

DEPARTMENT OF MATHEMATICS
 UNIVERSITY COLLEGE OF ENGINEERING (A) – O.U., HYD - 7
 B.E. (All Branches) SEMESTER-I, I-CLASS TEST
MATHEMATICS – I

TIME: 1 hour

Max.Marks: 20
 $4 \times 2 = 8$

PART – A

Answer ALL questions

1. Test the convergence of the series $\sum_{n=1}^{\infty} \left(1 - n \sin \frac{1}{n}\right) \frac{1}{n^4}$.

2. Test the convergence of the series $\sum_{n=1}^{\infty} \frac{2^{n+1} + 1}{2^n - 3}$.

3. Find the radius of curvature of the curve $y^2 = 4ax$ at $P(at^2, 2at)$.

4. Find the envelope of the family of curves $\frac{a^2}{x} \cos \theta - \frac{b^2}{y} \sin \theta = c$ and θ being the parameter.

PART - B
 Answer any THREE questions

3 × 4 = 12

5. Test the convergence of the series $\frac{1}{2\sqrt{1}} + \frac{x^2}{3\sqrt{2}} + \frac{x^4}{4\sqrt{3}} + \frac{x^6}{5\sqrt{4}} + \dots$

6. a) Test the convergence of the series $\sum_{n=1}^{\infty} \frac{(-1)^n \cdot n}{n^2 + 1}$.

b) Let $a_n > 0 \quad \forall n \geq 1$ and $\sum_{n=1}^{\infty} a_n$ is convergent then determine the nature of the series

$$\sum_{n=1}^{\infty} \frac{\sqrt{a_n}}{n}.$$

7. a) Find 'c' of the Cauchy's mean value theorem on $[a, b]$ for the functions

$$f(x) = e^x, g(x) = e^{-x}.$$

b) Find the coefficient of $\left(x - \frac{\pi}{4}\right)^2$ in Taylor series expansion of $f(x) = \sin x$

around $x = \frac{\pi}{4}$.

8. Find the asymptotes of $y^3 + x^3 + y^2 + x^2 - x + 1 = 0$.

* * * * *

$$K = \frac{4}{(1+y^2)^{3/2}}$$

DEPARTMENT OF PHYSICS

University College of Engineering (A), O.U.

B.E.1/4, I-Semester, Class Test-I: 2017-18

Subject: Engineering Physics-I (All branches)

Time: 1 Hr.

Max. Marks: 20

Part-A

Note: Answer all the questions. Each one carries '2' marks.

$$4 \times 2 = 8$$

1. Distinguish between Fresnel's and Fraunhofer's diffraction.
2. How many orders will be visible if the wavelength of the incident light is 5000 \AA and the number of lines on the grating is 2620 in one inch.
3. Define (i) Malus law and (ii) Double refraction.
4. If the refractive indices of ordinary and extra-ordinary rays in mica are 1.586 and 1.592, calculate the thickness of a mica sheet required for making a half wave plate for $\lambda = 5460 \text{ \AA}$.

Part-B

Note: Answer any '3' questions from the following. Each one carries '4' marks.

$$3 \times 4 = 12$$

1. Discuss the theory of interference in thin films due to reflected light.
2. Explain the formation of Newton's rings and show that the diameter of dark rings is proportional to under root of natural numbers.
3. Describe the theory of Fraunhofer's diffraction at double slit and obtain expression for the intensity.
4. Describe the construction and working of a Nicol's prism with the help of neat diagram.

**DEPARTMENT OF ENGLISH
UNIVERSITY COLLEGE OF ENGINEERING
OSMANIA UNIVERSITY**

CLASS TEST-I (SEPT 2017)

Max. Marks: 20

Time: 1 hour

Note: Answer all the questions in the same order as they appear in the question paper

Section A

I. Fill in the blanks with the right verb forms.

(½ x 6 = 3)

1. It _____ (rain) since last night, and it _____ (look) as if it may rain for the rest of the day.
2. When I _____ (study) he _____ (play).
3. The train _____ (left) the station, by the time I _____ (reach).

II. Choose the correct verb form.

(½ x 4 = 2)

1. Annesha and her brothers (is, are) at school.
2. Either my mother or my father (is, are) coming to the meeting.
3. One of my sisters (is, are) going on a trip to France.
4. (Is, Are) the tweezers in this drawer?

III. State whether the following statements TRUE/FALSE.

(¼ x 4 = 1)

1. American linguist C F Lockit defined features of communication.
2. Human languages have two fundamental structures namely, the structure of sound and the structure of grammar.
3. Communication is derived from a Greek word which means to share.
4. Satya Nadella had put in 22 years of experience at the time of taking over as a CEO of Microsoft.

IV. Write short notes on the following.

(1 x 2 = 2)

1. Importance of listening.
2. Write any two tips on listening.

Section - B

Answer any three of the following questions in about 150 words each.

(4 x 3 = 12)

- 1) Explain the features of Human Communication.
- 2) Who does Kalam owe his creativity? Why?
- 3) Write an essay on Satya Nadella.
- 4) Explain role and importance of communication with your own examples and also diagrammatically represent the process of communication.

DEPARTMENT OF CHEMISTRY
UNIVERSITY COLLEGE OF ENGINEERING (A)
B.E I/IV- I-SEMESTER CLASS TEST -I (2017)
(FOR ALL BRANCHES)
ENGINEERING CHEMISTRY-I

Time: 1hr

Part-A (Marks: 6)

Marks: 20

Note: Answer All Questions

- | | |
|---|-----------|
| 1. Define the terms System and Surroundings. Explain. | 1M |
| 2. Explain the terms Phase and Components in Phase Rule equation. | 1M |
| 3. Calculate the work done in isothermal reversible expansion of two moles of an ideal gas from a pressure of 1atm to 0.1atm at 20°C. | 2M |
| 4. Calculate the number of degrees of freedom at Triple point and Eutectic point. | 2M |

Part-B (Marks: 14)

Note: Answer any two of the following

- | | |
|---|-----------|
| 5. a).State and explain First law of thermodynamics. Give its limitations. | 4M |
| b).Calculate the efficiency of heat engine working between 10°C and 100°C.If the heat absorbed is 500J, calculate the work done. | 3M |
| 6. a).What is Gibb's Phase Rule? Explain the phase diagram of water system by using it. | 4M |
| b).Draw the well labelled phase diagram of Pb-Ag system and explain it's application in desilverization of lead. | 3M |
| 7. a).What is entropy? Explain the entropy Change in reversible and irreversible processes? | 4M |
| b) What are safety fuses and solders? Give their applications. | 3M |

