PURBANCHAL UNIVERSITY
2018

B. E. (Civil/First Semester/*Final*
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG175CO: Computer Concept and Programming *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.
All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer EIGHT questions.

1(a) What do you mean by generation of computer? Describe briefly about third and fourth generations of computer. 5

(b) Classify computers on the basis of working mode define them. Also illustrate your answers with examples. 5

2(a) Define operating system. List the functions of operating system and explain. 5

(b) Differentiate impact printer with non-impact printer. Explain about dot matrix printers. 5

3(a) What is memory? List out the differences between primary memory and secondary memory. 5

(b) What is software? Explain types of software with an example. 1+4

4. Perform the following conversions: 5×2=10
(a) $(2047)_8=(?)_{10}$
(b) $(A43D)_{16}= (?)_{10}$
(c) $(1100101)_2= (?)_8$
(d) $(526)_{10}= (?)_{16}$
(e) $(CD9)_{16}= (?)_8$

5(a) What do you mean by algorithm and flowchart. Write a flowchart to find the largest number out of any three numbers entered. 2+3

(b) Explain the major characteristics of engineering applications and word processor. 5

6(a) Define sound system. Explain working principle of CD-ROM. 5

Contd. ...

5. What are computer peripherals? Explain in brief about the working principle of magnetic tape storage. 2+8

Or

What is hard disk? Explain the working principle of hard disk. What are its advantage over floppy disk and magnetic tapes? 2+4+4

6(a) Suppose you are a civil engineer. How can you use spreadsheet and word processor software in your works? Relate using examples. 6

(b) Explain graphics package and its applications. 4

7(a) Explain basic structure of a C program. 5

(b) Define compilation. Discuss types of errors. 1+4

8(a) Define array. Write a program to find sum of elements of a given array. 2+4

(b) Define function. What are advantages of using a function? 1+3

9(a) Define structure and pointer. 3

(b) Write a program to reverse a given number. 7

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PURBANCHAL UNIVERSITY
2016

B. E. (Civil/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG175CO: Computer Concept and Programming *(New Course)*

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Answer EIGHT questions.

1. Discuss in detail the types of computer on the basis of size and compare between Man and Computer. 8+2

2. Explain different types of computer memory. What is the need of Hard Disk in computer system? What is the use of cache memory? 5+3+2

3. Convert the following no.: 5+5
   (a) $(273)_8 = (?)_2$ (b) $(4319)_{10} = (?)_{16}$
   (c) $(2C2B)_{16} = (?)_{10}$ (d) $(1110011)_2 = (?)_8$
   (e) $(10110)_{10} = (?)_2$

4. What is an operating system? Explain different types of operating system with example. 2+8

5. Explain the term Floppy Disk, Sound System and Magnetic Tape. 3+3+4

6. What are the different Software Applications? Explain. 10

7. What are the different programming languages? Explain different steps in solving problems using computer. 2+8

8. What is structure and pointer? Differentiate between them. 10

9. Write a program in C to enter 5 numbers in and array and sort them in descending order and display. 10

10. Write short notes on any TWO: 5+5
    (a) Array (b) Generation of computer
    (c) Database

Adarsha Kafle

Dhruba Yadav (PUSET)

PURBANCHAL UNIVERSITY
2015

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BEG175CO: Computer Concept and Programming *(New Course)*

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Answer EIGHT questions.

1(a) Define computer. Explain some important characteristics of computer. 5

(b) Explain the types of computers according to size. 5

2(a) What is operating system? Explain the functions of operating system. 5

(b) What do you mean by primary memory? Differentiate RAM and ROM. 5

3(a) What is database? Explain the features of database. 5

(b) Describe in brief the generations of computer. 5

4. Perform the following conversions. 2×5=10

(a) $(1101001)_2 = (?)_{10}$

(b) $(234)_{10} = (?)_2$

(c) $(F3E)_{16} = (?)_{10}$

(d) $(453)_8 = (?)_{16}$

(e) $(D0A)_{16} = (?)_8$

5(a) What are the differences between impact and non-impact printers? Explain about the laser printers. 5

(b) What are the different steps in problem solving? Explain in brief. 5

Contd. ...

6(a) What is flowchart? Draw the flowchart to check whether a number is even or odd. 5

(b) Write a program to find sum of the given series. 2+4÷6+8+ ----------+n^{th} term 5

7(a) What is if-else statement? Explain it with general syntax and flowchart. 5

(b) Write a program to ask a number from the user and test whether the number is prime or not. 5

8(a) Write down the differences between array and structure. 4

(b) Write a program to add two 2x2 matrices. 6

9(a) Define loop. Differentiate between while loop and do-while loop. 5

(b) Write a program to display the prime numbers between 1 and 100. 5

10(a) Define function. Explain call by value and call by reference. 5

(b) Write a program to calculate factorial of given number using function. 5

PURBANCHAL UNIVERSITY
2012

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BEG175CO: Computer Concept and Programming

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Answer ALL questions.

1(a) What is a computers? List out and explain some of the important characteristics of a computer. 1+4

(b) Draw a block diagram showing basic computer system and explain each block briefly. 2+3

2. Explain about the operating system and its types. Why GUI operating system is more popular than text based operating system? 7+3

3(a) What do you mean by primary storage? How does it differ from secondary storage? 2+3

(b) What is the difference between impact and non impact printers? Write in detail about sound system. 2+3

4. Perform the following conversion. 2×5=10
(a) $(1110101)_2 = (?)_{10}$
(b) $(ABC)_{16} = (?)_8$
(c) $(135)_8 = (?)_2$
(d) $(110001)_2 = (?)_{16}$
(e) $(1AF)_{16} = (?)_{10}$

5(a) What is word processor? Write the essential features of word processor. 2+3

(b) Define database. Write the advantages of using computerized filing system over traditional filing system. 2+3

Contd. ...

PURBANCHAL UNIVERSITY
2014 (New)

B. E. (Civil/First Semester/*Final*
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BEG175CO: Computer Concept and Programming

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All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer EIGHT questions.

1. Distinguish general purpose computers and specific purpose computers. Explain the generations of computer. 2+8

2. Explain the functions of CPU and its different units. 4+6

3. Convert the following: 5×2=10
(a) $(1011011)_2 = (?)_{16}$
(b) $(101101)_{16} = (?)_2$
(c) $(715)_{10} = (?)_2$
(d) $(162)_8 = (?)_{10}$
(e) $(1010)_{10} = (?)_8$

4. What is an operating system? Explain in detail about the functions of operating system. 2+8

5. List all the input and output devices. Explain any two input devices. 2+8

6. Write a brief history of C language. Write a program in C to enter length and breadth of a rectangle, and calculate area and perimeter. 4+6

7. Write a program in C to enter 20 numbers in an array. Determine the sum of odd numbers and even numbers separately. 10

8. Mention the advantages of using function in C. Write a program to illustrate concept of switch statement. 3+7

9(a) Write an algorithm and flowchart to find greatest among three numbers. 4

Contd. ...

(b) Discuss the applications of database package. 6

10. Write notes on any TWO: 2×5=10

(a) Hard disk

(b) Printer

(c) RAM

6(a) What is flowchart? Draw the flowchart for the program which checks whether the entered number is divisible by both 5 and 7 or not. 2+3

(b) Write a program to find sum of the series given below:

1! + 2! + 3! + 4! + ... + N! 5

7(a) What do you mean by loop. Differentiate between do loop and while loop. 1+4

(b) WAP to display the prime numbers in the range 100-200. 5

8(a) What is array? How array is different from structure. 2+3

(b) WAP to generate the Fibonacci series (1 1 2 3 ..... n). 5

PURBANCHAL UNIVERSITY
2011

B. E. (Civil/First Semester/Final
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG175CO: Computer Concept and Programming

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All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer EIGHT questions.

1(a) What is primary memory? Explain the types of ROM. 5

(b) What are input and output units of a computer system? Write the functions of CPU. 5

2(a) How do you classify computers? Describe general purpose and specific purpose of computers with examples. 6

(b) Compare 3rd and 4th generation computers. 4

3(a) "Operating system is a master control program." Justify this statement. 4

(b) Briefly explain the different types of operating system. 6

4(a) What are the different steps in problem-solving? Explain in brief. 5

(b) Write an algorithm to determine whether a given number is Even or Odd. Also develop a flow-chart for the algorithm. 2.5+2.5

5(a) Why do you use function in C program? Write a program in C to determine the greater number among two inputs using function. 1+4

(b) What are arrays? Explain their types with examples. 5

6. Solve the following: 4×2.5=10
(a) Convert $(1011001)_2$ into hexadecimal number system.
(b) Convert $(C2B)_{16}$ into decimal number system.

Contd. ...

(c) Convert $(7124)_8$ into decimal number system.

(d) Convert $(4380)_{10}$ into binary number system.

7(a) Differentiate between Magnetic tape and Magnetic disk. 4

(b) What are peripheral devices? Briefly describe some of them. 6

8(a) What is word processing software? Explain the most significant features of Microsoft Word application. 6

(b) What are the major uses of spreadsheet packages? Explain with examples. 4

9(a) Define database and database management system. 4

(b) Write a program to enter 10 numbers in an array and display the sum of all positive numbers only. 6

10. Write notes on any FOUR: $4 \times 2.5 = 10$

(a) Pointers
(b) Hard Disk
(c) History of C
(d) Hardware vs Software
(e) Data types

$(1011001)_2 = 0010,$

PURBANCHAL UNIVERSITY

2018

B.E. (Civil)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG156CI: Applied Mechanics-I (Statics) *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Define Couple and show that it is a free vector. 6

(b) Two homogeneous spherical ball rests between two vertical walls as shown in fig:I(b). The radius of smaller ball is 20cm and weight is 25N. The radius of larger ball is 26cm and weight is 40N. The distance between the walls is 80cm. Assuming the contact surfaces to be smooth; determine the reaction forces at all contact points. 10

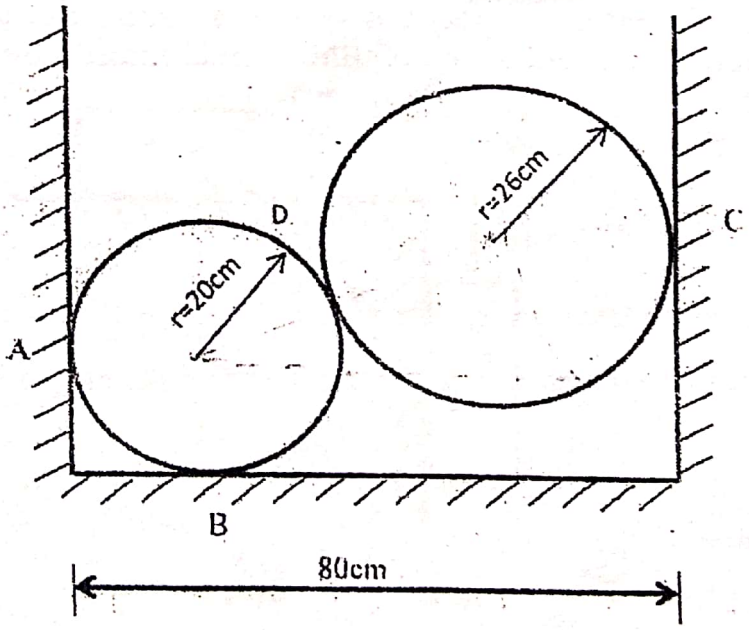

Fig: 1(b)

2(a) Derive the expression for centroid of a semi-circle by integration method. 6

Contd. ...

(b) Determine the moment of inertia of the given fig: 2(b) about the centroid x-axis and y-axis. 10

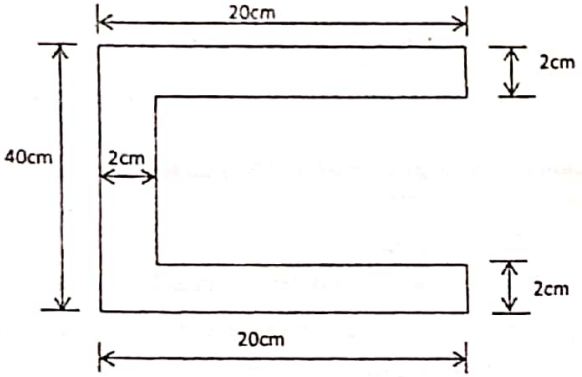

Fig: 2(b)

3(a) Define angle of friction. Explain the condition of tipping and sliding. 6

(b) Two blocks A and B of equal weight 10 kg are connected by a slender rod of negligible weight. The coefficient of static friction for all contact surfaces is 0.3. Determine the maximum value of force "P" for which the equilibrium is maintained. Refer fig: 3(b). 10

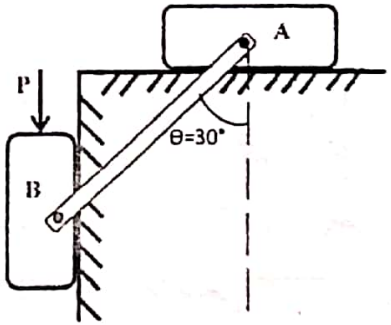

Fig: 3(b)

4(a) Derive the relationship between load intensity, shear force and bending moment for a simply supported beam with uniformly distributed load. 6

(b) Draw the shear force and bending moment diagram for loaded beam as shown in given fig: 4(b). 10

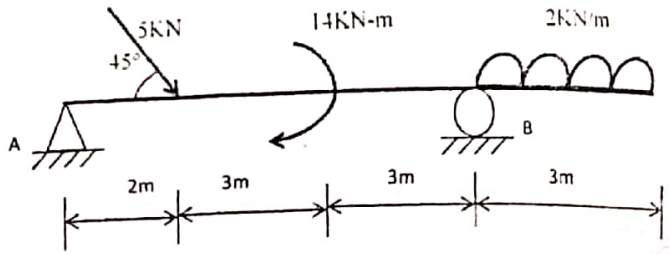

Fig: 4(b)

5. Draw Axial; Force, shear force and Bending moment diagram a frame loaded as shown in fig. 5.

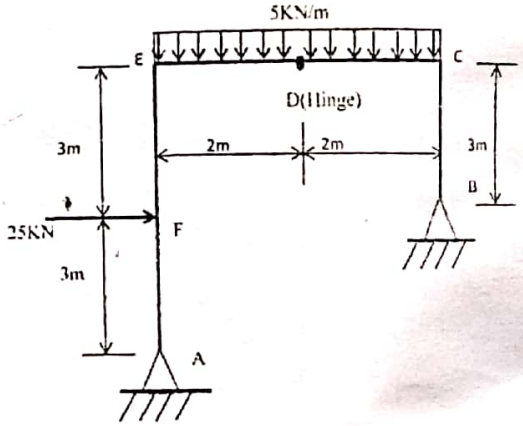

Fig: 5

6(a) What is tension coefficient? How can it be used to find member forces in space truss?

