

M

(Printed Pages 3)

(20514)

Roll No.

B.Tech. II Sem.

G-45

B. Tech. Examination, May 2014

Ag Engg.

Computer Science

BT-214(O)

Time : Two Hours /

/Maximum Marks : 50

Note : Attempt any **five** questions. All questions carry equal marks.

1. Draw & define CPU and its components in detail. 10
2. List the examples of following (At least three):
(i) Input device
(ii) Output device
(iii) Peripheral
(iv) Storage media 10

P.T.O.

3. What do you mean by Computer Hardware and Software? Define their types also. 10
4. What is data flow diagram? Define the various symbol used to draw the dataflow diagram. 10
5. Differentiate between translator-interpreter-compiler. 10
6. Convert the following : 10
- (i) $(540)_8 = (?)_2$
 - (ii) $(C8)_{16} = (?)_2$
 - (iii) $(1010.1100)_2 = (?)_{10}$
 - (iv) $(1011.0010)_2 = (?)_{16}$
 - (v) $(10101010)_2 = (?)_8$
7. What is computer network? What are the advantages of computer network? Explain how LAN is different from WAN? 10

8. Define operating system. Explain the different functions performed by an operating system. 10
9. Explain the classification of computers based on processing speed, memory & size. 10
10. Explain the various MS Office tools : 10
- (i) MS-Word
 - (ii) MS-Excel
 - (iii) MS-Power Point

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(Printed Pages 2)

(20514)

Roll No.

B.Tech. II Sem.

G-45(F)

B. Tech. Examination, May 2014

Ag Engg.

Agronomy

[BT-219(N)]

Time : Two Hours /

/Maximum Marks : 50

Note : Attempt any **five** questions. Each ques-
tions carries equal marks.

1. What is Agronomy? Explain its role in Ag. Engg. 10
2. Which are different weather parameters and how do they affect crop growth and yield?
3. What do you mean by tilth? How will you maintain good tilth in soil by tillage implements? 10
4. Explain soil-water-plant relationship. 10

P.T.O.

5. What do you mean by water requirement of crops? How does it affect irrigation scheduling? 10
6. What is crop rotation? Explain principles and utility of crop rotation. 10
7. What do you understand by cropping systems? Explain mono-cropping, double cropping and multiple cropping.
8. What do you mean by soil moisture conservation? Explain various measures to be adopted for moisture conservation in soil.
9. What is mixed cropping? Explain principles and benefits of mixed cropping. 10
10. Describe cultivation practices adopted in raising sugarcane crop. 10

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(20514)

Roll No.

B.Tech. II Sem.

G-34

B.Tech. Examination, May 2014

Computer Concepts & Programming in C

[BT-202 (O)]

Time : Three Hours / Maximum Marks : 100

Note : Attempt any five questions. All questions carry equal marks.

1. (a) What is the advantage of writing pseudo-code before writing a program? Explain with the help of a suitable example. 5
- (b) What is correctness of a program? Explain. 5
- (c) Write a program in C to read a list of numbers from a file into an array, read a number and position from keyboard, insert that number at the given position and write this modified array to another file. 10

P.T.O.

2. (a) Write down the basic data types available in C along with their widths in bytes and their data ranges. How can we modify them using type modifiers? 6
- (b) What is operator precedence? Explain the operator precedence used in C. 4
- (c) Distinguish between the top-down and the bottom-up approaches to program development. 10
3. (a) Convert the following numbers as indicated: 10
- (i) Octal to decimal: 706
 - (ii) Decimal to Hex: 4096
 - (iii) Hex to Octal: 72BF
 - (iv) Binary to grey: 1101101
 - (v) Find the value of the base b in the conversion: $(16)_{10} = (100)_b$
- (b) What are standard C pre-processor directives? Explain #define, #ifndef, #ifdef, #pragma and #error. 10

4. (a) What are the two approaches of developing a program? Explain the top-down approach and bottom-up approach giving their advantages and disadvantages. 10
- (b) WAP to read a date as mm, dd, yyyy and the day on 1st January, and find out the day on the specified date. 10
5. What is function? How many types of functions are there in C? Explain actual and format parameters. WAP to read a number and find out if it is an automorphic number or not. A number n is automorphic number if the sum of the factorials of its digits is equal to n. For example: $145 = 1! + 4! + 5!$ 20
6. What is recursion? Describe two types of recursive functions that exist. Write a recursive function to find out the greatest common divisor (gcd). 20

G-3418013

P.T.O.