DEPARTMENT OF CIVIL ENGINEERING
University College of Engineering, Osmania University, Hyderabad
B. E (I-Semester Civil EEE & CSE) 2017-2018
Sub: ENGINEERING MECHANICS-I (CLASS TEST-I)

DATE-13-09-2017

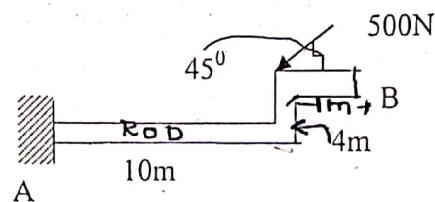
MARKS-20

PART-A

Answer all the Questions-

3X2=6m

- What is the difference between a resultant force and equilibration force
- Find the magnitude of two forces if they act at right angle their resultant is 10N but if they act at an angle of 60° their resultant is 13N.
- Compute the moment of force given in figure about point A & B

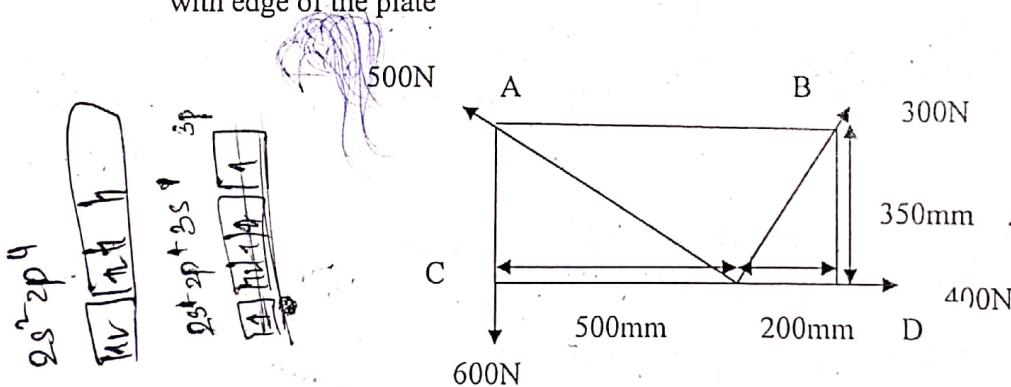


PART-B

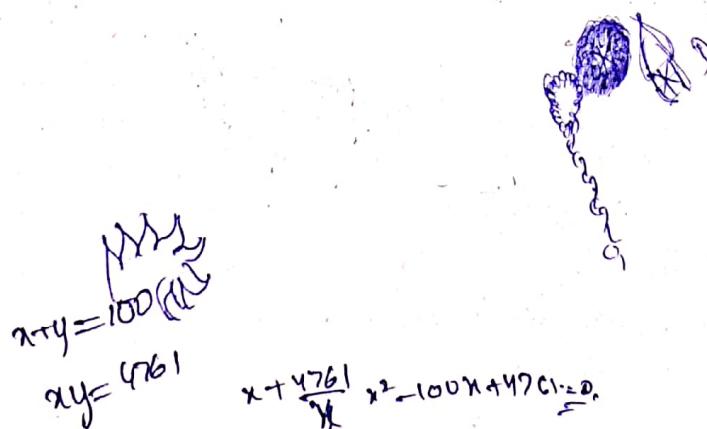
Answer any two questions

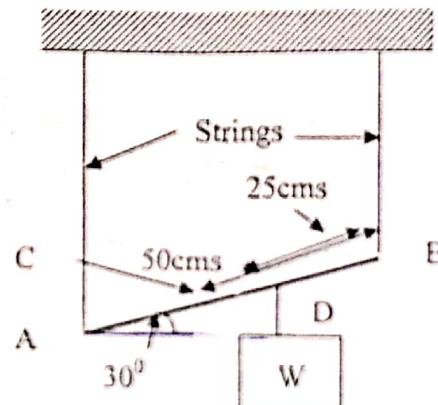
2X7=14m

- A) Four force act on 700mm x 350mm plate as shown in the figure A) find resultant of these forces B) locate the two points where the line of action of resultant of two forces coincides with edge of the plate



- B) A uniform meter rod of rigid mass of 0.5kgs is suspended from one of its end in an inclined position as shown in figure a mass of 1kg is suspended from point D. Determine the tension in each string where should the mass be placed so that the tension in both the strings is equal

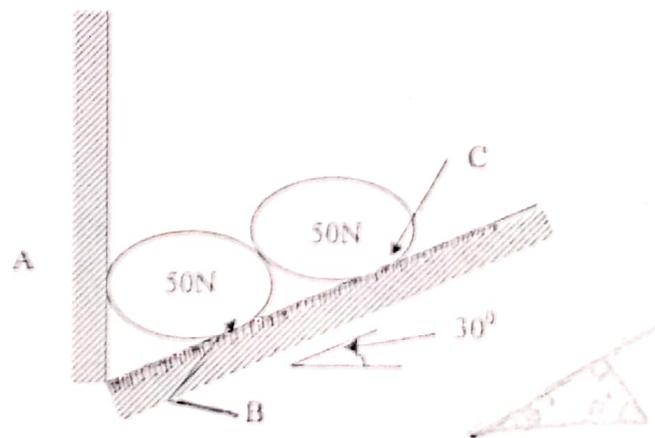




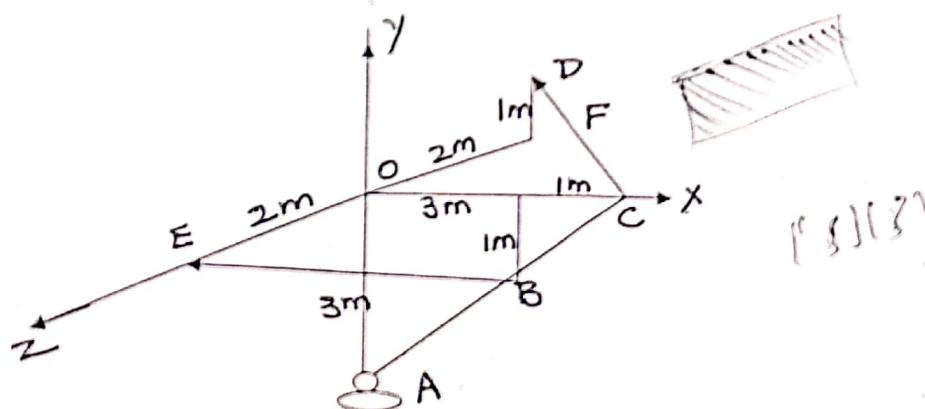
$$\begin{aligned}AC &= 50 \text{ cms} \\CB &= 50 \text{ cm} \\DB &= 25 \text{ cm} \\W \text{ is at } D\end{aligned}$$