(b) Determine the member forces in the given truss fig: 6(b) and indicate the nature of forces.

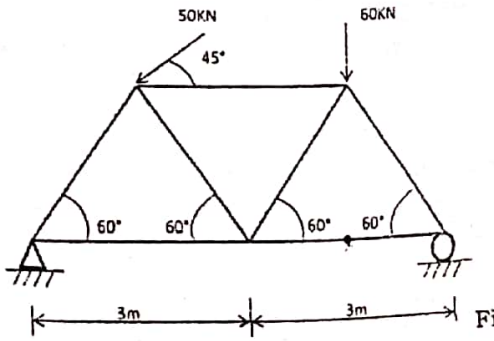

Fig: 6(b)

PURBANCHAL UNIVERSITY

2017

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BEG156CI: Applied Mechanics-I (Statics) *(New Course)*

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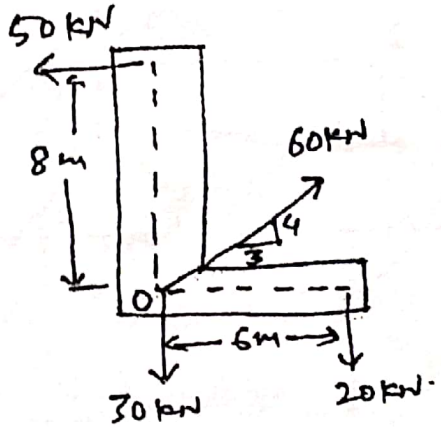
Answer FIVE questions.

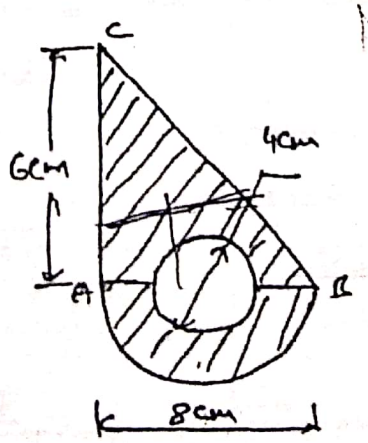
1(a) Define particle, rigid body and free body diagram. What are the points to be considered while drawing free body diagram? 6

(b) For the force system acting on the plate as shown in figure, calculate the resultant of the forces and locate where the line of action of resultant intersect the edge of plate. 10



2(a) Find the centroid of the circle using the method of integration 8

(b) Calculate the moment of inertia about line as shown in figure. 8



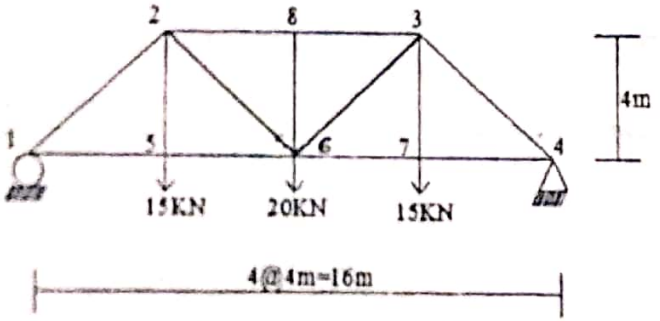
Contd

3(a) Explain how the frictional force varies with the applied force with sketch. 6

(b) A uniform ladder 3m long and weighing 200N is placed against a wall making an angle of 60° with the ground, the ladder has to support 800N man standing at its upper end. Coefficient of friction between wall and ladder as 0.3 and that between ground and ladder is 0.4. Make calculation for horizontal force P to be applied at the ground level to prevent slipping. 10

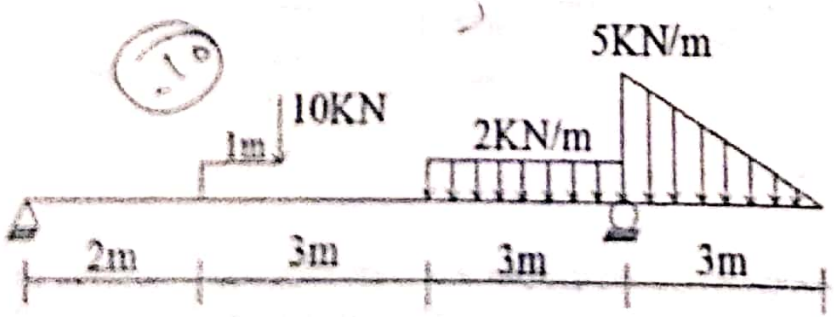
4(a) Show the relationship between uniformly distributed load, shear force and bending moment in a simply supported beam. 6

(b) A truss is loaded as shown in figure. Find out the member force developed in the member 2-6, 5-6 and 6-7 by section method. 10

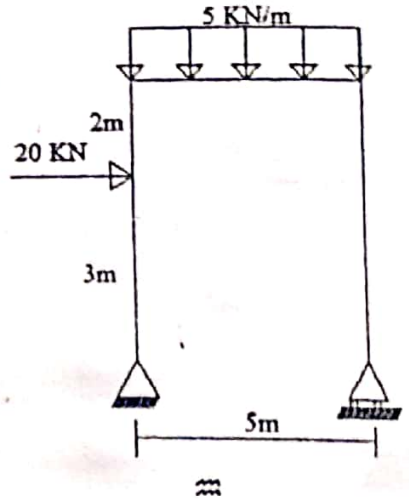


5(a) Explain statically determinate and indeterminate structure. 4

(b) Draw shear force and bending moment diagram for the beam shown. 12



6. Draw shear force and bending moment diagram for the fr shown:



PURBANCHAL UNIVERSITY

2016

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BEG156CI: Applied Mechanics-I (Statics) *(New Course)*

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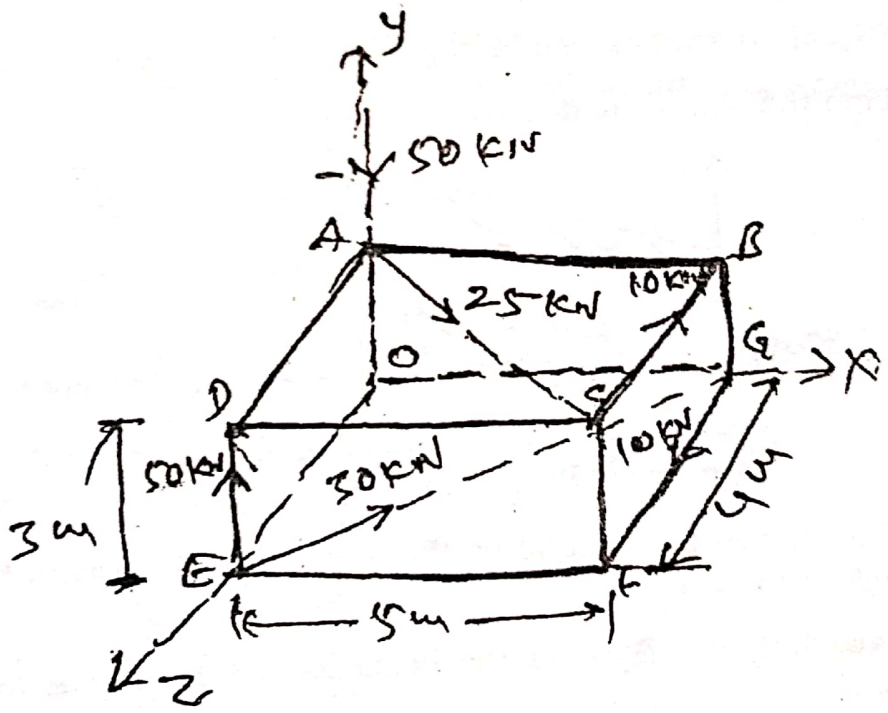
Answer FIVE questions.

1(a) State and prove Varignon's Theorem. 6

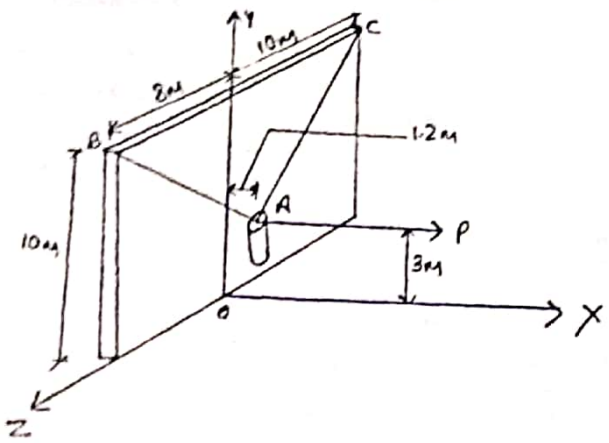
(b) Find the resultant of the force system shown in figure. 10



2(a) Locate the centroid of a right angle triangle. (7) 8

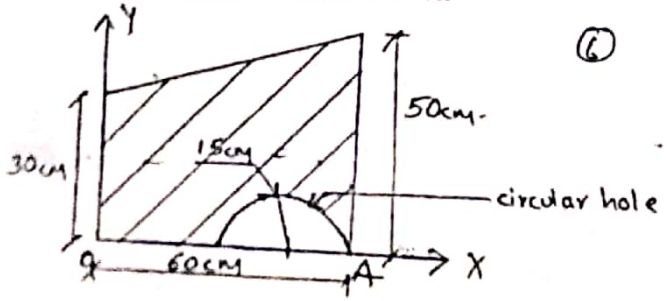
(b) A 210 kg cylinder is hung by means of two cables AB and AC, which are attached to the top of a vertical wall. A horizontal force perpendicular to the wall holds the cylinder in the position as shown in Figure. Determine the magnitude of tensions in each cable. 8

Contd. ...



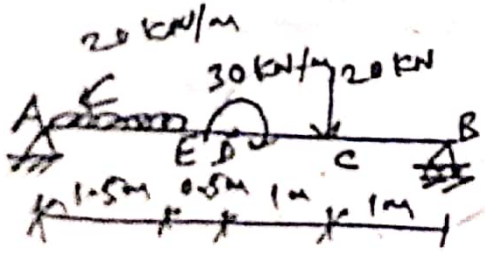
3(a) Explain the terms 'centre of gravity' and 'moment of inertia'. 6

(b) Find the M.I. of shaded area about OA. 10



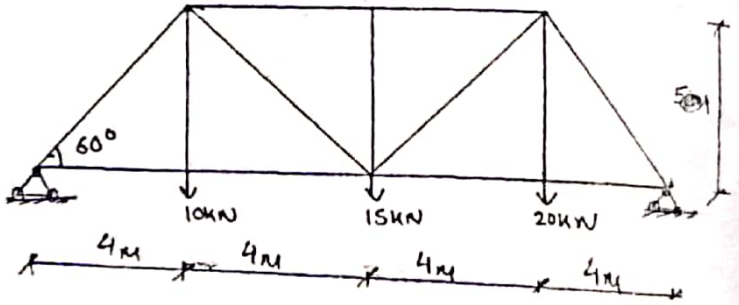
4(a) What do you understand by the term friction? Explain the term angle of friction. 6

(b) Draw SFD and BMD of the beam loaded as shown in figure below: 10

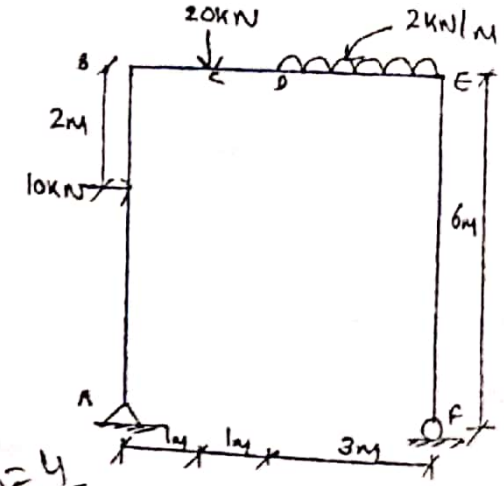


5(a) Derive the relation between load intensity, shear force and bending moment.

(b) Solve the truss shown in figure below using the joint method.

