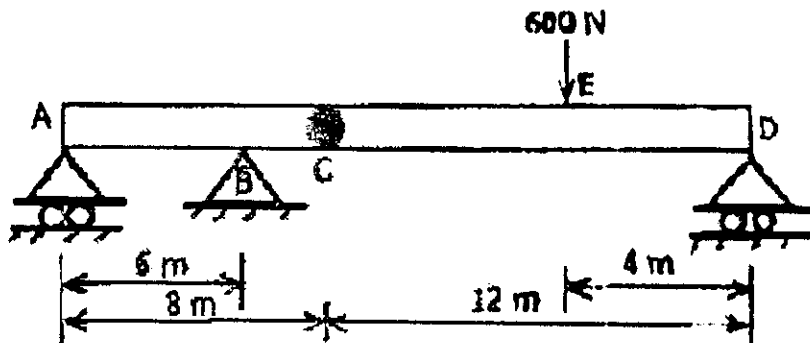


Fig. (ii)

Unit - II

2. a) State the law of machine. Derive an expression for the efficiency of a machine. (6)
- b) Find the moment of inertia about the horizontal and vertical axis (X-X and Y-Y) passing through the centroid of the section shown in Fig. (iii). (6+4)

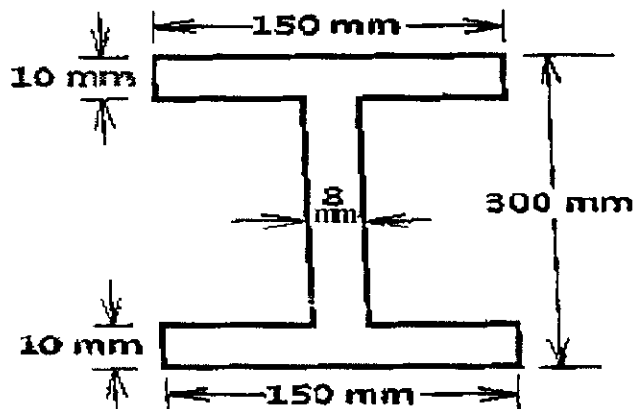


Fig. (iii)

OR

2. a) A machine lifts a load of 250 N by an effort of 160 N, at another instant the same machine lifts the load of 375 N by an effort of 175 N. If the velocity ratio of the machine is 20, determine :
- Law of machine,
 - Efficiency of the machine at 375 N &
 - Efforts lost in friction at 250 N load.

(2+2+2)

- b) A uniform lamina as shown in fig. (iv) consists of a rectangle, a semicircle and a triangle. Determine the centroid of the lamina. All dimensions are in mm. (10)

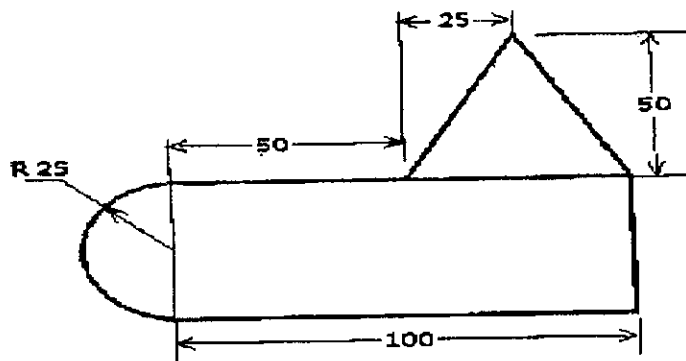


Fig. (iv)

Unit - III

3. a) Define angle of repose. Show that the angle of repose is equal to angle of static friction. (6)
- b) A uniform ladder 3 m long weighs 200 N. It is placed against a wall making an angle of 60° with the floor. The co-efficient of friction between the wall and the ladder is 0.25 and that between the ladder and the floor is 0.35. The ladder in addition to its own weight has to support a man of 1000 N at its top. Calculate :
- The horizontal force P to be applied to the ladder at the floor level to prevent slipping.
 - If the force P is not applied, what should be the minimum inclination of ladder with the horizontal, so that there is no slipping of it? (5+5)