2) A) Define the principle of Transmissibility (2m)

B) Two identical rollers are supported by inclined plane and smooth vertical wall as shown in figure. Determine the reaction at points of supports A, B and C



3) Compute the magnitude of force F acting from B to E which will cause a moment of 150kN-m about axis directed from C to D



University College of Engineering(A), O. U, Hyderabad-07.
Common to Dept. of CSE & MECH

Internal Examination - I

Date: 13/09/2017

Subject: Computer Programming and problem solving

Total Marks: 20m

Part-A
Answer all

(3x2=6m)

- 1) Pick the incorrect type declarations from the following list. Explain why they are incorrect.
 - a. float, servo, mass, iota;
 - b. int servo, digit, count;
 - c. int,rs,ps, unsigned;
 - d. float real, root, big;
- 2) Write the final value of k in the following program:
int k=5, i=3, j=252, m;
m= i*1000 + j*10;
k= m/1000 + k;
k=m % k++;
- 3) Convert (242)₁₀ to its octal equivalent.

Part-B
Answer any two

(2x7=14m)

- 1) Write a program to reverse a given number. (7m)
- 2) Explain the types of constants in C language. (7m)
- 3) a) Explain the structure of C program. (3 ½ m)
b) Discuss about flow charts in detail. (3 ½ m)

DEPARTMENT OF MATHEMATICS
 UNIVERSITY COLLEGE OF ENGINEERING (A) – O.U., HYD - 7
 B.E. (All Branches) SEMESTER-I, CLASS TEST – II
MATHEMATICS – I

TIME: 1 Hour**Max.Marks: 20**
 $4 \times 2 = 8$

PART – A
 Answer ALL questions

1. If $u = \frac{y}{x} + \frac{z}{x}$ then evaluate $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z}$.
2. If $u = x + y + z$, $uv = y + z$, $uvw = z$, then evaluate $\frac{\partial(x, y, z)}{\partial(u, v, w)}$.
3. Evaluate $\iint xy(x^2 + y^2)^{\frac{3}{2}} dx dy$ over the positive quadrant of the circle $x^2 + y^2 = 1$.
4. If \vec{a} is a constant vector and $\vec{r} = xi + yj + zk$ then evaluate (i) $\operatorname{div}(\vec{a} \times \vec{r})$
 (ii) $\operatorname{curl}(\vec{a} \times \vec{r})$.

 $3 \times 4 = 12$

PART - B
 Answer any THREE questions

5. Evaluate $\int_0^a \int_0^a \frac{y^2 dy dx}{\sqrt{y^4 - a^2 x^2}}$ by changing the order of integration.
6. Evaluate $\iiint (x + y + z) dx dy dz$ over the tetrahedron bounded by the planes $x = 0$, $y = 0$, $z = 0$ and $x + y + z = 1$.
7. (i) Examine $f(x, y) = x^2 - xy + y^2 + 3x - 2y + 1$ for extreme values.
 (ii) Find the minimum value of $ax + by + cz$ subject to the condition $\frac{a^2}{x} + \frac{b^2}{y} + \frac{c^2}{z} = 1$.
8. (i) Show that $\lim_{(x,y) \rightarrow (0,0)} \frac{x^2 y}{x^4 + y^2}$ does not exist.
 (ii) Find the directional derivative of $f = xy + yz + zx$ in the direction of the vector $i + 2j + 2k$ at P(1, 2, 0).

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DEPARTMENT OF PHYSICS
University College of Engineering (A), O.U.
B.E.1/4, I-Semester, Class Test-I: 2017-18
Subject: Engineering Physics-I (All branches)

Time: 1 Hr.

Max. Marks: 20

Part-A

Note: Answer all the questions. Each one carries '2' marks.

$$4 \times 2 = 8$$

1. Write short note on a optical fibre.
2. Write any four applications of LASER.
3. Calculate the fundamental frequency of vibration when a quartz crystal of 0.55Cm thickness is vibrating at resonance. [Given that Young's modulus of quartz is $8.0 \times 10^{10} \text{ Nm}^{-2}$ and Density is $2.65 \times 10^3 \text{ kg/m}^3$]
4. Derive relation between Thermodynamic Probability and Entropy.

Part-B

Note: Answer any '3' questions from the following. Each one carries '4' marks.

$$3 \times 4 = 12$$

1. Deduce the relation between Einstein's coefficients.
2. Define Acceptance angle and derive an equation for Numerical aperture.
3. What are ultrasonic waves? Describe the method of measuring the velocity of ultrasonic waves in liquids.
4. Obtain an expression for Maxwell-Boltzman's distribution function.

(P.T.O for QUIZ Question Paper)

DEPARTMENT OF PHYSICS
University College of Engineering (A), O.U.
B.E.1/4, I-Semester: 2017-18
Subject: Engineering Physics-I: Quiz (All branches)
Time: 10 min. Max. Marks: 5

Note: Answer all the questions in Your Answer Script. Each Question carries '1/2' mark.

$$10 \times 1/2 = 5$$

1. The word 'SONAR' represents
.....
2. Light travelling in a graded index fiber follows
 - a) Helical path
 - b) Circular path
 - c) Zig zag path
 - d) Straight line path
3. Laurent's polarimeter uses
 - a) half shade device
 - b) Quartz plate
 - c) Quarter plate
 - d) Bi quartz plate
4. are activator Ions in a Ruby laser.
5. Ultrasonic waves don't show
 - a) Reflection
 - b) Refraction
 - c) Absorption
 - d) Polarisation
6. Optical fiber communication is based on the phenomenon of
7. What is the relation between frequency and Einstein's coefficients
8. Relation between Entropy and Thermo dynamical Probability
9. Energy of a Photon in terms of frequency
10. Units of Specific Rotation -----

UNIVERSITY COLLEGE OF ENGINEERING (A)
DEPARTMENT OF CHEMISTRY

B.E I/IV- I-Semester Class Test -II-2017
(ALL BRANCHES)
Engineering Chemistry-I

Time: 1hr

Part-A (Marks: 6)