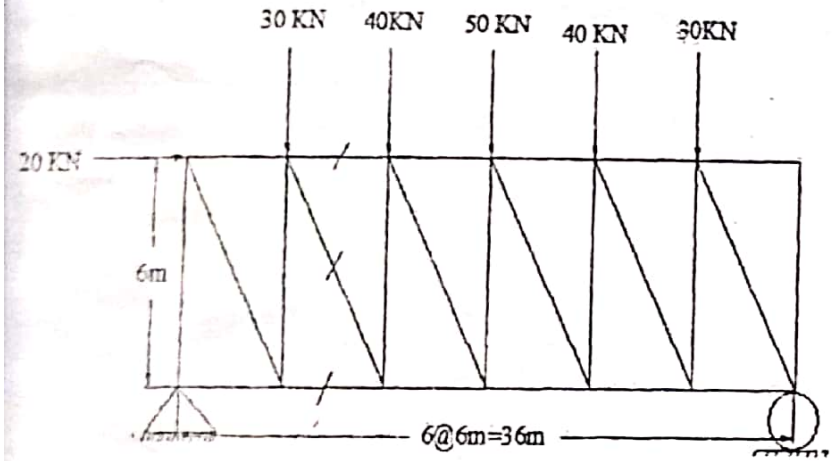


6. Draw AFD, SFD and BMD of the beam loaded as shown in figure below:



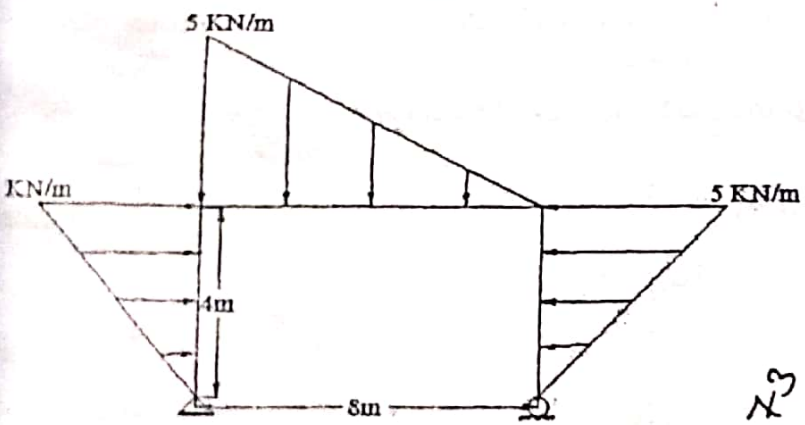
(a) Define support, indeterminacy, stability, load, shear leg, tension Coefficient and tripods. 8

(b) Find the forces in the members indicated using section method. 8



Define point of contra flexure, hinge, cantilever beam and rigid frame? 4

) Draw SFD, BMD and AFD of following frame structure. 12



Dhruv yadav (PUSET)

PURBANCHAL UNIVERSITY

2015

B.E. (Civil)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG156CI: Applied Mechanics-I (Statics) *(New Course)*

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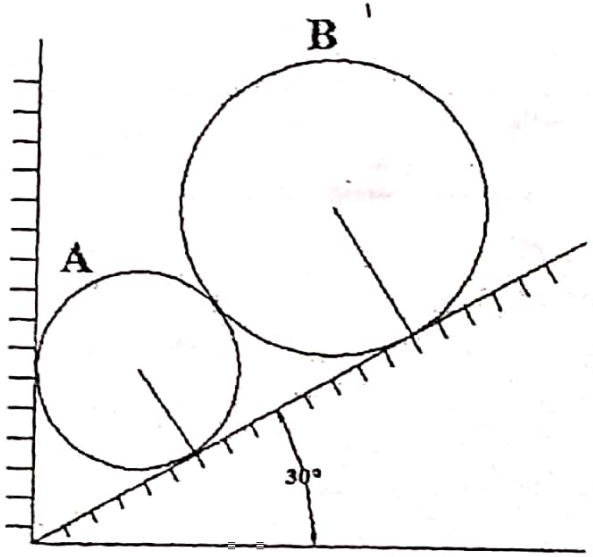
All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) What do you mean by free body diagram? Give its physical meaning with neat sketches. 1+3

(b) Two cylinders A and B rest in a inclined surface shown in figure. A has radius of 10 cm and weight of 50 N. B has radius of 15 cm and weight of 110 N. Determine force at all points of contacts. 12



2(a) Differentiate centroid and centre of gravity? Find centroid of following figure. 2+4

Contd. ...

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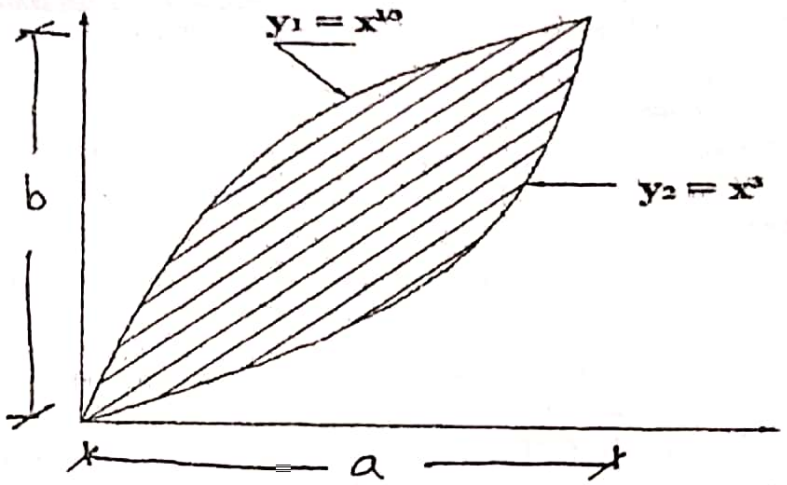
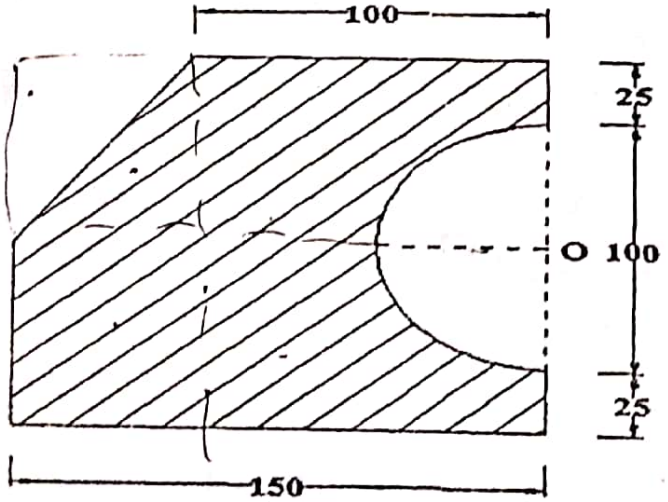


(b) Define polar moment of inertia and radius of gyration .Find the Polar moment of inertia and radius of gyration of following figure, about centroidal axes. (All dimensions are in mm). 1+1+8



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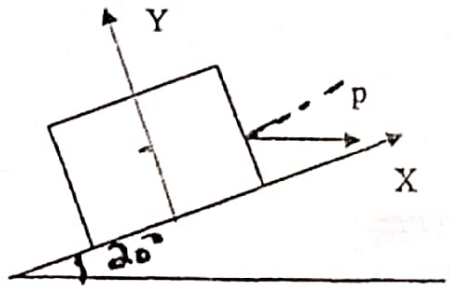
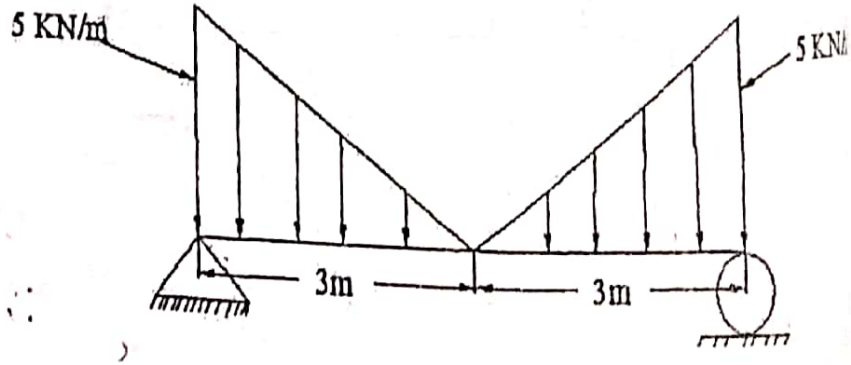
3(a) Differentiate coefficient of static and kinematic friction. Explain about impeding motion, condition of tipping and sliding with neatsketches. 2+2½

(b) The homogeneous square block (100mm×100mm) has a mass m kg and the coefficient of friction between the block and plane is 0.40. If the force p, increases gradually until motion ensues, will the block slide or tip and for what value of p? (Angle of inclination is 20°.)



4(a) What do you mean by load? Write different types of loads with neat sketches. Derive the relationship between the intensity of load, SF and BM. 1+

(b) Draw AFD, SFD and BMD of following beam.



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PURBANCHAL UNIVERSITY

2013

B.E. (Computer/Electronics & Comm.)/Second Semester/*Final*

Time: 03:00 hrs. Full Marks: 80/Pass Marks: 32

BEG158CI: Applied Mechanics

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

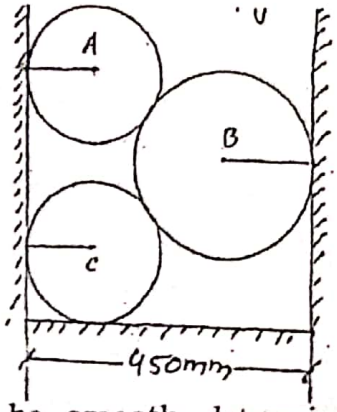
Answer FIVE questions selecting at least TWO from each GROUP.

Group-A

1(a) Define the term 'Rigid Body'. 'Deformed Body' with suitable example to support your answer. 2+2+2

(b) The weights and radii of the three cylinders piled in a rectangular ditch as shown in fig. are as given below,

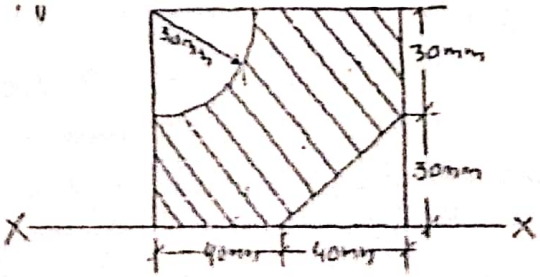
Cylinder	Weight	Radius
A	80 N	100 mm
B	100 N	200 mm
C	80 N	100 mm



Assuming all contact surface to be smooth determine the reaction on cylinder C. 10

2(a) Describe the conditions illustrating tipping and sliding of a block with neat figure. 6

(b) Compute the moment of inertia of the shaded area shown in fig. about x-x axis. 10



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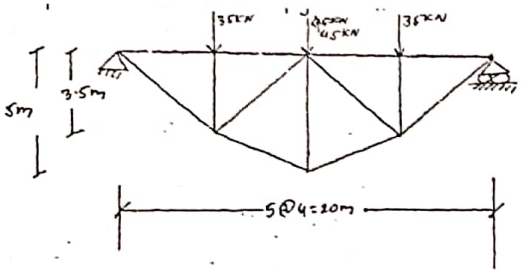
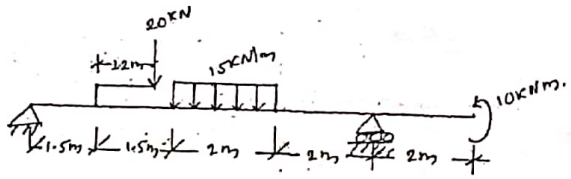
3(a) Define the principle of Transmissibility. Do you agree on "couple as a free vector". Support your answer. 2+4

(b) Calculate the forces in the inclined members of the truss as in fig. below. 10



4(a) Prove that center of pressure (C.P.) is always below the C.G. of the immersed object. 6

(b) Draw S.F.D. and B.M.D. for the beam as shown in fig.



Group-B

5(a) Define the term kinetics and kinematics. Also describe rectilinear, curvilinear and plane curvilinear motion of a particle with example. 1+1+2+2+2

(b) The motion of a particle is defined by the position vector $\vec{v} = 6t\vec{i} + 4t^2\vec{j} + t^3/4\,\vec{k}$ where r is in meter and t is in second. At the instant, when t = 3sec. Find the unit position vector, velocity and acceleration. 8

6(a) Define instantaneous centre of rotation. Illustrate the location of instantaneous centre of rotation in various case. 1+5

(b) A bullet is fired upward at an angle of 30° to the horizontal from a point P on a hill and it strikes a target which is 80m lower that the level of projection. The initial velocity of the bullet is 100m/s. Calculate:

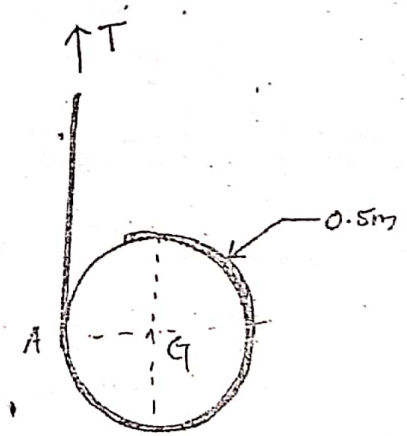
(a) The maximum height to which the bullet will rise above the horizontal

(b) The actual velocity with which it will strike the target

(c) The total time requirement for the flight of the bullet neglect the resistance due to air. 10

7(a) Define general plane motion. Derive the expression for the kinetic energy in plane motion of a rigid body. 1+5

(b) A cord is pulled upward with force T of magnitude 180N. Determine (a) the acceleration of the centre of the disk (b) the angular acceleration of the disk (c) the acceleration of the cord. 10



(b) By detail analysis of the given beam as shown in figure 7(b), draw the salient features. 10

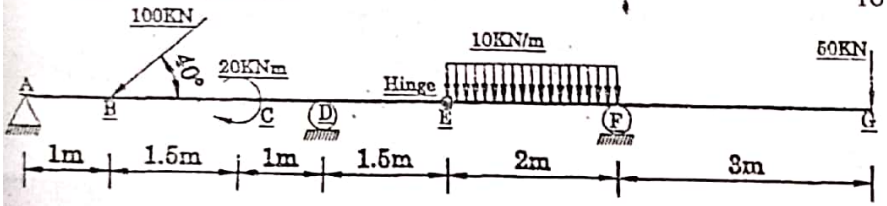


Fig. 7(b)

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PURBANCHAL UNIVERSITY
2013 (New)

B.E. (Civil)/First Semester/ *Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG156CI: Applied Mechanics-I (Statics)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Illustrate with example about the differences between rigid bodies and deformable bodies. What are the points to be kept in mind while drawing a free body diagram from a space diagram? 6

(b) The cylinder A and B rest in an incline smooth surface which makes an angle of 30° with horizontal as shown in Fig. 1(b). Determine all the contact forces. Given weight of cylinders A and B are 1kN and 3kN respectively and radius of both cylinders are 200mm. 10

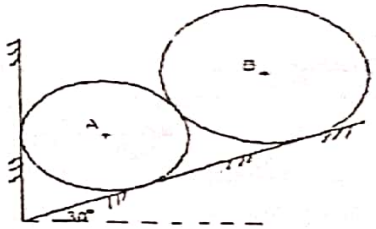


Fig. 1(b)

2(a) State and prove Varignon's Theorem. 6

(b) Four forces act on a 350mm×300mm plate as shown in Fig. 2(b): 10

(i) Find the resultant of the forces.