7. Write a C program that implements the selection sort algorithm. Also show how the numbers will shift if the given numbers are sorted in ascending order using selection sort algorithm: (25, 14, 4, 9, 30, 22). 20
8. What is dynamic memory allocation and how is it achieved in C? Implement a linked list in C where each node stores a string and any node in the list can be deleted or inserted. 20
9. Work through Binary search algorithm on an ordered file with keys (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16) and determine the number of key comparisons made while searching for the key 2. Write a program that illustrates binary search on a sorted array of integers. 20
10. What are matrices and how they may be initialized? Write down five salient features of matrices. Write a program to read a rectangular matrix and find out if the sum of all the border elements is greater than 100. 20

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(Printed Pages 4)

(20514)

Roll No.

B.Tech.-II Sem.

TU-414

B.Tech. Examination, May 2014

Common Paper in All Branches

Mathematics - II

(BT-205)

Time : Three Hours / Maximum Marks : 100

Note: Attempt any five questions.

1. (a) Solve the O.D.E $\frac{dy}{dx} = \sin(x+y)$. 10

(b) Solve $(1+y^2) dx = (\tan^{-1} y - x) dy$

10

2. (a) Show that $P_n(x) = \frac{1}{2^n n!} \frac{d^n}{dx^n} (x^2 - 1)^n$

10

P.T.O.

(b) Find the inverse Laplace transform of

$$\frac{s}{(s^2 + 1)(s^2 + 4)}. \quad 10$$

3. (a) Prove that $J_{1/2}(x) = \sqrt{\frac{2}{\pi x}} \sin x. 10$

(b) Find the Laplace transform of

$$f(t) = \frac{e^{-4t} \sin 3t}{t}. \quad 10$$

4. (a) Solve by changing the independent variable 10

$$(1+x)^2 \frac{d^2 y}{dx^2} + (1+x) \frac{dy}{dx} + y = 4 \cos \log (1+x)$$

(b) Solve $(D^4 - 1)y = e^x \cos x$

where $D \in \frac{d}{dx} (\therefore)$ 10

5. (a) Solve $(x^2 D^2 - x D - 3) y = x^2 \log x$
 10

(b) Solve dy method of variation of parameter. 10

$$\frac{d^2 y}{dx^2} + y = \operatorname{cosec} x$$

6. Find series solution about $x = 0$ of the differential eq"

$$x \frac{d^2 y}{dx^2} + \frac{dy}{dx} - y = 0 \quad 20$$

7. (a) Find Laplace transform of unit step function. 4

(b) State and prove that convolution theorem. 16

8. (a) Solve the following O.D.E by Laplace transform method

$$(D^2 - D - 2)y = Z_0 \sin z t, y(0) = -1,$$

$$y'(0) = 2 \quad 10$$

(b) Solve 10

$$(mz - ny) \frac{\partial z}{\partial x} + (nx - \ell z) \frac{\partial z}{\partial y} = \ell y - mx$$

9. Solve the partial differential equation by method of variables separable method (separation of variables)

$$\frac{\partial^2 z}{\partial x^2} - 2 \frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 0. \quad 20$$

10. (a) Find Laplace transform of Periodic function:

$$f(t) = \begin{cases} t, & 0 < t \leq c \\ 2c - t, & c < t < 2c \end{cases} \quad 10$$

(b) Find Laplace transform of the function:

$$f(t) = (2014)^t. \quad 10$$

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(20514)

Roll No.