Marks: 20

Note: Answer All Questions

- 1) What are scales and sludges? (1)
- 2) Distinguish between thermoplastic and thermosetting polymers. (2)
- 3) Calculate the total hardness of water sample which contains 1.46 mg of $Mg(HCO_3)_2$, 4.75mg of $MgCl_2$ and 13.6 mgs of $CaSO_4$. (2)
- 4) Define co-polymer. Give an example. (1)

Part-B (Marks: 14)

Note : Answer any two of the following

- 1) a) What is alkalinity of water? How is it determined experimentally? (3)
b) 50ml of standard hard water containing 1gm. of $CaCO_3/L$ consumed 2.5 ml. of EDTA. 50 ml of water sample consumed 15 ml of same EDTA. After boiling 50 ml. of the same water sample required 10ml. of EDTA. Calculate temporary, permanent and total hardness of water. (4)
- 2) a) Give preparation, properties and applications of i) Bakelite ii) Nylon6,6. (4)
b) What are conducting polymers? Give their applications. (3)
- 3) a) What is vulcanization of rubber? What are its advantages? (3)
b) Describe the principle and method of softening of hard water by ion-exchange method. (4)

(P.T.O)

Department of Chemistry
University College of Engineering (A)
Osmania University
Hyderabad

Engineering Chemistry –I (I semester) Quiz questions

Total Marks: 5

1. Solubility of CaSO_4 in water -----with rise of temperature.
 2. Disinfection of Ozone is due to liberation of-----
 3. Priming and foaming in boilers produce _____ steam.
 4. On addition of chlorine to water _____ acid is produced which is powerful germicide .
 5. Natural rubber is a basically a polymer of _____
 - 6.----- method causes the flow of solvent from lower concentration to higher concentration through semi permeable membrane.
 7. Butyl rubber is produced by co-polymerization of-----
 8. _____ and _____ are the monomeric units of Kevlar.
 9. $\text{Al}_2(\text{SO}_4)_3$ alum produce _____ as flocculant precipitates during softening of water.
 10. _____ is a conducting polymer.
-

**DEPARTMENT OF ENGLISH
UNIVERSITY COLLEGE OF ENGINEERING
OSMANIA UNIVERSITY**

CLASS TEST- II (November 2017)

Time: 1 hour

Max. Marks: 20

Note: Answer all the questions in the same order as they appear in the question paper

Part A

I. Fill in the following blanks with but/ so/ and / because) $\frac{1}{2} \times 3 = 1\frac{1}{2}$

1. Taj Mahal is one the greatest most beautiful structures in the world.
2. You have only three days to visit the place you'll be very busy.
3. It's very cold in winter..... in summer the temperature goes up to 45c

II. Match the following with appropriate question tags $\frac{1}{2} \times 3 = 1\frac{1}{2}$

- | | |
|---|------------------|
| 1. You don't like programmes about politics | a. isn't he? () |
| 2. We haven't seen this programme before | b. have we? () |
| 3. Shahrukh Khan is a good actor | c. do you? () |

III. Write the degrees of comparison for the following words $\frac{1}{2} \times 2 = 1$

- | | | |
|--------------|-------|-------|
| 1. Tough | | |
| 2. Beautiful | | |
| 3. Cute | | |
| 4. Little | | |

VI. For each word given in capital letters choose the best antonym $\frac{1}{2} \times 2 = 1$

- | | | | |
|----------------|---------------|-----------|-----------|
| 1. Cordial | | | |
| a. warm | b. unfriendly | c. modest | d. jovial |
| 2. Conciseness | | | |
| a. brevity | b. long | c. wide | d. high |

V. For each word given in capital letters choose the best synonym. $\frac{1}{2} \times 2 = 1$

- | | | | |
|---------------|-----------|-------------|-----------|
| 1. Timid | | | |
| a. courageous | b. coward | c. lenient | d. deny |
| 2. Abundance | | | |
| a. least | b. less | c. scarcity | d. plenty |

VI. Choose the exact meaning of the idiomatic expressions/phrases $\frac{1}{2} \times 2 = 1$

1- Between the devil and the deep sea.

- a. A.to be in a dilemma
- b. B.to be in a temper
- c. C.to choose correctly
- d. D.to live dangerously

2- To cut the crackle.

- a. A.to stop talking and start
- b. B.to dig a well

- c. C.to annoy others
- d. easy to understand

$\frac{1}{2} \times 2 = 1$

VII. Punctuate the following.

1. Having washed her face she brushed her hair.
2. Frightened by the tremendous explosion the soldiers bolted to their dug-out.

$\frac{1}{2} \times 2 = 1$

VIII. Convert the following sentences into indirect speech.

John said, "I am going to church".

He said, "I have been reading a novel".

IX. Use the given root words in your own sentence and write the basic meaning and example word for it. $\frac{1}{2} \times 2 = 1$

- 1. anthrop
- 2. Morph

Part - B

I. Write a précis of the following passage to one-third of its length and also give a suitable title.

$1 \times 2 = 2$

Not until the nineteenth century did canning become a part of food preservation. Until then, foods were dried, salted, or smoked. In 1795, during the Napoleonic Wars, the French government offered a reward to the first person who could preserve food satisfactory for military use.

In 1809, M. Nicholas Appert won the 12,000 francs and earned recognition as the father of canning. Although he used glass bottles, sealed with cork and processed in a hot-water bath, he did not know why his process worked. Ultimately, Louis Pasteur determined why improperly processed foods spoil. Microorganisms found in the air, and on all objects, cause spoilage as soon as they come in contact with food. Only proper sterilization, found Pasteur, could kill these microorganisms.

Prior to 1850, the only sterilization method known to farm women called for canning—first in tin cans and later in glass jars, both of which had a groove around the top, into which a tin lid fit. Hot food, placed in hot cans or jars and topped with a hot lid, was sealed with hot sealing wax—a hard red wax, quite unlike today's paraffin. When dry, the brittle wax seal was broken only by pelting the wax with a blunt object, usually a knife handle. In 1858, John L. Mason invented a glass jar that could receive a screw-on zinc lid sealed by a rubber gasket. For the first time, home canning became easy, economical, and popular. By 1903, Alexander H. Kerr perfected the two-piece lid, a snap lid and a ring, still in use nearly 90 years later. Home canning literally snapped forth a new option for homemakers.