(ii) Locate the two points where the line of action of the resultant intersects the edge of the plate.

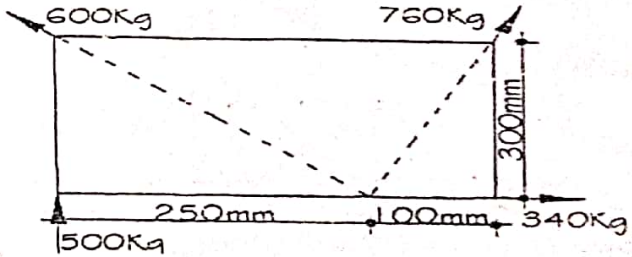


Fig. 2(b)

Contd. ...

3(a) State and prove perpendicular axis theorem. 6

(b) Calculate the moment of inertia and radius of gyration about the x-axis for the shaded area as shown in Fig. 3(b). 10

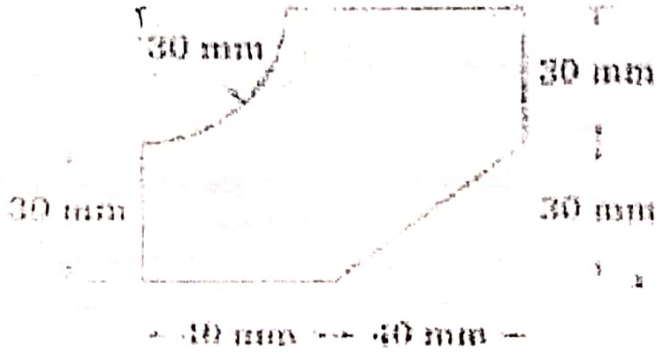


Fig. 3(b)

4(a) Define the terms angle of friction and angle of repose, and enlist the laws of coulomb friction. 6

(b) A homogeneous block as shown in Fig. 4(b) has mass of M kg and the coefficient of static friction between the block and plane is 0.4 and coefficient of dynamic friction is 0.25. If the force P increases gradually until motion ensures, will the block slide or tip and for what value of P? All dimensions are in mm. 10

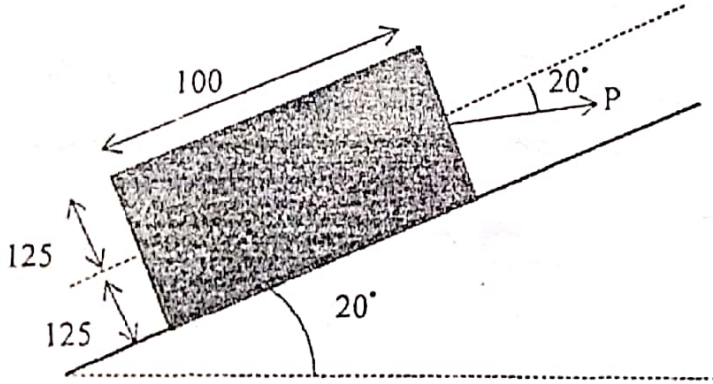


Fig. 4(b)

5. Analyze the given rigid frame as shown in figure 5 and show its salient features. 16

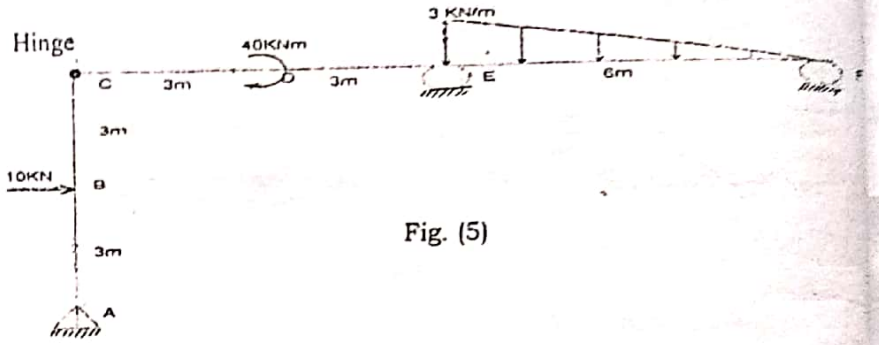


Fig. (5)

6(a) Give brief description about beam, tie, struts, frame, Colum truss.

(b) Analyze the given truss system as shown in Fig. 6(b). 1

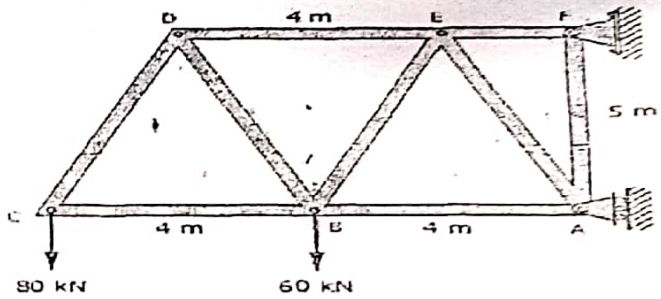


Fig. 6(

7(a) Determine the total static indeterminacy of the given rigid jointe system and pin jointed system as shown in Fig. 7(a) and 7(a1 Differentiate determinate and indeterminate structures. 2+2+

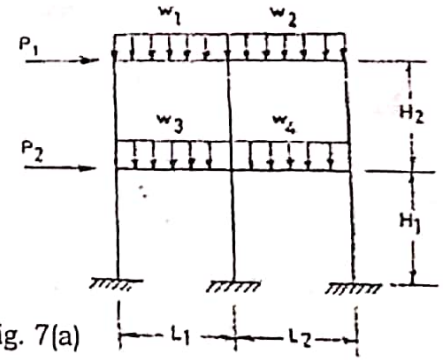


Fig. 7(a)

Fig. 7(a1)

PURBANCHAL UNIVERSITY
2012

B.E. (Civil)/First Semester/Final

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG156CI: Applied Mechanics-I (Statics)

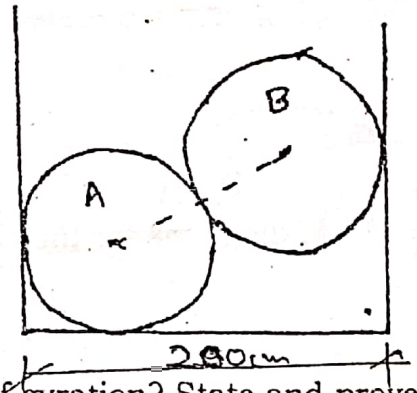
Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

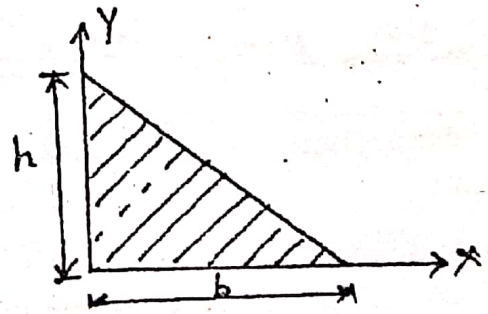
1(a) Define rigid body, free body diagram. What are the points to be considered while drawing a free body diagram? 7

(b) Two spheres A and B of weight 150N and 300N and radius 50cm and 60cm respectively are placed in a vessel as shown in fig. Find the reactions at the contact points. Assume that contact surfaces are smooth. 9



2(a) What is radius of gyration? State and prove parallel axis theorem used in moment of inertia. 7

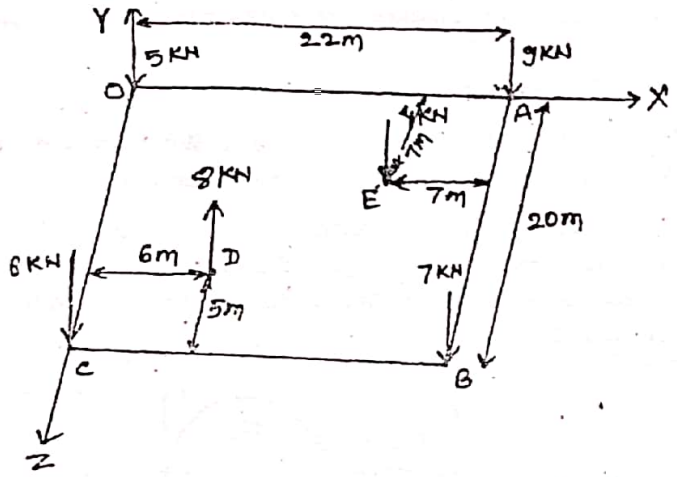
(b) Locate the centroid of the shaded area as shown in fig by using the method of integration. 9



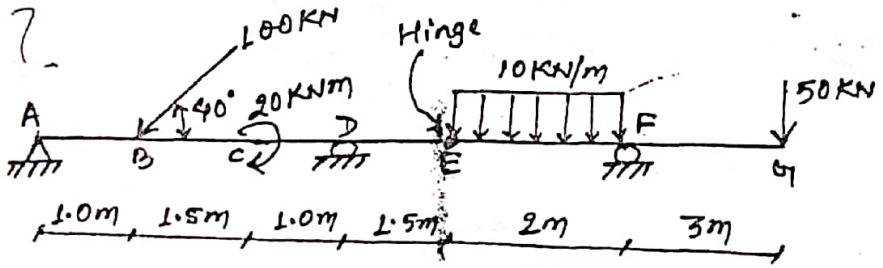
Contd. ...

3(a) Define vector product, scalar triple product and moment of a force about a point. 6

(b) A concrete slab supports six vertical loads shown in figure below. Determine the resultant of these forces and the point through it acts. 10

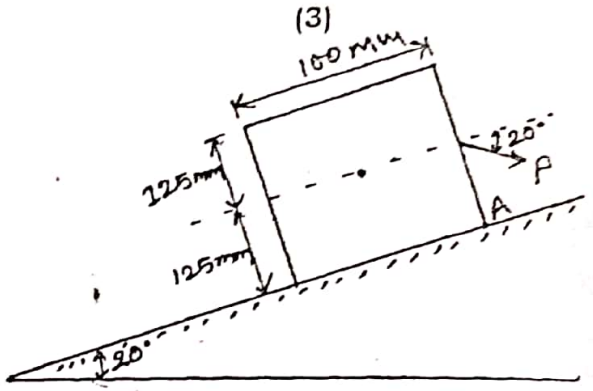


4. Draw AF, SF and BM diagrams for the beam loaded as shown in figure below. 16

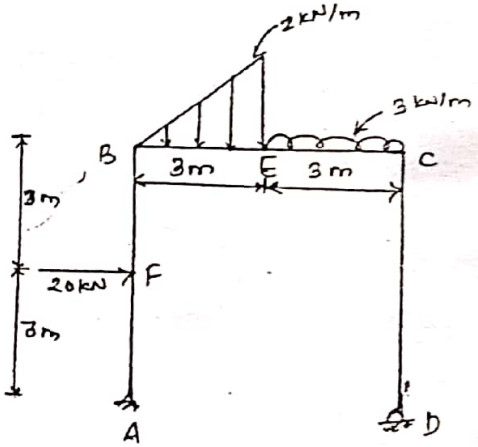


5(a) Derive the relationships between load, shearing force and bending moment. 6

(b) The homogeneous block as shown in figure, has a mass of m kg and the coefficient of friction between the block and the plane is 0.40. If the force P increases gradually until motion ensues, will the block slide or tip and for what value of P? 10

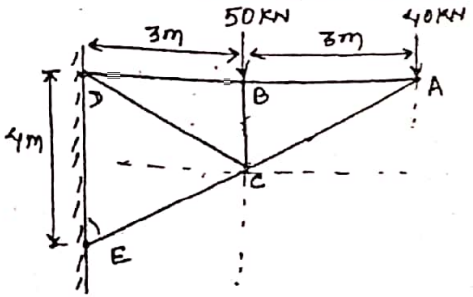


6. Draw axial force, shear force and bending moment diagram for frame loaded as shown in fig.



7(a) What is tension coefficient? How it can be used to find member forces?

(b) Find all the member forces in the given truss as shown in fig.