OR

3. a) Derive an expression for the ratio of belt tensions on the tight side and slack side for a flat belt passing over a fixed pulley in terms of co - efficient of friction and angle of contact of belt over pulley. (8)
- b) A ladder of weight 390 N and 6 m long is placed against a vertical wall at an angle of 30° with wall. The co-efficient of friction between the ladder and the wall is 0.25 and that between ladder and floor is 0.38. Find how high a man of weight 1170 N can ascend, before the ladder begins to slip. (8)

Unit - IV

4. a) A stone is thrown vertically upwards with a velocity 20 m/s from the top of the tower of 25m height. Make calculations for the following parameters :
- The maximum height to which the stone will rise in its flight. (2+2+2)
 - Velocity of the stone during its downward travel at a point in the same level as the point of projection.
 - Time required for the stone to reach the ground.

- b) What is Projectile motion? Derive the expression for the horizontal range, maximum height and time of flight. (4+3+3)

OR

4. a) Two guns are pointed at each other, one upwards at an angle of 30° and the other at the same angle of depression. The muzzles of the guns are 40 m apart. If the guns are shot with velocities of 350 m/s upwards and 300 m/s downwards respectively, determine when and where the shots will meet. (8)
- b) A particle moves along horizontal direction and its position at any instant is prescribed by the relation $X = 3t^3 - 5t^2$, where X is in m and t is in seconds, determine : (2+2+2+2)
- Displacement during $t = 2$ sec. to 5 sec.
 - Average velocity during $t = 2$ sec. to 5 sec. and instantaneous velocity at $t = 2$ sec.
 - Average acceleration during $t = 2$ sec. to 5 sec. and instantaneous acceleration at $t = 5$ sec.
 - Distance travelled in first 5 sec.

Unit - V

5. a) Explain the principle of work and energy and derive an expression for the same. (8)
- b) A pile hammer of 250 kg mass is made to fall freely on a pile from a height of 6 m. If the hammer comes to rest in 0.012 sec, determine (i) the change in momentum, (ii) impulse and (iii) average force. (3+2+3)

OR

5. a) State impulse momentum relation. A shell of mass 60 kg is fired horizontally with a velocity of 250 m/s by a gun of 3000 kg mass. Make calculations for :
- The velocity with which the gun recoils, (2+2+2+2)
 - The uniform force required to stop the gun in 0.5 m distance, and
 - The time required to stop the gun. It may be presumed that momentum of the system comprising the gun and the shell is conserved.
- b) From what height, must a heavy elastic ball be dropped on a floor, so that after rebounding thrice it will reach a height of 9 meters? Take $e = (0.5)^{1/3}$. (8)

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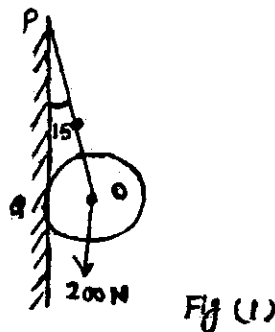
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2E1012**2E1012****B.Tech. I Year II Semester (Old Back) 2007 - 08 & 2008 - 09 Batch****Examination, June/July - 2016****Common to all Branches of Engg.****204 (O) Engineering Mechanics****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 24****Instructions to Candidates:**

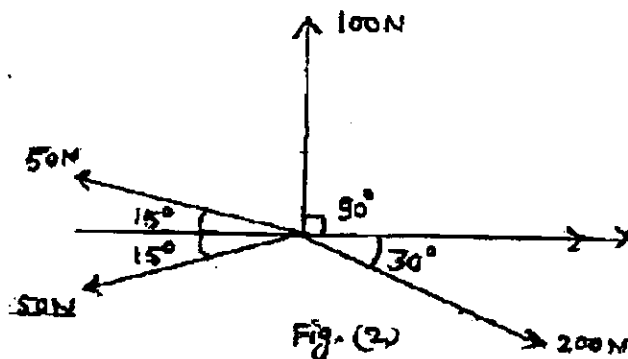
Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Define equilibrium. State the conditions of equilibrium. (4)
- b) A body of weight 200 N is tied to a wall through a string as shown in fig. (1). Find the tension in the string and reaction of wall on the body. (4)