PART – C

Answer any two of the following questions in 150 words: $2 \times 4 = 8$

- 1) How is writing made clear with punctuation? Explain it with any five punctuation marks of your own.
- 2) Write in detail why Sachin Tendulkar is considered as the God of cricket?
- 3) Write a letter to your parents about your campus selection into your dream organization and your other benefits in the job.
- 4) As a student of BE write a report to the principal regarding poor infrastructure facilities that you are facing in the college besides your conclusion and suggestions.

CIVIL ENGINEERING DEPARTMENT
 UNIVERSITY COLLEGE OF ENGINEERING (A)
 OSMANIA UNIVERSITY :: HYDERABAD

B.E. 1/4(All Branches except ME) I-Semester, Class Test-II, Oct'2017

ENGINEERING MECHANICS-I

Time : 1 hr

Max. Marks: 20

Note: Answer Question No. 1 and any two questions from the remaining.

- 1 a) What are the basic assumptions for truss analysis? (1)
- b) Explain the differences between angle of friction and angle of repose. (2)
- c) The frictional force at the impending of motion is called _____. (1)
- d) A rope drum transmit power with pulley (diameter 1.25m; lap angle 180° ; grove angle 45° ; max. Tension 1200N; μ is 0.3). Find the torque on the pulley. (2)

- 2) A truss of span 5 m is loaded as shown in Figure 1. Find the reactions and forces in the members of the truss. (7)

- 3) Referring to Figure 2 given below, determine the least value of force P to cause motion to impend rightwards. Assume the coefficient of friction under the block to be 0.2 and pulley to be friction less. (7)

- 4 a) Prove that angle of friction is equal to angle made by an inclined plane with the horizontal when a solid body placed on inclined plane is about to slide. (3)
- b) Using the method of section determine the force in members AD and BD of the equilibrium truss. (Figure 3) (4)

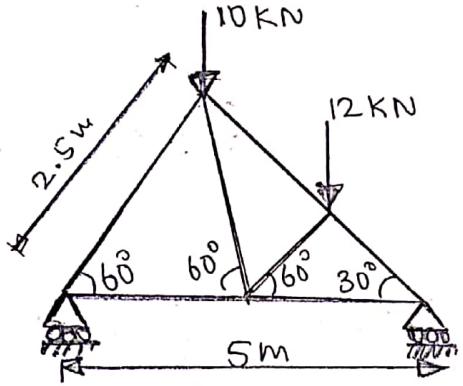


Figure 1

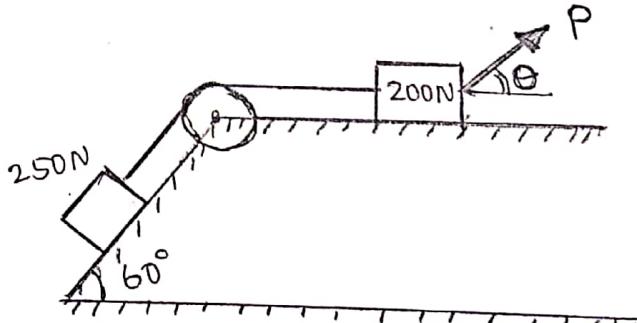


Figure 2

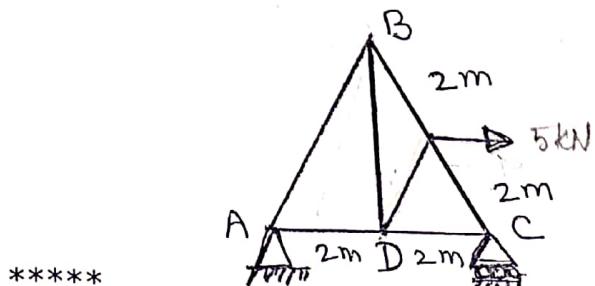


Figure 3

**Department of Computer Science & Engineering
University College of Engineering(A), O. U, Hyderabad-07.**

Internal Examination – II

**Class : B.E 1/4 I Sem
Subject : CPPS**

**Time : 1 hour
Max. Marks : 20**

PART - A
Answer ALL Questions (3 x 2 = 6 marks)

- 1) Define Recursion? Give an example for Fibonacci series.
- 2) What is the difference between header files <stdio.h> and “stdlib.h”?
- 3) What are the data types for which it is not possible to create an array?

PART - B
Answer any TWO Questions (2 x 7 = 14 marks)

- 1) a) Elaborate on how a function can return multiple values, with an example. (5)
b) Mention the storage classes. (2)
- 2) Write a program to find the transpose of a matrix. (7)
- 3) Write an algorithm for binary search with the help of an example. (7)

OSMANIA UNIVERSITY
FACULTY OF ENGINEERING
UNIVERSITY COLLEGE OF ENGINEERING (AUTONOMOUS)
B.E. (All Branches) I-Semester (Main) Examination

November/December 2017

MATHEMATICS-I

Time : 3 hours

Max. Marks : 70

- Note :**
- i) First Question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.
 - ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
 - iii) Missing data, if any, may suitably be assumed.
-

1. a) Determine the nature of the series $\sum_{n=1}^{\infty} \frac{3n+7}{6-5n}$. [2]
 - b) Verify Cauchy mean value theorem for the functions $f(x) = \log x, g(x) = \frac{1}{x}$ in $[1, e]$. [2]
 - c) Find the coefficient of x^3 in the expansion of $f(x) = e^x \cos x$ around $x = 0$. [2]
 - d) If $u = x^2 - y^2, x = 2r + 3s + 4, y = 3r - 2s + 5$ then find $\frac{\partial u}{\partial r}$. [2]
 - e) If $u = x \sin y, v = y \sin x$ then find $\frac{\partial(u, v)}{\partial(x, y)}$. [2]
 - f) Evaluate $\int_0^a \int_0^{\sqrt{a^2 - y^2}} (x^2 + y^2) dx dy$ by changing x, y into polar coordinates. [2]
 - g) If $f = x^2 + y^2 + z^2$ and $\vec{r} = xi + yj + zk$ then find $\operatorname{div}(f\vec{r})$. [2]
2. a) Discuss the nature of the series $\sum_{n=1}^{\infty} \frac{x^n}{3^n \cdot n^2}$ (where $x > 0$) [7]
 - b) State Leibnitz's test and using it determine the nature of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2 + 7}$. [7]
3. a) Find the circle of curvature of the curve $x^{\frac{1}{3}} + y^{\frac{1}{3}} = 1$ at $P\left(\frac{1}{8}, \frac{1}{8}\right)$. [7]
 - b) Find all asymptotes of the curve $x^3 - 2y^3 + 2x^2y - xy^2 + xy - y^2 + 1 = 0$. [7]
4. a) Find the maximum value of xyz subject to the condition $xy + 2yz + 2zx = 48$. [7]
 - b) Examine the function $f(x, y) = x^4 + y^4 - x^2 - y^2 + 1$ for maxima or minima. [7]