7(a) Define space and plane truss. Discuss the differences between joint and section method of analysis of truss. 2+4

(b) Truss has been loaded and supported as shown in figure 7. Make the calculation for the reactions at the supports and forces in the members of truss. 10

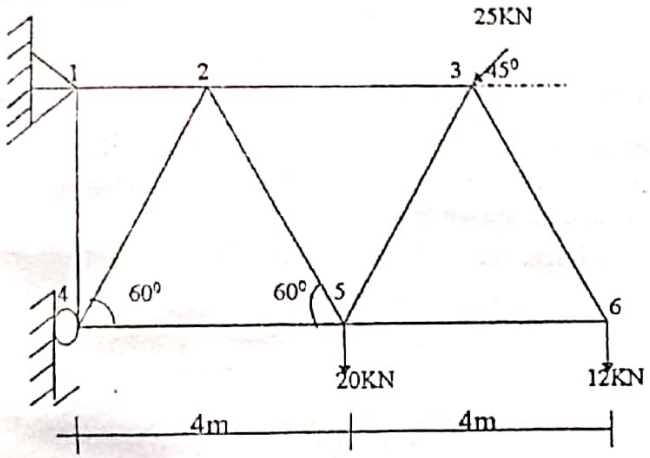
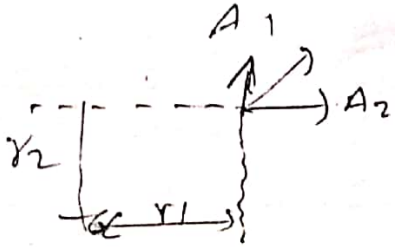


Fig. 7(b)



PURBANCHAL UNIVERSITY
2011

B.E. (Civil)/First Semester/Final
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG155CI: Applied Mechanics-I (Statics)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) What do you meant by free body diagram? Explain principle of equilibrium. 3+3

(b) Two cylinders A and B rest in channel as shown in fig. 1. A has a diameter of 10cm and weight 20kg. B has diameter of 18cm and weight 50kg. The channel is 18cm wide at the bottom with one side vertical and other side at an angle of 60° with horizontal as shown in figure. Determine the forces at all four points of contact. 10

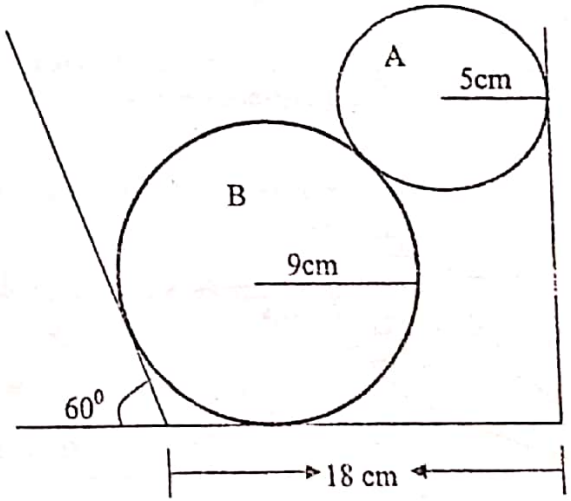


Figure 1

Fig. 1(b)

2(a) Define scalar and vector quantities. Derive expression for vector triple product. 6

Contd. ...

(b) A block is supported by a system of cables as shown in figure 2. The weight of the block is 1500N. Determine tension in cables DA, DB and DC. 10

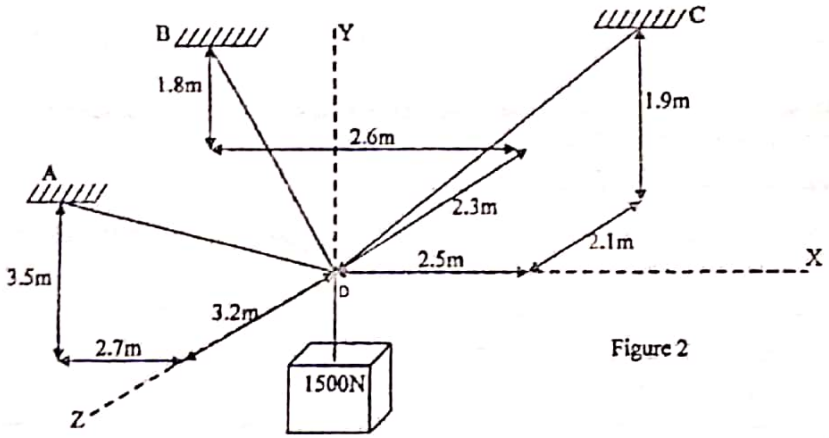


Figure 2

3(a) Differentiate between centre of gravity (CG) and centroid of body. State and explain parallel axis theorem. 6

(b) Determine by direct integration, the centroid of area between curve $y=kx^2$ and straight line $y=mx$ as shown in figure 3. 10

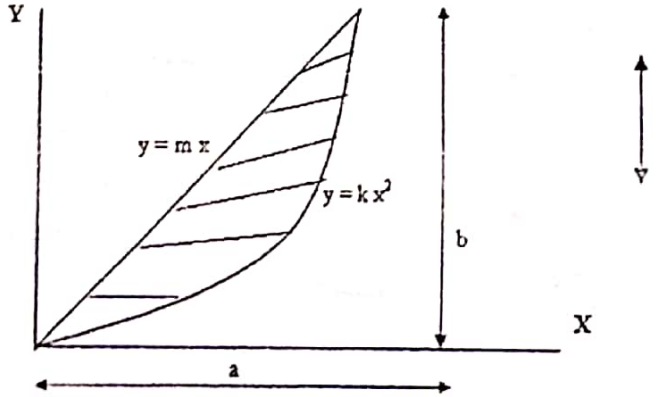


Figure 3

4(a) Define friction between any two surfaces of contact. Explain variation of frictional coefficient in static condition as well as in motion. Also define angle of friction. 2+2+2

Contd. ...

(b) A ladder (AB) 5m long weights W and rests on a frictionless wall as shown in figure 4. Find the coefficient of friction between ladder and the ground when ladder tends to slide. Take W = 50N.

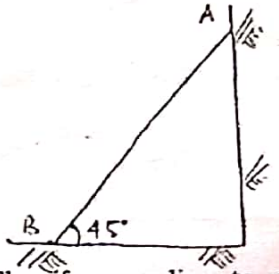


Figure 4(b)

5(a) What is beam? Classify according to support condition. Also deduce the relationship between load and shear for a beam subjected to distributed load. 6

(b) Draw axial force, shear force and bending moment diagrams for beam loaded as shown in figure 5. 10

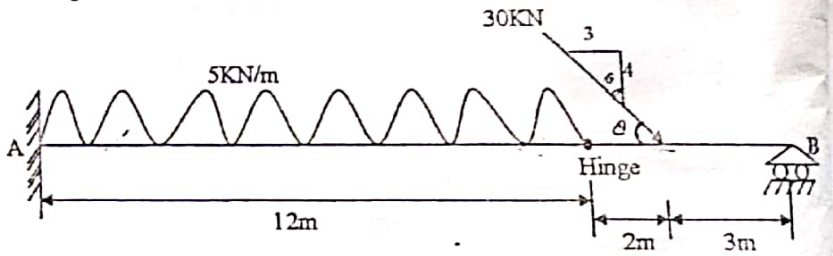


Fig. 5(b)

6. Draw shear force, axial force and bending moment diagram for frame loaded as shown in figure 6.

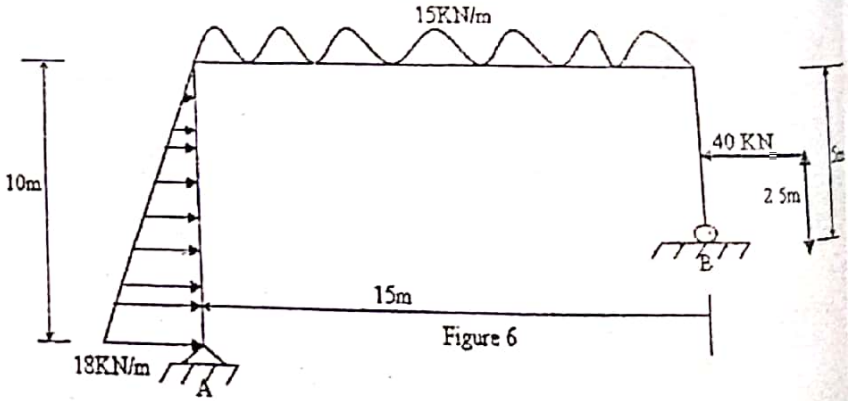


Figure 6

Fig. 6

Contd...

PURBANCHAL UNIVERSITY
2018

B. E. (Civil)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG159CI: Construction Materials *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions. **5×16=80**

1(a) Explain the following terms fatigue, tenacity, resistivity and coercive force. Draw stress-strain curve of ductile material and also explain the significant point. 4+4

(b) Why it is necessary to know the properties of construction materials? Explain briefly. Illustrate the procedure for Rockwell hardness test. 4+4

2(a) Classify the building stones and write the qualities of good stones. 2+4

(b) Compare the different aspect of cast iron, wrought iron and mild steel. Discuss the Heat treatment in steel. 5+5

3(a) Briefly explain the microstructure of wood. What is seasoning of timber? Write its importance. 6+4

(b) What are the different ingredients of brick earth? Write the qualities of good bricks. 4+2

4(a) Briefly explain different types of tiles. 6

(b) What are the main ingredients of cement? Explain the function of Bouge's Compound. 5+5

5(a) What are different types of asphalt? Explain briefly. Write the uses of bitumen. 4+4

Contd. ...

(b) Write the uses of Polymers in building construction. Write briefly on thermoplasts and additives. 4+4

6. Write short note on any FOUR: 4×4=16

(a) Bulking of Sand

(b) Paints and its Types

(c) Griffith's theory of brittle fracture

(d) Microstructure of steel

(e) Types of Cements

(f) Insulating materials

PURBANCHAL UNIVERSITY

2017

B. E. (Civil)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG159CI: Construction Materials *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions. **5×16=80**

1(a) Describe the test required to determine the linear coefficient of thermal expansion of aluminum with neat sketch. 8

(b) What is setting time of cement? What are the properties of good Stones? Explain. 8

2(a) What can be observed from Microstructure examination of mild steel, alloy steel, aluminum alloy, cast iron and wood, using optical microscopes with sketch. 8

(b) What is the scope of construction materials in civil engineering field? Elaborate the various types of construction materials briefly. 8

3(a) What is seasoning of timber? Differentiate between Hard wood and Soft wood. 8

(b) Explain Microstrcuture study of brittle and ductile metals with sketches. 8

4(a) What are the chief ingredients of good earth brick? Explain the harmful ingredients of earth bricks. 8

(b) Define asphalt, bitumen and tar? Mention about asphalt concrete and its properties. 8

5(a) Explain the manufacturing process of Cement with neat flow diagram. 8

(b) Explain briefly about Use of polymers in repairs of structures. 8

6. Write short note on any FOUR: 4×4=16

(a) Adhesive and insulting material

(b) Water cement ratio (c) Vicat's Apparatus

(d) Common properties of glass (e) Cast iron and Pig iron

PURBANCHAL UNIVERSITY
2016

B. E. (Civil)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG159CI: Construction Materials *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Why construction materials are important for civil engineering? Explain the terms Permeability, Toughness, Ductility, and Creep. 2+4

(b) Draw a stress-strain curve for ductile material and also explain the curve in detail. Explain Griffith's theory for brittle fracture with neat sketches. 6+4

2(a) What is sieve analysis? What are the properties of good stone? 2+6

(b) Explain various types of corrosion in metals and method of prevention against corrosion. 4+4

3(a) Explain various methods of seasoning giving necessary sketches. Write down the different commercial products of timber. 6+2

(b) Explain any four methods of heat treatment of steel. Write down the defects found in the steel. 6+2

4(a) Explain how Bamboo can be used as a construction material? Write down the characteristics of Soft and Hard wood. 3+3

(b) What are the functions of ingredients present in an ordinary Portland cement? Explain different types of cement. 4+6

5(a) Describe classification of lime and its properties. 8

(b) Explain the composition of bricks and their function? Give suitable classification of glass with brief explanation. 4+4

6. Write short note on any FOUR: 4×4=16

(a) Modulus of Elasticity
(b) Bulking of sand
(c) Asphalt Concrete
(d) Paints and its Type
(e) Insulating materials

PURBANCHAL UNIVERSITY
2015

B. E. (Civil)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG159CI: Construction Materials *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) How can you classify the construction materials in the field of civil engineering? Write down the comparison between stone works and brick works. 4+4

(b) Define Poisson's ratio. Explain the procedure of Brinell Test Method with its limitations. 2+6

2(a) Define steel and its properties. Mention the factors affecting the physical properties of steel. 4+4

(b) Following results are obtained from sieve analysis of a soil sample.

D_{60}= 2.4mm D_{30}= 0.54mm D_{10}= 0.26mm

Find the uniformity coefficient and coefficient of curvature. 4

(c) In Brinell's Hardness Test, a steel piece is indented by the Universal Testing Machine (UTM) at 25°C. What is the Brinell's Hardness Number (BHN)? If the indentor diameter is 10mm and diameter of indentation is found to be 7.7mm when the load of 40 KN is applied and released after 15 seconds. 4

3(a) What are the classifications of tree? Illustrate the Macrostructure of tree. 2+6

(b) Discuss the composition of bricks found in Nepal. What are the harmful ingredients in brick earth? 4+4

4(a) Explain the laboratory procedure to find the setting time test of Ordinary Portland Cement. 8

Contd. ...

(b) Define lime. Describe the classification of lime. 1+7

5(a) Write down the properties and engineering application of bitumen. 4

(b) What are the constituents of oil paint? Explain thermoplastic and thermosetting plastic. 4+3

(c) Explain heat treatment process of steel. 5

6) Write short note on any FOUR 4×4=16

(a) Bulking of Sand

(b) Commercial forms of timber

(c) Glass

(d) Varnish

(e) Heat insulating materials

(f) Ductility and resilience

PURBANCHAL UNIVERSITY
2014 (New)

B. E. (Civil)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG159CI: Construction Materials

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Define Nominal stress and Nominal strain. Explain stress- strain diagram for a ductile material with suitable diagram. 2+6

(b) What is bulking of sand? Explain the procedure for Rockwell hardness test. 4+4

2(a) Explain various alloys of steel. Differentiate between Bessemer process and Open Hearth Process. 6+4

(b) Explain different heat treatment methods. Explain on fracture modes of materials. 6

3(a) List the major defects in timber? Explain the methods of Artificial Seasoning. 2+6

(b) Give the characteristics of good timber. Explain the cross-section of exogenous tree. 6+2

4(a) Explain various testing procedures for bitumen. Differentiate between asphalt and tar. 6+2

(b) Explain commercial forms of glass. Highlight how you can say the brick is good for civil works. 5+3

5 (a) Describe various types of cement. Differentiate between hydraulic lime and fat lime. 7+3

(b) List and explain the function of Bogue's compounds? Describe the use of various polymers in civil engineering. 4+2

Contd. ...