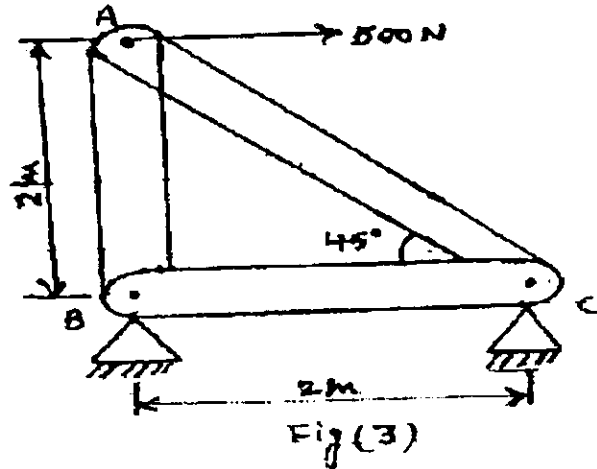


- c) Determine the resultant of the coplanar system of Con-Current forces as shown in fig. (2) (8)



OR

1. a) Differentiate between perfect, imperfect and redundant truss. (6)
- b) Using the method of joints determine the force in each member of the truss as shown in fig (3) and indicate whether the members are in tension or compression. (10)

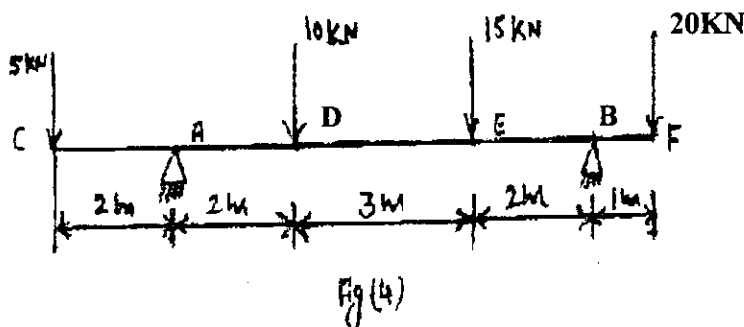


Unit - II

2. a) What do you mean by the coulomb's law of friction. (4)
- b) Define cone of friction. (4)
- c) Derive the relation $\frac{T_1}{T_2} = e^{\mu\theta}$ for flat belt friction. (8)

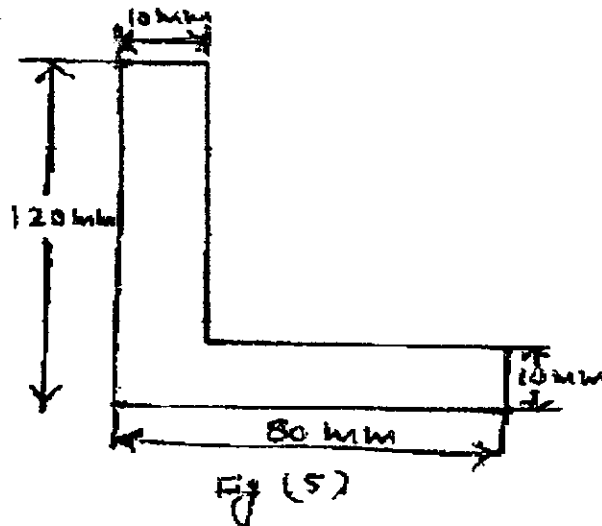
OR

2. a) Define the principle of virtual work. (6)
- b) Determine the reactions of a double overhang beams as loaded as shown in fig (4) by applying principle of virtual work. (10)



Unit - III

3. a) What is the difference between centre of gravity and centroid. (4)
- b) Determine the moment of inertia of the L - Section shown in fig. (5) about its centroidal axis parallel to the faces. Also find out the polar moment of inertia. (12)