5. a) Using change of variable, evaluate $\iint_R (x+y)^2 dx dy$ where R is [7]
 the region bounded by the parallelogram
 $x+y=0, x+y=2, 3x-2y=0,$ and $3x-2y=3.$
- b) Evaluate $\iiint_v \frac{dx dy dz}{(x+y+z+1)^3}$ taken over the volume bounded by planes [7]
 $x=0, y=0, z=0$ and the plane $x+y+z=1.$
6. a) Show that the vector field $\vec{V} = 3x^2y^2z^4i + 2x^3yz^4j + 4x^3y^2z^3k$ is [7]
 irrotational and also find a scalar field $f(x, y, z)$ such that $\vec{V} = \nabla f.$
- b) Using Gauss divergence theorem, evaluate $\iint_S xdydz + ydzdx + zdxdy$ [7]
 where S is surface of the cube $0 \leq x \leq 1, 0 \leq y \leq 1, 0 \leq z \leq 1.$
7. a) State and prove Rolle's mean value theorem and discuss its applicability to [7]
 the function $f(x) = 1 + (x-3)^{\frac{2}{3}}$ on $[2, 4].$
- b) Evaluate $\int_{y=0}^1 \int_{x=4}^4 e^{x^2} dx dy$ by changing the order of integration. [7]

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OSMANIA UNIVERSITY
FACULTY OF ENGINEERING
UNIVERSITY COLLEGE OF ENGINEERING (AUTONOMOUS)
B.E. (ALL BRANCHES) I-Semester (Main) Examination

November/December 2017

ENGINEERING PHYSICS-I

Time : 3 hours

Max. Marks : 70

- Note :**
- i) First Question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.
 - ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
 - iii) Missing data, if any, may suitably be assumed.
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1. a) Why do radio waves diffract around buildings, although light waves do not? [2]
- b) List some of the applications of laser. [2]
- c) The cladding of a step-index fiber has a refractive index of 1.40. If numerical aperture of the fiber is 0.25, calculate the refractive index of the core material. [2]
- d) Define i) Micro canonical and ii) Grand canonical ensemble. [2]
- e) Calculate the de Broglie wavelength of an electron moving with velocity 10^7 m/s. [2]
- f) Mention some properties of photons. [2]
- g) In Newton's rings experiment, diameter of 10^{th} dark ring due to wavelength 6000\AA in air is 0.5cm. Find the radius of curvature of the lens. [2]
2. a) Describe Fresnel's biprism. Explain how the wavelength of light can be determined with its help. [7]
- b) Discuss the Fraunhofer diffraction at a single slit. Obtain the condition for principal maximum and minimum. [7]
3. a) Describe the construction and working of Laurent's half shade Polarimeter. [7]
- b) Explain the construction and working of He-Ne laser with the help of neat energy level diagram. [7]
4. a) Define Acceptance angle and derive an equation for Numerical aperture. [7]
- b) What are ultrasonic waves? Describe the method of measuring the velocity of ultrasonic waves in liquids. [7]
5. a) What are fermions? Obtain an expression for Fermi-Dirac distribution function. [7]

- b) Derive Wiens distribution law and Rayleigh-Jeans law from Planks law. [7]
6. a) Derive the time dependent Schrödinger's wave equation. [7]
- b) Explain the displacement current and Derive Maxwell's equations . [7]
7. a) Write a short note on construction of hologram. [7]
- b) Solve the Particle in a 1-D Box problem with Schrodinger equation. [7]

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OSMANIA UNIVERSITY
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UNIVERSITY COLLEGE OF ENGINEERING (AUTONOMOUS)
B.E. (All Branches) I-Semester (Main) Examination

November/December 2017

ENGINEERING MECHANICS-I

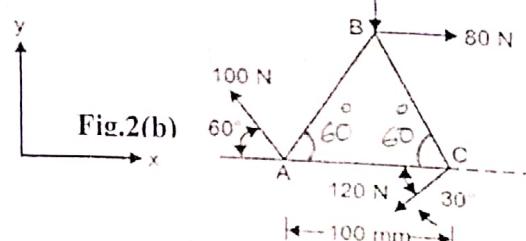
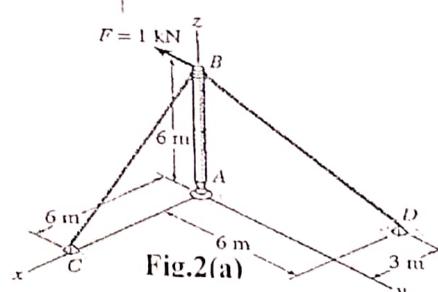
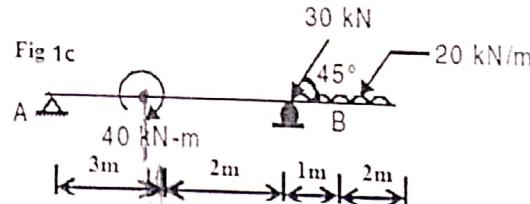
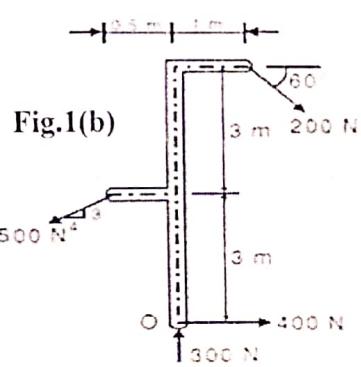
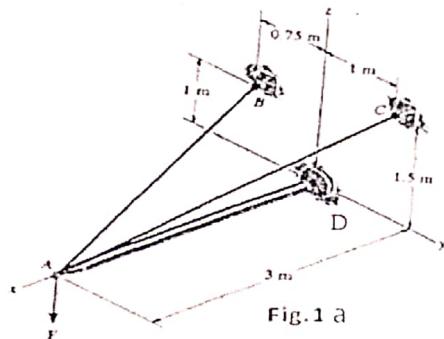
Time : 3 hours