6. Write short notes on (any FOUR):

(a) Corrosion in Steel and its treatment

(b) Plastics, paints and varnishes

(c) Uses of rubber

(d) Importance of Sieve Analysis

(e) Griffith Theory of Brittle Fracture

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PURBANCHAL UNIVERSITY
2013 (New)

B. E. (Civil)/First Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG159CI: Construction Materials

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Explain the importance of construction materials in the Civil engineering field. Define Specific gravity, Specific heat capacity, Dielectric strength and abrasive resistance. 4+4

(b) Explain the Rockwell Hardness test of the materials with neat sketches. 8

2(a) Explain the characteristics of good stones. Describe the Sieve analysis. 4+4

(b) Explain different heat treatment methods. Explain on deformation of steel. 4+4

3(a) What is corrosion? Explain the types of corrosion. 2+6

(b) Why seasoning is done? Describe Air seasoning and kiln method of seasoning. 1+3+4

4(a) Give the characteristics of good timber. Explain the cross section of exogenous tree. 2+6

(b) What are the constituent of bricks and its functions? Also explain on harmful ingredients of brick. 6+2

5(a) Explain on manufacture of cement using flowchart by dry process. Explain on manufacture of white cement. 6+2

(b) Describe on testing of mortars. Define polymers and its type. 4+4

Contd. ...

PURBANCHAL UNIVERSITY
2011

B. E. (Civil)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG159CI: Construction Materials

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) What is the hardness of materials? Explain the procedure of Rockwell hardness test. 8

(b) What is bulking of sand? What are the properties of good stones? 8

2(a) Write the different alloy steels and their function. 4

(b) Define corrosion. Explain various types of corrosion in metals and method of prevention against corrosion. 12

3(a) What is seasoning of timber? Explain kiln seasoning and air seasoning with neat sketches. 12

(b) Define thermal conductivity, toughness, permeability, malleability. 4

4(a) What are the chief ingredients of good earth brick? Explain the harmful ingredients of earth bricks. 12

(b) Describe penetration test and ductility test of bitumen. 4

5(a) Explain the manufacturing process of ordinary Portland cement with neat flow diagram. 12

(b) Explain briefly about bitumen, asphalt and tar. 4

6. Write short notes on any FOUR: 4×4=16
(a) Sieve analysis
(b) Water cement ratio
(c) Griffith of brittle facture
(d) Microstructure of steel
(e) Basic types of paint

6. Write short notes on any FOUR:

(a) Types of asphalt cement

(b) Abrasives and additives

(c) Block board

(d) Tiles

(e) Griffith's theory

PURBANCHAL UNIVERSITY
2018

B. E. (Civil/Computer/E&C/Electrical)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG101SH: Engineering Mathematics-I *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Answer FIVE questions. **5×5=25**

1. If y = sinmx+cosmx, prove that $y_n = m^n\{1+(-1)^n \sin 2mx\}^{1/2}$.
2. State Maclaurin's series in infinite form. Obtain by Maclaurin's series, the expansion of *logsecx*.
3. Evaluate $\lim_{x\to\frac{\pi}{2}} (\sin x)^{\tan x}$
4. Show that for the ellipse $x^2/a^2 + y^2/b^2 = 1$, the radius of curvature at extremity of the major axis equal to half the latus rectum.
5. Find asymptotes of curve: $x^2(x-y)^2=4(x^2+y^2)$
6. Trace the curve $y=x^3-12x-16$.

Group B

Answer FIVE questions. **5×5=25**

7. Evaluate (any TWO):

   (a) $\int_0^1 \frac{1-x}{1+x}$ (b) $\int \frac{1}{1+\tan x}dx$ (c) $\int_0^{\pi/2} \frac{\sin\theta}{\sin\theta+\cos\theta}$

8. Find , from the first principle, the integral of $\int_0^1 \sqrt{x}\ dx$.
9. Define Beta and Gamma function. ~~Prove that~~ Evaluate $\int_0^1 x^6\sqrt{1-x^2}\ dx$

Contd. ...

10. Find the area of loop of the curve: $y^2(a^2+x^2)=x^2(a^2-x^2)$.

11. Prove that the volume and surface area of a sphere of radius r is $\frac{4}{3}\pi r^3$ and $4\pi r^2$ respectively.

12. Evaluate: $\iint xy(x+y)dxdy$ over the area bounded by the curve $y=x^2$ and straight line $y = x$.

Group C

Answer THREE questions. **3×5=15**

13. If the axis be turned through an angle $\theta=\tan^{-1}2$. What does the equation $4xy-3x^2=a^2$ become?

14. Find the nature of conic given equation
$25x^2-120xy+144y^2-2x-29y-1=0$.

15. Show that the line $x\cos\alpha+y\sin\alpha=P$ is tangent to the ellipse $x^2/a^2+y^2/b^2=1$ if $p^2=a^2\cos^2\alpha+b^2\sin^2\alpha$.

16. Find the centre, eccentricity, foci and directrices of the hyperbola $3x^2-16y^2+12x+32y+44=0$

Group D

Answer THREE questions. **3×5=15**

17. Prove by vector method:
$\cos(A - B) = \cos A.\cos B+\sin A.\sin B$

18. Define scalar triple product. Prove that:
$\left[\vec{a}+\vec{b}\ \ \vec{b}+\vec{c}\ \ \vec{c}+\vec{a}\right]=2[a\,\vec{b}\,c]$

19. Find the Cartesian and cylindrical coordinates of the point having spherical coordinate: $\sqrt{3}, \frac{\pi}{3}, -\frac{\pi}{2}$.

20. Find the distance from the point (2, 2, 3) to the plane $2x+y+2z=4$ (by vector method).

$r=5\sin\phi$

PURBANCHAL UNIVERSITY

2017

B. E. (Civil/Computer/E&C/Electrical)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG101SH: Engineering Mathematics-I *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Answer FIVE questions. 5×5=25

1. Prove that x/a+y/b=1 touches the curve $y=be^{-x/a}$ at the point where the curve crosses the axis of y.

2. Find the asymptotes of following curve

$$y^3-2xy^2-x^2y+2x^3+3y^2-7xy+2x^2+2y+2x+1=0$$

3. Find the extreme value of $\phi=x^2+y^2+z^2$ such that x+z=1 and 2y+z=2.

4. Evaluate the following limit $\lim_{x\to 0}(\cot x)^{1/\log x}$.

5. Expand the function log(1-x) in ascending powers of x up to the term containing x^5.

6. If $y=\log\left(x+\sqrt{a^2+x^2}\right)$, show that

$$(a^2+x^2)y_{n+2}+(2n+1)xy_{n+1}-n^2y_n=0$$

Group B

Answer FIVE questions. 5×5=25

7. Integrate (any TWO):

(a) $\int\sqrt{\frac{a+x}{a-x}}\,dx$ (b) $\int_0^{\pi/2}\left(\sqrt{\tan x}+\sqrt{\cot x}\right)dx$ (c) $\int_0^{\pi/4}\log(1+\tan\theta)\,d\theta$

8. Evaluate the integral by the method of summation $\int_0^{\pi/2}\cos x\,dx$.

Contd. ...

9. Obtain the reduction formula for $\int \cos^m x \sin nx\,dx$.

10. Find the area covered by the astroid $x^{2/3} + y^{2/3} = a^{2/3}$

11. Find the volume and surface area generated by the solid formed by the revolution of the curve $y=a(\theta+\sin\theta)$, $x=a(1+\cos\theta)$, about its base.

12. Change the order of integration and evaluate the following double integral $\int_{-a}^{a}\int_{0}^{\sqrt{a^2-y^2}} dx\,dy$.

Group C

Answer THREE questions. **3×5=15**

13. Find the point to which origin should be shifted to reduce the equation $3x^2-2xy+4y^2+8x-10y+8=0$ into one with linear term missing.

14. Show that the line $x\cos\alpha+y\sin\alpha=p$, touches the parabola $y^2=4a(x+a)$ of $p\cos\alpha+a=0$.

15. Show that $4x^2+16y^2-24x-32y-12=0$ is the equation of an ellipse. Find its vertices, foci, eccentricity and length of latus rectum.

16. The foci of a hyperbola coincide with the foci of the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$. Find the equation of the hyperbola if its eccentricity is $\sqrt{7}$.

Group D

Answer THREE questions. **3×5=15**

17. Find the equation of plane passes through the points (2, 4, 5), (1, 5, 7) and (-1,6,8).

18(a) Find the Cartesian co-ordinates of the point whose spherical coordinates are $\left(\sqrt{2}, \pi, \frac{3\pi}{2}\right)$.

Contd. ...

(b) Find the equation of line passes through a point (2, -9, 5) parallel to vector $\vec{v}=3\vec{i}-\vec{j}+4\vec{k}$.

19. Prove that $(\vec{b}\times\vec{c})(\vec{a}\times\vec{d})+(\vec{c}\times\vec{a})(\vec{b}\times\vec{d})+(\vec{a}\times\vec{b})(\vec{c}\times\vec{d})=0$ and de that $\mathrm{Sin}(A+B)\mathrm{Sin}(A-B)=\mathrm{Sin}^2A-\mathrm{Sin}^2B$

20. If is $\vec{a}$ vector, prove that $(\vec{a}.\vec{i})\vec{i}+(\vec{a}.\vec{j})\vec{j}+(\vec{a}.\vec{k})\vec{k}=\vec{a}$. Also p that $\vec{a}\times(\vec{b}+\vec{c})+\vec{b}\times(\vec{a}+\vec{c})+\vec{c}\times(\vec{b}+\vec{a})=0$.s

PURBANCHAL UNIVERSITY
2016

B. E. (Civil/Computer/E&C/Electrical)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG101SH: Engineering Mathematics-I *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Answer FIVE questions. **5×5=25**

1. If $y = a\cos(\log x) + b\sin(\log x)$, prove that
$$x^2 y_{n+2} + (2n+1)xy_{n+1} + (n^2+1)y_n = 0$$

2. Expand the following function using Maclaurin's theorem $f(x) = e^{\sin x}$.

3. Evaluate: $\lim_{x\to 0} \frac{(1+x)^{1/x} - e}{x}$.

4. Find the derivative sinx by first principle.

5. Find the asymptotes of the curve $r\theta = a\cos 2\theta$.

6. If $u = \cos^{-1}\frac{x+y}{\sqrt{x}+\sqrt{y}}$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \tan u$.

Group B

Answer FIVE questions. **5×5=25**

7. Integrate (any TWO):

(a) $\int\sqrt{\frac{a+x}{a-x}}\,dx$ (b) $\int_0^{\pi/2}\left(\sqrt{\tan x} + \sqrt{\cot x}\right)dx$ (c) $\int_0^{\pi/4}\log(1+\tan\theta)\,d\theta$

8. Evaluate the following integrates by first principle $\int_0^c x^3 dx$.

9. Obtain the reduction formula for $\int\sin^n x\,dx$ and find $\int\sin^6 x\,dx$.

Contd. ...

10. Find the area of the hypocycloid: $\left(\frac{x}{a}\right)^{2/3}+\left(\frac{y}{b}\right)^{2/3}=1$

11. Prove that the volume and surface area of a sphere of radius 'a' is $\frac{4}{3}\pi a^3$ and $4\pi a^2$.

12. Evaluate: $\int_0^1\int_0^{\sqrt{1+x^2}} \frac{1}{1+x^2+y^2}\,dx\,dy$

Group C

Answer THREE questions. 3×5=15

13. Find the co-ordinates of the mid points of the chord which the circle $x^2+y^2+4ax-2y-3=0$ cuts of the line $x-y+2=0$.

14. Show that the line $lx+my+n=0$ touches the parabola $y^2=4ax$ if $am^2=bl^2+nl$.

15. Find the condition that the line $lx+my+n=0$ may be normal to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$.

16. The foci of a hyperbola coincide with the foci of ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1$, find the equation of hyperbola if its eccentricity is 2.

Group D

Answer THREE questions. 3×5=15

17. Prove by vector method, in any ΔABC, $\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$.

18. Describe scalar and vector product of three vectors.

19. Find the set of reciprocal vectors of the following sets:
$-\vec{i}+\vec{j}+\vec{k}, -\vec{i}-\vec{j}+\vec{k}, -\vec{i}+\vec{j}-\vec{k}$

20. Find the equation of plane through the points (2,4,5), (1,5,7) and (-1,6,8) by vectors method.

PURBANCHAL UNIVERSITY
2015

B. E. (Civil/Computer/E&C/Electrical)/First Semester/*Final*
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG101SH: Engineering Mathematics-I *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Answer FIVE questions. **5×5=25**

1. $y = \sin\left(m\sin^{-1}x\right)$, prove that
   (a) $\left(1-x^2\right)y_2 - xy_1 + m^2y = 0$
   (b) $\left(1-x^2\right)y_{n+2} - (2n+1)xy_{n+1} + \left(m^2-n^2\right)y_n = 0$

2. Obtain the series expansion of e^{Sinx} by Maclaurin's theorem as far as the term x^4.

3. Evaluate: $\lim_{x\to 0}\left(\frac{1}{x^2} - \frac{1}{Sin^2x}\right)$.

4. Prove that the sum of the intercepts of the tangent to the curve $\sqrt{x}+\sqrt{y}=\sqrt{a}$ upon the co-ordinate axes is constant.

5. If $u=\tan^{-1}\frac{x^3+y^3}{x-y}$, x ≠# y prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \sin 2\mathcal{U}$

6. Find the asymptotes of the curve, $y^2\left(a^2+x^2\right) = x^2\left(a^2-x^2\right)$

Group B

Answer FIVE questions. **5×5=25**

7. Evaluate (any TWO):

   (a) $\int\frac{dx}{\sqrt{x}+x}$ (b) $\int_0^{\frac{\pi}{2}} Sin^4x\,dx$ (c) $\int\frac{d\theta}{\sqrt{5-4\sin\theta}}$

Contd. ...