B.Tech. II Sem.

G-45

B. Tech. Examination, May 2014

Ag Engg.

Computer Science

BT-214(O)

Time : Two Hours /

/Maximum Marks : 50

Note : Attempt any **five** questions. All questions carry equal marks.

1. Draw & define CPU and its components in detail. 10
2. List the examples of following (At least three):
(i) Input device
(ii) Output device
(iii) Peripheral
(iv) Storage media 10

P.T.O.

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B.Tech. II Sem.

G-45(F)

B. Tech. Examination, May 2014

Ag Engg.

Agronomy

[BT-219(N)]

Time : Two Hours /

/Maximum Marks : 50

Note : Attempt any **five** questions. Each ques-
tions carries equal marks.

1. What is Agronomy? Explain its role in Ag. Engg. 10
2. Which are different weather parameters and how do they affect crop growth and yield?
3. What do you mean by tilth? How will you maintain good tilth in soil by tillage implements? 10
4. Explain soil-water-plant relationship. 10

P.T.O.

5. What do you mean by water requirement of crops? How does it affect irrigation scheduling? 10
6. What is crop rotation? Explain principles and utility of crop rotation. 10
7. What do you understand by cropping systems? Explain mono-cropping, double cropping and multiple cropping.
8. What do you mean by soil moisture conservation? Explain various measures to be adopted for moisture conservation in soil.
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B.Tech. II Sem.

G-34

B.Tech. Examination, May 2014

Computer Concepts & Programming in C

[BT-202 (O)]

Time : Three Hours / Maximum Marks : 100

Note : Attempt any five questions. All questions carry equal marks.

1. (a) What is the advantage of writing pseudo-code before writing a program? Explain with the help of a suitable example. 5
- (b) What is correctness of a program? Explain. 5
- (c) Write a program in C to read a list of numbers from a file into an array, read a number and position from keyboard, insert that number at the given position and write this modified array to another file. 10

P.T.O.

2. (a) Write down the basic data types available in C along with their widths in bytes and their data ranges. How can we modify them using type modifiers? 6
- (b) What is operator precedence? Explain the operator precedence used in C. 4
- (c) Distinguish between the top-down and the bottom-up approaches to program development. 10
3. (a) Convert the following numbers as indicated: 10
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 - (v) Find the value of the base b in the conversion: $(16)_{10} = (100)_b$
- (b) What are standard C pre-processor directives? Explain #define, #ifndef, #ifdef, #pragma and #error. 10

4. (a) What are the two approaches of developing a program? Explain the top-down approach and bottom-up approach giving their advantages and disadvantages. 10
- (b) WAP to read a date as mm, dd, yyyy and the day on 1st January, and find out the day on the specified date. 10
5. What is function? How many types of functions are there in C? Explain actual and format parameters. WAP to read a number and find out if it is an automorphic number or not. A number n is automorphic number if the sum of the factorials of its digits is equal to n. For example: $145 = 1! + 4! + 5!$ 20
6. What is recursion? Describe two types of recursive functions that exist. Write a recursive function to find out the greatest common divisor (gcd). 20

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P.T.O.

7. Write a C program that implements the selection sort algorithm. Also show how the numbers will shift if the given numbers are sorted in ascending order using selection sort algorithm: (25, 14, 4, 9, 30, 22). 20
8. What is dynamic memory allocation and how is it achieved in C? Implement a linked list in C where each node stores a string and any node in the list can be deleted or inserted.
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9. Work through Binary search algorithm on an ordered file with keys (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16) and determine the number of key comparisons made while searching for the key 2. Write a program that illustrates binary search on a sorted array of integers.
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10. What are matrices and how they may be initialized? Write down five salient features of matrices. Write a program to read a rectangular matrix and find out if the sum of all the border elements is greater than 100.
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(20514)

Roll No.

B.Tech.-II Sem.