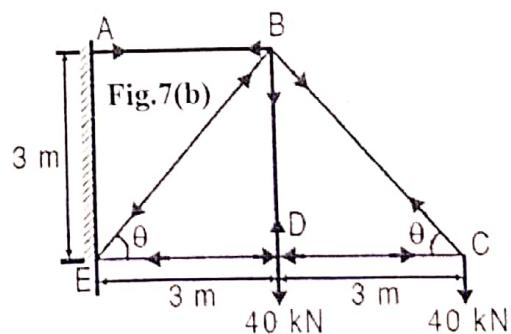
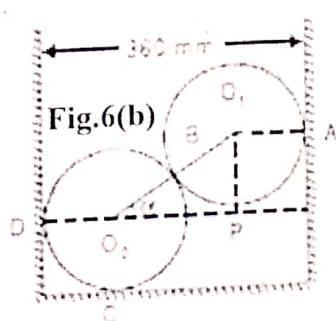
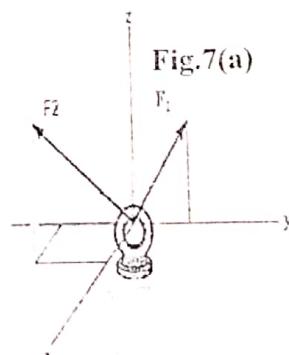
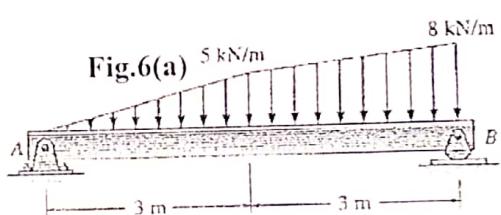
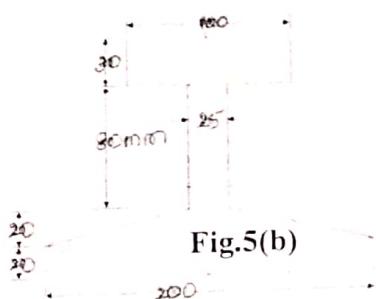
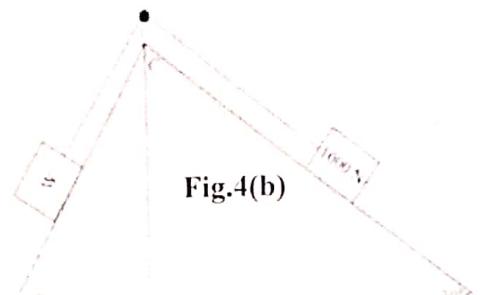
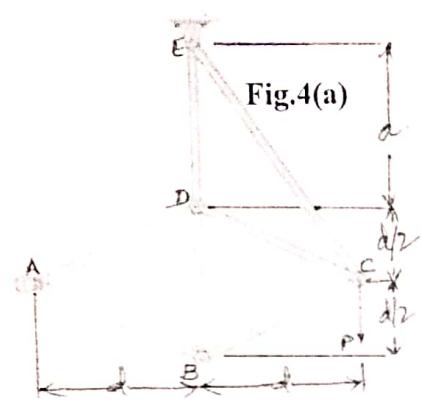
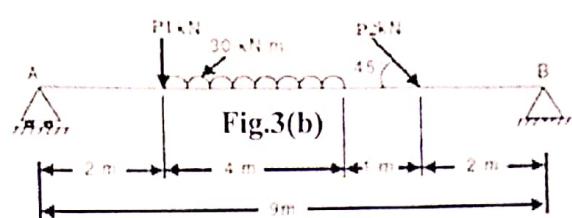
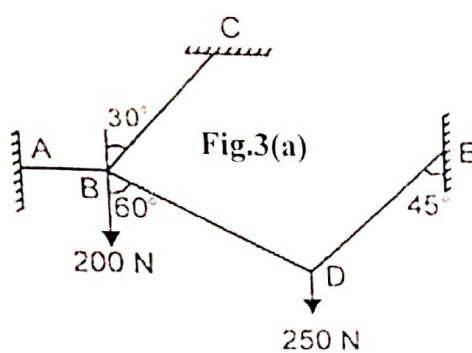
Max. Marks : 70

- Note :**
- i) First Question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.
 - ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
 - iii) Missing data, if any, may suitably be assumed.
-

1. a) For the force system shown in **Fig.1a**. Consider $F = \{60i + 12j - 40k\}N$ and [2]
Compute the magnitude of force component along direction AB.
 - b) Compute the magnitude of force component along the direction AC for the [2]
Fig.1a. Consider $F = \{60i + 12j - 40k\}N$.
 - c) State the assumptions made in the analysis of trusses. [2]
 - d) Consider the structure shown in **Fig.1 b** determine the magnitude of [2]
resultant force.
 - e) Compute the direction of resultant force with horizontal axis for the [1]
problem shown in **Fig.1b**.
 - f) State the laws of friction. [2]
 - g) Determine the support reactions at A for the beam shown in **Fig.1c**. [2]
 - h) Define Pappn's Theorem-I. [1]
2. a) A mast AB is supported by cables BC and BD and acted upon by external [8]
forces as shown in **Fig.2(a)**. Determine tension in cables BC, BD and
reactions at the Ball and Socket joint A.
 - b) Determine the resultant of system of forces acting on the triangular lamina [6]
shown in **Fig.2(b)**. Also provide the location where the resultant intersects
x axis.
3. a) A system of connected flexible cables is acted by vertical forces at point B [8]
and D as shown in **Fig.3(a)**. Determine the forces in the segments
AB,BC,BD and DE.
 - b) Find the reactions at the supports of a beam loaded as shown in **Fig.3(b)**. [6]
Consider $P1=P2=30kN$.

4. a) Determine the forces in the members AD, BD, CD, DE and CE of the truss shown in Fig.4a, Given external force $P=100$ kN .Also state the nature of forces in the members. Consider $d = 3\text{m}$. [5]
- b) A 1kN load rests on the inclined plane BC and is tied by a rope passing over a frictionless pulley to a block of weight 'W' N, resting on the plane AC as depicted in the Fig.4(b). If the coefficient of friction between the load and the plane BC is 0.28 and that between the block and the plane AC is 0.20, find the least value of 'W' to ensure equilibrium of the system. [9]
5. a) State the difference between Moment & Couple. Also explain Varignons theorem of moments. [5]
- b) Determine the moment of inertia about centroidal x-x axis for the section shown in Fig. 5b. [9]
6. a) Determine the support reactions for the beam AB shown in Fig.6(a) [6]
- b) Two smooth spheres each of radius 100 mm and weight 100 N, rest in a horizontal channel having vertical walls, the distance between vertical walls is 360 mm as shown in Fig. 6b. Find the reactions at the points of contacts A, B, C and D. [8]
7. a) Given $F_1=\{60j + 80k\}$ and $F_2 = \{50i -100j +100k\}$ for the structure shown in Fig.7(a). Determine the magnitude and direction cosines of the resultant force. [6]
- b) Find the forces in all the members of the truss shown in Fig.7(b). [8]