8. Find the volume of a solid formed by rotation of a loop $ay^2 = x(a-x)^2$ about x-axis.

9. Evaluate, from first principles, $\int_a^b e^{mx}dx$.

10. Use Gamma function to prove that $\int_0^1 \frac{dx}{(1-x^6)^{1/6}} = \pi/3$

11. Find the perimeter of the asteroid: $x^{2/3} + y^{2/3} = a^{2/3}$

12. Evaluate: $\int_0^1 \int_0^{\sqrt{y}} (x^2 + y^2)dydx$

Group C

Answer THREE questions. **3×5=15**

13. Transform the equation $2x^2+4xy+5y^2-4x-22y+7=0$ to parallel axes through (-2.3).

14. A tangent to the parabola $y^2 = 8x$ makes an angle of 45^0 with the straight line y=3x+5. Find its equation.

15. Show that $9x^2+4x^2-18x-16y-11=0$ represents the equation of an ellipse. Find its, centre, vertex, focus, eccentricity.

16. Find the equation of the hyperbola whose eccentricity is 2, whose focus is (2,0) and whose directrix is x–y=0.

Answer THREE questions. **3×5=15**

17. If $[\vec{a}\ \vec{b}\ \vec{c}]=0$, prove that $[\vec{a}\times\vec{b}\quad \vec{b}\times\vec{c}\quad \vec{c}\times\vec{a}] = 0$

18. If $\vec{a}=\vec{i}+\vec{j}-2\vec{k}$ and $\vec{b}=2\vec{i}-\vec{j}-\vec{k}$ are any two vector find $|\vec{a}|, |\vec{b}|$, $\vec{a}.\vec{b}$ and the angle between the two vectors.

19. If $\vec{a}, \vec{b}, \vec{c}$ and $\vec{a'}, \vec{b'}, \vec{c'}$ are the reciprocal syste vectors, then $[\vec{a'}\ \vec{b'}\ \vec{c'}]\ [\vec{a}\ \vec{b}\ \vec{c}] = 1$.

20. Find the equation of the plane through the point (1,-1,0) perpendicular to the vector $2\vec{i} + \vec{J} + \vec{k}$

$9x^2+4y^2-18x-16y-11=0$

PURBANCHAL UNIVERSITY

2014 (New)

B. E. (Civil/Computer/E&C/Electrical)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG101SH: Engineering Mathematics-I

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt any Sixteen questions, selecting Five questions each from Group-A and B, Three questions each from Group-C and D.

Group A: (5×5=25)

1. If y = a.cos(logx) + bsin(logx), prove that $x^2 y_{n+2} + (2n+1)xy_{n+1} + (n^2+1)y_n = 0$

2. Expand tanx in ascending powers of x, using Maclaurin's series and hence get the expansion of Sec^2x.

3. Evaluate: $\lim_{x\to 0}\left(\frac{Sinx}{x}\right)^{1/x}$.

4. Prove that the condition that xcosα + ysinα = P should the curve $x^m y^n = a^{m+n}$ is $p^{m+n} m^m n^n = (m+n)^{m+n} a^{m+n} Sin^n \alpha Cos^n \alpha$.

5. Find the chord of curvature through the pole for the curve $r^2 = a^2 Cos2\theta$.

6. Trace the curve $(x^2+y^2)x = a(x^2-y^2)$

Group B: (5×5=25)

7. Evaluate: (a) $\int \frac{1}{(5+4Cosx)}dx$ (b) $\int_0^{\frac{\pi}{2}} \left(\sqrt{\tan x} + \sqrt{\cot x}\right)dx$

8. Prove that $\int_0^{\frac{\pi}{2}} \frac{\sqrt{Sinx}}{\sqrt{Sinx}+\sqrt{Cosx}}dx = \pi/4$

Contd. ...

9. Change the order of integration and evaluate integral $\int_0^{\infty}\int_x^{\infty} e^{-y^2/x}\,dy\,dx$.

10. If $I_{m,n} = \int_0^{\pi/2} Cos^m x Sinnx \; dx$, prove that

$$I_{m,n} = \frac{1}{m+n} + \frac{m}{m+n} I_{m-1,n-1}$$

11. Find the area of the asteroid

$$x^{2/3} + y^{2/3} = a^{2/3}$$

12. Find the volume of the solid generated by the revolution of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, about x-axis.

Group C: (3×5=15)

13. Find the point to which origin should be shifted to reduce the equation.
$3x^2 - 2xy + 4y^2 + 8x - 10y + 8 = 0$ into one with linear terms missing.

14. Find the equation of tangent to the circle $x^2 + y^2 = 9$ which is perpendicular to the line $4x - 3y + 5 = 0$.

15. Show that the line $lx+my+n = 0$ touches the parabola $y^2 = 4ax$ if $ln = am^2$.

16. If e and e' be the eccentricities of a hyperbola and its conjugate, prove that $\frac{1}{(e)^2} + \frac{1}{(e')^2} = 1$

Contd. ...

Group D: (3×5=15)

17. Calculate the modulus and unit vector in the direction of t sum of the vectors $\hat{i} + 4\hat{j} + 2\hat{k}, -2\hat{i} + 2\hat{j} + 6\hat{k}$ and $3\hat{i} - 3\hat{j} -$

18. Show that $\left[\vec{a}+\vec{b} \quad \vec{b}+\vec{c} \quad \vec{c}+\vec{a}\right] = 2\left[\vec{a} \; \vec{b} \; \vec{c}\right]$

19. If $\vec{a} = 7\hat{i} + 6\hat{j} + 5\hat{k}$, $\vec{b} = 4\hat{i} + 3\hat{j} + 2\hat{k}$, $\vec{c} = 2\hat{i} - 3\hat{j} + 4\hat{k}$ $\vec{d} = 5\hat{i} + 6\hat{j} - 7\hat{k}$ then verify that
$(\vec{a}\times\vec{b})(\vec{c}\times\vec{d}) = (\vec{a}.\vec{c})(\vec{b}.\vec{d}) - (\vec{b}.\vec{c})(\vec{a}.\vec{d})$

20. Find the distance 'd' between the point (2, -3, 4) and th $x + 2y + 2z = 13$.

PURBANCHAL UNIVERSITY

2013 (New)

B. E. (Civil/Computer/E&C/Electrical)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG101SH: Engineering Mathematics-I

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt any Sixteen questions, selecting Five questions each in from Group-A and B, Three questions each from Group-C and D.

Group A: (5×5=25)

1. If $x\cos\alpha + y\sin\alpha = p$ touch the curve $\frac{x^m}{a^m}+\frac{y^m}{b^m}=1$ show that $(a\cos\alpha)\frac{m}{m-1}+(b\sin\alpha)\frac{m}{m-1}=p\frac{m}{m-1}$.

2. If $y^{1/m}+y^{-1/m}=2x$, show that $(x^2-1)y_{n+2}+(2n+1)xy_{n+1}+(n^2-m^2)y_n=0$

3. Evaluate: $\lim_{x\to 0}\left(\frac{Sinx}{x}\right)^{1/x^2}$.

4. Trace the curve $y^2(a^2+x^2)=x^2(a^2-x^2)$

5. Find the radius of curvature of the curve $\sqrt{x}+\sqrt{y}=\sqrt{a}$ at the point where it cuts the line y = x.

6. If $u = Sin^{-1}\frac{x^2+y^2}{x+y}$, Prove that $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=Tanu$.

Group B: (5×5=25)

7. Evaluate: (a) $\int\frac{x^2+2x-1}{2x^2+3x+1}dx$ (b) $\int_1^2\frac{dx}{x(1+x^4)}$

233.

Contd.....

8. Show that $\int_0^1 \frac{\log x}{\sqrt{1-x^2}}dx = \pi/2 \log 1/2$

9. Use Gamma function to prove $\int_0^{\pi/6} Cos^4 3\theta \, Sin^2 6\theta = \frac{5\pi}{192}$.

10. Find the area of the loop of the curve $y^2 = x^2(x+a)$

11. Find the circumference of the circle $x^2 + y^2 = a^2$

12. Evaluate: $\int_0^1 \int_x^{\sqrt{x}} (x^2 + y^2)\,dy\,dx$

Group C: (3×5=15)

13. Find the equation of tangent to circle $x^2 + y^2 = 4$ which is parallel to $3x + 4y - 5 = 0$.

14. Prove that the line $lx + my + n = 0$ touches the parabola $y^2 = 4ax$ if $ln = am^2$.

15. Find the value K so that the straight line y = x + k may touch the ellipse $2x^2 + 9y^2 = 144$.

16. If the axes be turned through an angle $Tan^{-1}2$, what does the equation $4xy - 3x^2 = a^2$ become?

Group D: (3×5=15)

17. Show that $4\bar{i} + 5\bar{j} + \bar{k}, -\bar{j} - \bar{k}, 3\bar{i} + 9\bar{j} + 4\bar{k}$ and $-4\bar{i} + 4\bar{j} + 4\bar{k}$ are coplanar.

18. If $\bar{a}, \bar{b}, \bar{c}$ are three non-coplanar vectors, then express $\bar{a}, \bar{b}, \bar{c}$ interms of $\bar{b} \times \bar{c}$, $\bar{c} \times \bar{a}$ and $\bar{a} \times \bar{b}$.

Contd. ...

19. Prove that $(\bar{b} \times \bar{c})(\bar{a} \times \bar{d}) + (\bar{c} \times \bar{a})(\bar{b} \times \bar{d}) + (\bar{a} \times \bar{b})(\bar{c} \times \bar{d}) =$ and deduce that Sin (A+B). Sin(A–B) = $Sin^2A - Sin^2B$

20. Find the angle between the two planes 3x – 6y – 2z = 7 and 2x – 2z = 5 by using vector method.

=

$\vec{a} \cdot (\vec{b} \times \vec{c}) \neq 0$

$\vec{a} = a\vec{i} + a\vec{j} + a\vec{k}$

$\vec{b}, \vec{c}$

PURBANCHAL UNIVERSITY
2018

B.E. (Civil)/First Semester/*Final*
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG104SH: Chemistry *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions, selecting at least TWO questions from Group A and ONE from Group B and C.

Group A

1(a) What do you mean by wave function? Derive Schrodinger's wave equation for electron having mass 'm' and total energy 'E'. 2+8

(b) What are the essential conditions for acceptable wave function? Write significances of Ψ and Ψ^2. 3+3

2(a) An element of atomic number 11 combines with elements of atomic number 17. Which types of chemical bond is formed? Explain the formation of bond and write the characteristics of its compound. 8

(b) Explain the free electron gas model for formation of metallic bonding. Explain the following properties metal on the basis of this model, (i) Malleability and ductility, (ii) Electrical and thermal conductivity. 8

3(a) State and explain the Ostwald's dilution law. Find the PH of 0.002M acetic acid solution if it is 3.2% ionized. 8

(b) What do you mean by standard electrode potential? Find the emf of the cell $Cu+2Ag^{+} \rightarrow Cu^{2+}+2Ag$ at 25°c, when molarity of copper ion is 0.13M and molarity of silver ion is 1.10M and reduction potential values of copper and silver are 0.34 volt and 0.80 volt respectively. 8

4. Write short notes any TWO: 8+8
(a) Electronic configuration

Cu → anode
Ag → cathode.

Contd. ...

(b) Quantum numbers
(c) Buffer solution and its PH measurement

Group B

5(a) Write the main postulates of valence bond theory. How does it explain the inner and outer orbital complexes of octahedral complexes? Explain. 2+3+3=8

(b) How did Werner's theory explain the formation of complex compounds? 8

6. What is meant by transition element? Why do zinc, cadmium and mercury not consider as transition elements? Write coloured formation and complex formation properties of transition elements. 2+2+6+6

7. Write short notes on any TWO: 8+8
(a) Magnetic properties of complexes
(b) Legends
(c) Variable oxidation number of transition elements.

Group C

8. Write the mechanisms, reactivity order kinetics and configurations of SN1 and SN2 type of reactioss. 16

9(a) What is Geometrical isomerism? What are different conditions of Geometrical isomerism? Explain with examples. 2+6

(b) What is Grignard reagent? How is it prepared? Explain different properties of Grignard reagent in the synthesis of different compounds. 1+1+6

10. Write short notes on any TWO: 8+8
(a) Addition reaction
(b) Explosives
(c) Polymer and polymerization

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/First Semester/*Final*
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG104SH: Chemistry *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions, selecting at least TWO questions from Group A and ONE from Group B and C.

Group A

1(a) Define buffer. Derive Henderson equation to calculate the pH of the buffer consisting of a weak acid and its salt. 2+6

(b) Define electrode potential. Calculate the emf of following cell at 25°C. 8

$$Zn\left|Zn^{2+}(1.25M)\right\|Ag^{+}(1.10M)\left|Ag\right.$$

$$E^{\circ}_{Zn^{2+}/Zn} = -0.76V \quad E^{\circ}_{Ag^{+}|Ag} = +0.80V$$

2(a) Derive Schrodinger's wave equation and write the physical significances of ψ and ψ^2. 8+2

(b) Define quantum number. Explain the types of quantum number and their significances. 2+4

3(a) Define metallic bond on the basis of 'electron gas theory'. How does it explain the different properties of metal? 8

(b) Explain electrovalency with examples. Write the Characteristics of electrovalent compounds. 2+3+3

4. Write short notes on any TWO: 8+8
(a)Stability of Noble gases
(b) Standard Hydrogen Electrode.
(c) Aufbau Principle and Hund's rule

Contd. ...

Group B

5(a) Give the Postulates of Werner's co-ordination theory. 2+2

(b) How does Valence bond theory explain the formation of four-coordinated complexes? Illustrate with two suitable examples. 6+6

6(a) What do you mean by paramagnetism and diamagnetism? Explain the cause of origin of paramagnetism in transition elements. 4+4

(b) List out the members of first transition series with their electronic configurations. 8

7. Write short notes on any TWO: 8+8
   (a) Double salt and complex salt
   (b) Variable oxidation stages
   (c) High skin and low skin complexes

Group C

8. What is nucleophilic substitution reaction? Briefly explain S_N1 and S_N2 paths of such reaction in halo alkane describing kinetics, reactivity and stereochemistry. 4+5+5+2

9(a) Define optical activity. What is the condition for a compound to be optically active? Differentiate between optical isomerism with geometrical isomerism. 6

(b) Give an account of the stereoisomerism of organic compounds having two asymmetric carbon atoms. 10

10. Write short notes on any TWO: 8+8
   (a) Polymers
   (b) Grignard's Reagent
   (c) High and Low explosives

PURBANCHAL UNIVERSITY
2016

B.E. (Civil)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG104SH: Chemistry *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions, selecting at least TWO questions from Group A and ONE from Group B and C.