TU-414

B.Tech. Examination, May 2014

Common Paper in All Branches

Mathematics - II

(BT-205)

Time : Three Hours / Maximum Marks : 100

Note: Attempt any five questions.

1. (a) Solve the O.D.E $\frac{dy}{dx} = \sin(x+y)$. 10

(b) Solve $(1+y^2) dx = (\tan^{-1} y - x) dy$

10

2. (a) Show that $P_n(x) = \frac{1}{2^n n!} \frac{d^n}{dx^n} (x^2 - 1)^n$

10

P.T.O.

(b) Find the inverse Laplace transform of

$$\frac{s}{(s^2 + 1)(s^2 + 4)}. \quad 10$$

3. (a) Prove that $J_{1/2}(x) = \sqrt{\frac{2}{\pi x}} \sin x. 10$

(b) Find the Laplace transform of

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4. (a) Solve by changing the independent variable 10

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where $D \in \frac{d}{dx} (\therefore)$ 10

5. (a) Solve $(x^2 D^2 - x D - 3) y = x^2 \log x$
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(b) Solve dy method of variation of parameter. 10

$$\frac{d^2 y}{dx^2} + y = \csc x$$

6. Find series solution about $x = 0$ of the differential eq"

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G-45

B. Tech. Examination, May 2014

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Computer Science

BT-214(O)

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Roll No.

B.Tech. II Sem.

G-45(F)

B. Tech. Examination, May 2014

Ag Engg.

Agronomy

[BT-219(N)]

Time : Two Hours /

/Maximum Marks : 50

Note : Attempt any **five** questions. Each ques-
tions carries equal marks.

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2. Which are different weather parameters and how do they affect crop growth and yield?
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(20514)

Roll No.

B.Tech. II Sem.

G-34

B.Tech. Examination, May 2014

Computer Concepts & Programming in C

[BT-202 (O)]

Time : Three Hours / Maximum Marks : 100

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P.T.O.

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P.T.O.

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(Printed Pages 4)

(20514)

Roll No.

B.Tech.-II Sem.

TU-414

B.Tech. Examination, May 2014

Common Paper in All Branches

Mathematics - II

(BT-205)

Time : Three Hours / Maximum Marks : 100

Note: Attempt any five questions.

1. (a) Solve the O.D.E $\frac{dy}{dx} = \sin(x+y)$. 10

(b) Solve $(1+y^2) dx = (\tan^{-1} y - x) dy$

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2. (a) Show that $P_n(x) = \frac{1}{2^n n!} \frac{d^n}{dx^n} (x^2 - 1)^n$

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P.T.O.

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Printed Pages : 4

(20514)

B.Tech. II Sem.

Roll No.

G-42

B.Tech. Examination, May 2014

Ag. Engg.

Thermodynamics & Heat Engines

[Code No. BT-212]

Time : Three Hours

[Maximum Marks : 100]

Note: Attempt any five questions. All questions carry equal marks.

1. Discuss the following terms : 10
 - (a) System, Surrounding and Boundary.
 - (b) Closed and open systems.

(1)

G-42/60

2. (a) State Zeroth law of thermodynamics with neat sketch and what is the significance of zeroth law of thermodynamics? 10
- (b) Derive Steady Flow Energy Equation (S.F.E.E.). 10
3. (a) State two major statements of second law of thermodynamics with neat sketches. 10
- (b) Explain Carnot cycle with neat sketches on P-V and T-S diagrams. Also write the equation for Carnot efficiency. 10
4. (a) State Carnot theorem and define entropy with example. 10
- (b) Find the C.O.P. and heat transfer rate in a condenser of a refrigerator in KJ/hr which has a regeneration capacity of 12000 KJ/hr when power input is 0.75KW. 10

5. (a) Define "Dryness fraction" and explain its significance. 5

(b) Explain the phase transformation of ice into vapour at constant pressure. 15

6. (a) List the various factors on the basis of which steam boilers are classified. 10

(b) What are boiler accessories? Mention and three boiler accessories. Explain any one boiler accessory with neat sketch. 10

7. (a) Derive an expression for Air standard efficiency of Otto cycle with P-V and T-S diagram. 10

(b) Explain Rankine cycle with neat sketch on P-V and T-S diagram. 10

8. (a) Explain B.P. and I.P. of an engine. 10
- (b) A two-stroke cycle Petrol engine has a piston diameter of 110mm and stroke length of 140mm. Mean effective pressure exerted on head of piston is 600 KN/M^2 . If it runs at 1000 r.p.m., find the I.P. of the engine. 10

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Roll No.