OSMANIA UNIVERSITY
FACULTY OF ENGINEERING
UNIVERSITY COLLEGE OF ENGINEERING (AUTONOMOUS)
B.E. (ALL BRANCHES) I-Semester (Main) Examination

November/December 2017

ENGINEERING CHEMISTRY-I

Time : 3 hours

Max. Marks: 70

- Note :**
- i) First Question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.
 - ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
 - iii) Missing data, if any, may suitably be assumed.
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1. a) What is 1 law of thermodynamics? What are its limitations? [3]
 b) What are safety fuses and solders? Give examples [2]
 c) A sample of water was analysed as given below: Mg (HCO₃)₂ = 7.3 mg/L, Ca (HCO₃)₂ = 16.2 mg/L MgCl₂ = 9.5 mg/L, CaSO₄ = 13.6 mg/L. Calculate the temporary and permanent hardness of water. [3]
 d) What are homo and co-polymers? Give examples. [2]
 e) Define Thermal spalling and Refractoriness under load (RUL). [2]
 f) What is alkalinity? Mention the cause of alkalinity. [2]
2. a) What is Carnot Cycle? Derive an expression for efficiency of heat engine [9]
 b) Derive the expressions for variation of free energy with temperature and pressure. [5]
3. a) State phase rule. Explain the phase diagram of Lead-Silver with a neat diagram [8]
 b) What is Triple point and Eutectic point? [6]
4. a) How do you determine hardness of water by EDTA method? Explain. [8]
 b) What is hardness? What are its types? What are the units of harness? [6]
5. a) What are polyesters and polyamides? Give examples? Write Preparation, applications of PVC. [8]
 b) What are conducting polymers? Write conduction mechanism in polyaniline . [6]
6. a) What are Refractories? How do you Determine RUL? [5]
 b) (i) Explain Boundary film and Extreme pressure lubrication. [9]
 (ii) What is viscosity index? Mention its significance.

7. a) Derive an expression for work done in reversible adiabatic expansion of an ideal gas? [6]
- b) (i) Explain reverse osmosis method for softening of water [8]
(ii) What Homo chain and Hetero chain polymers? Give examples.

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OSMANIA UNIVERSITY
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UNIVERSITY COLLEGE OF ENGINEERING AUTONOMOUS
B.E. (All Branches) I-Semester (Main) Examinations
November/December 2017

ENGINEERING ENGLISH**Time : 3 hours****Max. Marks : 70**

- Note :**
- i) First Question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.
 - ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
 - iii) Missing data, if any, may suitably be assumed.
-

1. a) Write the difference between one-way and two-way communication with two examples each. [2]
- b) Rewrite the following sentences after making the required changes. [3]
 - i) The human beings are polluting the environment.
 - ii) In a corner of the room, stood a wooden large cupboard.
 - iii) One of the girls have qualified in the entrance test.
- c) Write a paragraph in about 100 words on 'students' role in building the nation'. [3]
- d) Write one-word substitutes for the following: [3]
 - i) Doing something without being asked.
 - ii) Not affected or embarrassed by people's disapproval.
 - iii) One who believes in peace and refuses to fight in a war.
- e) When did Azim Premji return to India and why? [3]
2. What are the types of listening? Explain each type of listening and also list out the tips for effective listening. [14]
3. Describe tense and aspect with two examples each. [14]
4. Write an essay in about 500 words on 'the influence of social media on kids'. [14]
5. Construct a story in about 500 words using the following idioms: [14]
 - i) Odd man out
 - ii) Jack-of-all-trades
 - iii) On the spur of the moment
 - iv) As free as a bird
 - v) The prime of life

6. Write in detail about Sachin Tendulkar's career in cricket while commenting on how he remained successful throughout his career. [14]
7. 'The Internet and the Web have changed everything'. Describe how Sam Pitroda revolutionized the knowledge in today's world. [14]

OSMANIA UNIVERSITY
FACULTY OF ENGINEERING
UNIVERSITY COLLEGE OF ENGINEERING (AUTONOMOUS)
B.E. (All Branches) I-Semester (Main) Examination

November/December 2017

COMPUTER PROGRAMMING & PROBLEM SOLVING

Time : 3 hours

Max. Marks : 70

- Note :**
- i) First Question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.
 - ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
 - iii) Missing data, if any, may suitably be assumed.
-

1. a) Write the following in C code [2]
$$\frac{\frac{1}{2}ax^2 + \frac{\log x}{2\sin\theta}}{(pv)^3 - \frac{|x-y|}{\sqrt{b^2 - 4ac}}} (5\mu + 10\beta)$$
- b) What will be output when you will execute the following C code? [2]

```
#include<stdio.h>
void main(){
    int a=5,b=10,c=1;
    if(a&&b>c){
        printf("OsmaniaUniversity");
    }
    else{
        break;
    }
}
```
- c) Differentiate between Scope and Lifetime with example. [3]
- d) What is conditional compilation? How does it help a programmer? [2]
- e) What are function prototypes? What is their purpose? Where within a program are function prototypes normally placed? [2]
- f) How can structure variables be declared? How do structure variable declarations differ from structure type declarations? [3]
2. a) Explain the procedure to convert decimal number to hexadecimal number. [7]
- b) Draw the Flow Chart to find the largest number among given three numbers. [7]

3. a) With suitable example explain the differences between the call by value [7] and call by reference.
- b) Write a program to add 1 to 10 numbers recursively. [7]
4. a) Explain with suitable example explain the concept of bubble sort method. [7]
- b) Write C program to multiply two given matrices. [7]
5. a) Write a program using pointers to read in an array of integers and print its [7] elements in reverse order.
- b) Write the program to copy and compare the two strings (with and without [7] using string functions).
6. a) What are enumerated data types? Write a program using this concept. [7]
- b) Write a program to accept records of the different states using array of structures. The structure should contain char state, int population, int literacy rate and int per capital income. Assume suitable data. Display the state whose literacy rate is the highest and whose per capita income is the highest. [7] 252
7. a) Discuss in detail about command line arguments. [7]
- b) Write a program compute mean, mode and median of given set of [7] numbers.

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