OR

3. a) Obtain the expression for velocity ratio for the third system of pulleys with the help of diagram weight of pulleys are neglected. (8)
- b) A lifting machine uses an effort of 200 N to raise a load of 7500 N successfully. What is its mechanical advantages? Find the velocity ratio if the efficiency at this load is 62%. If a load of 13,000 N is raised by an effort of 300 N with the same machine. determine.
- The law of machine
 - Maximum efficiency
 - Maximum mechanical advantage. (8)

Unit - IV

4. a) A particle starting from rest moves along a straight line with a variable acceleration 'a' which depends on time 't' as $a = \left(4 - \frac{t^2}{g}\right) \text{ m/sec}^2$ Find (i) the velocity of particle at $t = 3 \text{ sec.}$ and (ii) distance traversed in 3 seconds (8)
- b) A ball is thrown vertically upward with a velocity of 24.5 m/sec. from the top of a tower 29.4 m high. Find the total time taken by the stone to reach the foot of the tower. (8)

OR

4. a) A shot is fired into space with a velocity of 50 m/sec. at an elevation of 60° . Determine.
- Maximum height attained
 - Time of flight
 - Horizontal Range (6)
- b) State D'Alembert's principle. (2)
- c) A light cord passing over a frictionless pulley has masses 10 kg and 20 kg. suspended from its ends Find :
- The tension in the cord
 - velocities of the two bodies at 3 seconds after starting from rest.
 - Distance moved in 3 seconds. (2+3+3=8)

Unit - V

5. a) Explain work - energy theorem. (4)
- b) A ball of mass 0.2 kg is moving in air with a velocity of 10 m/sec. A player brings it to rest in 0.5 sec. Determine the impulse and the force applied on the ball. (6)
- c) A body is displaced from point A (2m, 4m, -6m) to point B (6m, -4m, 4m) under a constant force $\vec{F} = (2\hat{i} + 3\hat{j} + 4\hat{k})N$. Find the work done. (6)

OR

5. a) Explain damped and undamped vibration with suitable examples. (8)
- b) Obtain the expression for frequency of free longitudinal vibration by equilibrium method. (8)

2E2006	Roll No. _____	[Total No. of Pages : 2]
	2E2006	
	B.Tech. II Semester (Main/ Back) Examination, June/July - 2016 Common to All Branch 206 Fundamentals of Computer Programming	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Discuss Enumerated data type with the help of suitable code of 'C' language. (10)
- b) Arrange following operators in order of precedence and associativity rules of 'C'. +, %, <, /, *, =, !, ++, () (6)

OR

1. a) Write a program in 'C' to read characters one by one and display it back. (8)
- b) Discuss various storage classes available in 'C' with the help of suitable example. (8)

Unit - II

2. Write a 'C' program to Input and display data in following structure.

Roll - No

Student - name

Date - of - birth

Course

Semester

(16)

OR

2. a) Write a 'C' program to multiply two Arrays of dimension $[3 \times 4]$ and $[4 \times 2]$ (10)
 b) Write short note on command line Arguments with suitable example (6)

Unit - III

3. a) Write a 'C' program to allocate memory dynamically to an Integer Array. (10)
 b) Discuss predefined functions available in 'C' for file processing and handling (6)

OR

3. Write a program in 'C' to read contents from a file and display them in upper case. (16)

Unit - IV

4. a) Contrast between parameter passing in a function, 'By value' and 'By Reference'. (8)
 b) How can you pass Entire Array as function Argument. Explain by Example. (8)

OR

4. a) How Array of Instances of a structure can be created and displayed. Explain by suitable example. (12)
 b) Discuss void pointer and its utility in brief. (4)

Unit - V

5. Write short notes on following :
 a) Types of primary memory
 b) High level v/s Assembly level programming
 c) Notations of Flow chart
 d) Primary memory v/s secondary memory. (4×4)

OR

5. Convert following :
 a) $(651.24)_8 = (?)_2$
 b) $(10110001101)_2 = (?)_{10}$
 c) $(9896)_{10} = (?)_{16}$
 d) $(5676)_{10} = (?)_8$ (4×4)