B.Tech.-II Sem.

G-41(B)

B.Tech. Examination, May 2014

AG. ENGG.

Engineering Mechanics

[BT-215(N)]

Time : Three Hours

Maximum Marks : 100

Note: Attempt any five questions. All questions carry equal marks.

1. Explain following with suitable Figure. 5x4
 - (i) Coplaner force system
 - (ii) Non Coplaner force system
 - (iii) Condition of equilibrium
 - (iv) Vector and scalar quantities
2. (a) Two vectors A & B are given as 10
 $\vec{A} = 4i - 3j - 2k$
 $\vec{B} = 3i + 2j - k$

Determine Dot product and angle between them.

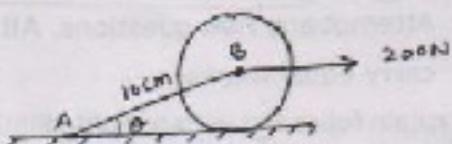
P.T.O.

(b) State and prove Varignon's Theorem.

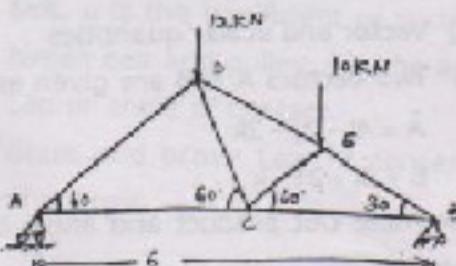
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3. (a) State all types of assumption made during Truss / frames analysis. 10

(b) A circular roller of radius 6 cm and weight 10N rests on a smooth horizontal surface and held in a position by an inclined bar AB of length 10 cm as shown in fig. A horizontal force of 200 N is acting at B. Find the tension in the Bar AB and the vertical reaction at C. 10



4. Determine the axial forces in all members of the truss with loading as shown in fig. .20



G-41(B)\140\2

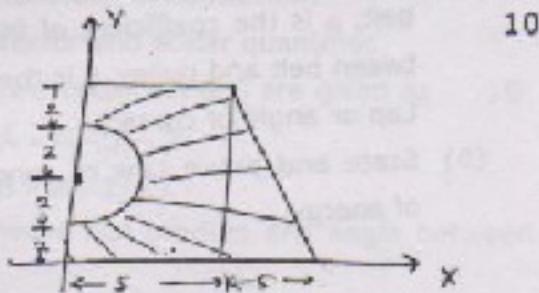
5. Define & Explain the following: 5x4

- (i) Laws of Machine
- (ii) Static & Dynamic Friction
- (iii) Mechanical advantage
- (iv) Angle of friction

6. (a) An uniform ladder of length 10m and weighing 20 N is placed against a smooth vertical wall with its lower end 8 m from the wall. In this Position the ladder is just to slip. Determine

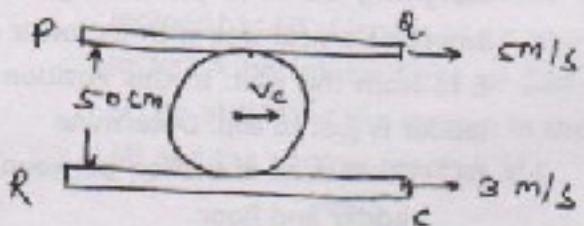
- (i) Coefficient of friction between the ladder and floor
- (ii) Frictional force acting on the ladder at the point of contact between ladder and floor 10

(b) Locate the centroid of the L-section as shown in fig., all dimensions are in mm.