Group A

1(a) Derive the Schrödinger's time independent equation in three dimensional forms and write the significance of Ψ and Ψ^2. 8+2

(b) Define Pauli's exclusion principle. What is the main generalization of this principle? Write the electronic configuration of copper and chromium. 4+2

2(a) Define weak electrolyte. How is degree of ionization related with dilution in case of weak electrolyte? Explain. 2+6

(b) Define electrode potential and standard electrode potential. How electrode potential is originated? Calculate the electrode potential of copper wire dipped in 0.1 molar copper sulphate solutions at 25°C. Given $E°_{Cu^{++}}/Cu$=+0.34V, F=96500C, R=8.314 J kg^{-1} mol_{-1}. Assume $CuSO_4$ is completely ionized. 2+2+4

3(a) What do you mean by electrovalent bond? Explain with examples. What are the general characteristics of electrovalent compounds? 4+4

(b) What do you mean by crystal? Define the term crystal lattice, lattice point and unit cell. 2+3+3

4. Write short notes on any TWO: 8+8

(a) Galvanic cell

(b) Quantum numbers

(c) Henderson's equation

Contd. ...

Group B

5(a) What do you mean by complex compound? How does it differ from double salt? 2+2

(b) Write the postulates of valence bond theory. Explain the geometry and magnetic properties of $[CO(NH_3)6]^{3+}$ ion on the basis of VBT. 6+6

6(a) Discuss the characteristics of transition metals with respect to (i) variable oxidation state and (ii) magnetic properties. 4+4

(b) Write the names of elements of first transition series with their electronic configurations. 8

7. Write short notes on any TWO: 8+8
   (a) Werner's theory
   (b) Colour formation in complex compound
   (c) High skin and low skin complexes

Group C

8. Define substitution reaction and Elimination reaction. Explain the mechanism of E_1 and E_2 reaction. 3+3+5+8

9(a) What is stereoisomerism? Write about different types of stereoisomerism. 2+6

(b) Give the method of preparation and synthetic utilities of Grignard's reagent. 8

10. Write short notes on any TWO: 8+8
    (a) Polymers
    (b) High explosives and low explosives
    (c) Markonikov's and anti-Markonikov's Rule

Dhruv yadav. (PUSET)

PURBANCHAL UNIVERSITY

2015

B.E. (Civil)/First Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG104SH: Chemistry *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions, selecting at least TWO questions from Group A and ONE from Group B and C.

Group A

1(a) Define buffer solution. Derive the Henderson's equation pH for of acid buffer solution. 2+8

(b) What would be the pH of a solution obtained by mixing 1gm of acetic acid and 1.5 gm of sodium acetate in the volume 200ml? Given (dissociation constant of acetic acid=1.75×10^{-5} at 25°C. 6

2(a) What do you mean by quantum numbers? What are their significances? What are the permitted values of n land m for $2p_z$ atomic orbital? 2+3+3

(b) Derive time independent. Schrödinger's ware equation for the electron in atom. 8

3(a) Define electrovalent bond. Explain the formation NaCl. 4+2

(b) Explain the metallic bond on the basis of Electron gas mode. Illustrate the following properties of metal on the basis of metallic bond: 4+3+3

(i) Electrical and thermal conductivity

(ii) Malleability and ductility

4. Write short notes on any TWO: 8+8

(a) Corrosion and its prevention

(b) Lattice points and crystal lattice

(c) Galvanic cell

Contd. ...

Group B

5(a) What are co-ordination compounds? Explain the terms? (i) Ligands and (ii) Co-ordination Number. 5+5

(b) What do you mean by complex ion? Write the IUPAC name of the following coordination compounds: 2+4

(i) $[Pt(NH_3)_2 Cl_2]^{2+}$ (ii) $k[Ag(CN)_2]$

(iii) $[AuCl_4]$ (iv) $[CO(H_2O)_6]Cl_3$

6(a) What are transition elements? Why are they called so? Why are the species such as Zn^{2+}, Cd^{2+}, Hg^{2+} not regarded as transition elements 2+3+3

(b) Explain the following, giving reasons for your answer: 4+4

(a) Mn(II) ion shows maximum magnetic character among the bivalent ions of first transition series.

(b) $[Ti(H_2O)_6]^{3+}$ is colored while $[Sc(H_2O)_6]^{3+}$is colorless.

7. Write short notes on any TWO: 8+8

(a) Postulates of VBT

(b) Double salt and complex salt

(c) Applications of coordination compounds

Group C

8(a) Define carbocation and carboanion? How do SN1 and SN2 reaction differ in Haloalkane. 4+4

(b) Explain the mechanism of addition and elimination reaction with suitable examples. 4+4

9. Define isomerism. How optical isomer differs form Geometrical isomers? Illustrate optical and Geometrical isomers with suitable examples. 2+6+4+4

10. Write short notes on any TWO: 8+8

(a) Markovikov's rule and Peroxide effect

(b) Low explosives and high explosives

(c) Properties and uses of Grignard's reagent

PURBANCHAL UNIVERSITY
2014 (New)

B.E. (Civil)/First Semester/Final

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG104SH: Chemistry

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions, selecting at least TWO questions from Group A and ONE from Group B and C.

Group A

1(a) Derive the Schrodinger time independent wave equation. Write the significances of Ψ and Ψ^2. 8+4

(b) What is Pauli's Exclusion principle? Illustrate with example. 4

2(a) Explain Ostwald's dilution law. Write it's limitation. A buffer solution contains 0.015M of ammonium hydroxide and 0.025M of ammonium chloride. Calculate the P^H value of solution. Dissociation constant of NH_4OH at room temperature is 1.8×10^{-5}. 4+2+4

(b) How standard electrode potential of an electrode is determined? Illustrate with example.

$Zn\,|\,Zn^{2+}\,(0.01M)||Ag^{+}(0.15M)|Ag.$ 3

$E^0_{Zn^{2+}|Zn} = -0.76V$

$E^0_{Ag^{+}|Ag} = +0.80V$

3(a) Explain electrovalent bond with suitable examples. What are the characteristics of ionic compounds. 6+4

(b) Define crystal lattice. Explain the structure of NaCl. 6

4. Write short notes on any TWO: 8+8

(a) Aufbau principle

(b) Galvanic Cell

(c) Metallic bond

Contd. ...

Group B

5(a) What are co-ordination compounds? Explain the primary and secondary valency of the central metal atom in co-ordination compounds. 2+8

(b) What do you mean by complex ion? Write the IUPAC name of the following co-ordination compounds. 2+4

(i) $[PtCl6]^{4-}$ (ii) $[Ag(NH_3)_2]Cl$ (iii) $[ZnCl_4]^{2-}$ (iv) $[Co(H_2O)_6]Cl_3$

6. What are transition elements? Why are they called so? Why do transition metals? 2+2+4+4+4

(i) tendency to show magnetic properties
(ii) give colored compounds
(iii) form complex compounds

7. Write short notes on any TWO: 8+8

(a) V.B.T.
(b) Double salt and complex salt
(c) Applications of coordination compounds

Group C

8. What do you mean by nuclephilic substitution reaction? Explain the Kinetics and reactivity of SN1 and SN2 reactions with suitable example. 2+7+7

9. What is organometallic compound? How Grignard reagent is prepared? Show the reactions of Grignard reagent with: 2+4+4+3+3

(a) aldehydes and ketone
(b) Carbon dioxide
(c) Water

10. Write short notes on any TWO: 8+8

(a) Synthetic and natural polymers
(b) Optical isomerism
(c) High and low explosives

PURBANCHAL UNIVERSITY
2013 (New)

.E. (Civil)/First Semester/*Chance*

me: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

EG104SH: Chemistry

andidates are required to give their answers in their own words as far s practicable.

ll questions carry equal marks. The marks allotted for each sub-question specified along its side.

nswer FIVE questions, selecting at least TWO questions from roup A and ONE from Group B and C.

Group A

(a) Derive Schrodinger's wave equation. Explain the significance of Ψ and Ψ^2. 8+2

(b) The uncertainity in the position and velocity of a particle are 9.54×10^{-10}m and 5.5×10^{-20} ms^{-1} respectively. Calculate the mass of the particle. ($h=6.6\times10^{-34}$ kg m^2s^{-1}). 6

(a) Define a buffer solution. Explain with an example. Why pH of buffer solution does not change significantly on small addition of acid or bases? Derive Henderson equation to calculate the pH of the buffer consisting of weak acid and its salt. 2+6+4

(b) A buffer solution contains 0.1 moles/litre of both CH_3COOH and CH_3COONa. Calculate the pH of solution when 0.001 moles of HCl is added to one litre of the buffer solution Pka=4.74. 4

(a) What is an ionic bond? What are the necessary conditions for the formation of an ionic bond? Write down the characteristic of ionic compound. 2+4+4

(b) What is meant by electrode potential? Calculate the emf of the cell: Zn/Zn^{+2} (0.001M) | |Ag^{+}(0.1M)/Ag. The standard potential of
Ag/Ag^{+}=–0.80V
Zn/Zn^{+2}= +0.76V 2+4

Write notes on any TWO: 8+8
(a) Types of hybridisation (b) Corrosion and its control
(c) Quantum number

Contd. ...

PURBANCHAL UNIVERSITY
2012

B. E. (Civil/First Semester/Final

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG175CO: Computer Concept and Programming

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer ALL questions.

1(a) What is a computers? List out and explain some of the important characteristics of a computer. 1+4

(b) Draw a block diagram showing basic computer system and explain each block briefly. 2+3

2. Explain about the operating system and its types. Why GUI operating system is more popular than text based operating system? 7+3

3(a) What do you mean by primary storage? How does it differ from secondary storage? 2+3

(b) What is the difference between impact and non impact printers? Write in detail about sound system. 2+3

4. Perform the following conversion. 2×5=10
(a) $(11101011)_2 = (?)_{10}$
(b) $(ABC)_{16} = (?)_8$
(c) $(135)_8 = (?)_2$
(d) $(110001)_2 = (?)_{16}$
(e) $(1AF)_{16} = (?)_{10}$

5(a) What is word processor? Write the essential features of word processor. 2+3

(b) Define database, Write the advantages of using computerized filing system over traditional filing system. 2+3

Contd. ...

6(a) What is flowchart? Draw the flowchart for the program which checks whether the entered number is divisible by both 5 and 7 or not. 2+3

(b) Write a program to find sum of the series given below:

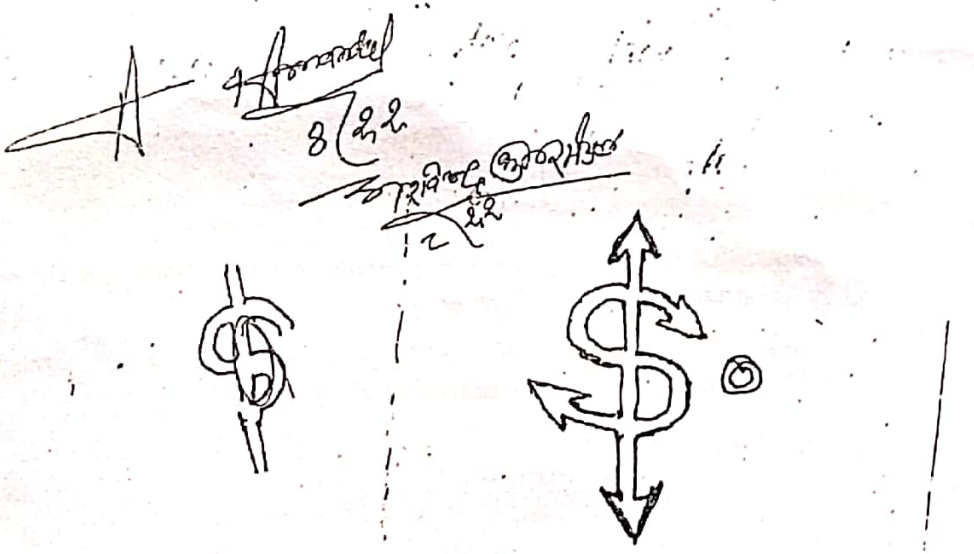
1! + 2! + 3! + 4! + ... + N! 5

7(a) What do you mean by loop. Differentiate between do loop and while loop. 1+4

(b) WAP to display the prime numbers in the range 100-200. 5

8(a) What is array? How array is different from structure. 2+3

(b) WAP to generate the Fibonacci series (1 1 2 3 ..... n). 5



Group B

5(a) What are 'd' block elements? Write the name and electronic configuration of 3d transition elements. Which of the 3d series element is not considered as transition element and why? 2+4+2

(b) Explain the characteristic properties of transition element with reference to (i) magnetic behaviour and (ii) Coloured compound. 4+4

6. Give the difference between Inner orbital and Outer orbital complex. Explain the formation of $[Ni(NH_3)_6]^{+2}$ and $[Co(NH_3)_6]^{+3}$ on the basis of VB.T. Also predict its geometry and magnetic behaviour with reason. 4+4+4+4

7. Write short notes on any TWO: 2×8=16

(a) Valence bond theory

(b) Effective atomic number and its application

(c) Double salt and complex salt

Group C

8(a) How does substitution reaction differ from elimination reaction? Explain the kinetics and mechanism involved when tertiary alkyl halide reacts with aqueous alkali. 2+6

(b) State and explain Markownikoff's rule and peroxide effect with detailed mechanism. 4+4

9(a) What is optical activity? Write the necessary condition for a compound to show the optical activity. 2+6

(b) State and illustrate enantiomers, raomic mixture and meso compound with an example each. Also explain their optical activity. 6+2

10. Write notes on any TWO: 2×8=16

(a) Explosive

(b) Types of polymerisation

(c) Preparation and uses of Grignard Reagent