7. A cylindrical roller 50 cm in diameter, is in contact with two conveyor belts at its top and bottom as shown in figure. If the belts run at uniform speed of 5m/sec and 3m/sec. Find the Linear velocity and angular velocity of the roller.

20



8. (a) Prove the relation $\frac{T_1}{T_2} = e^{\mu\theta}$, where T_1 is the tension in Tight side of the belts and T_2 is the tension in slack side of the belt, μ is the coefficient of friction between belt and pulley, θ is the angle of lap or angle of contact.
- (b) State and prove Law of conservation of energy.

10

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(Printed Pages 4)

(20514)

Roll No.

B.Tech. II Sem.

G-42(C)

B.Tech. Examination, May 2014

Ag. Engg.

Engineering Mathematics-II

[BT-216(N)]

Time : Three Hours] Maximum Marks : 100

Note : Attempt any five questions.

1. (a) A particle moves along a curve whose parametric equation are $x = e^{-t}$, $y = 2 \cos 3t$, $z = 2 \sin 3t$, where t is the time. $10 \times 2 = 20$

- (i) Determine its velocity and the acceleration at any time.
(ii) Find the magnitude of velocity and acceleration at $t = 0$.

- (b) Show that :

$$\nabla \cdot \left(\frac{\vec{r}}{r^3} \right) = 0, \text{ where } \vec{r} = xi + yj + zk$$

P.T.O.

2. Verify divergence theorem for the function

$$\vec{F} = (x^2 - yz)\hat{i} + (y^2 - zx)\hat{j} + (z^2 - xy)\hat{k}$$

taken over the rectangular parallelopiped
 $0 \leq x \leq 1, 0 \leq y \leq 1, 0 \leq z \leq 1.$ 20

3. (a) Solve :

$$3e^x \tan y \, dx + (1 + e^x) \sec^2 y \, dy = 0,$$

given by $y = \pi/4$ when $x = 0.$

(b) Solve : 20

$$(1 + y^2) \, dx = (\tan^{-1} y - x) \, dy$$

4. (a) Solve the following differential equation:

$$\frac{d^3y}{dx^3} + 3\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + y = e^{-x} \quad 10 \times 2 = 20$$

(b) $(D^2 - 4D + 4)y = e^{-4x} + 5 \cos 3x,$

$$D = \frac{d}{dx},$$

5. (a) Solve the Homogeneous differential equation : 10 \times 2 = 20

$$x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \log x \sin(\log x)$$

(b) Evaluate by Green's theorem -

$$\int_C [(\cos x \sin y - xy)dx + (\sin x \cos y)dy]$$

where C is the circle $x^2 + y^2 = 1$

6. (a) Show that : $\int_{-1}^1 P_n(x) dx = 2$, $10 \times 2 = 20$
when $n = 0$ and 0 when $n \neq 0$.

- (b) Prove that $(1 - 2xz + z^2)^{-\frac{1}{2}}$ is a solution of the equation

$$z \frac{\partial^2}{\partial z^2}(zv) + \frac{\partial}{\partial x} \left[(1 - x^2) \frac{\partial v}{\partial x} \right] = 0$$

7. (a) Prove that : $10 \times 2 = 20$

$$x J_n' = n J_n - x J_{n+1}$$

- (b) Prove that :

$$J_{n+2} + J_{n+5} = \frac{2}{x} (n+4) J_{n+4}$$

8. (a) Reduce the matrix $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$.

to the upper triangular form by using
elementary transformation and also
compute its rank. 10

(b) Show that the system of equations

$$x + y + z = 3, \quad 3x + y - 2z = -2,$$

$$2x + 4y + 7z = 7 \text{ is not consistent.}$$

9. For what values of a and b do the equations :

20

$$x + 2y + 3z = 6$$

$$x + 3y + 5z = 9$$

$$2x + 5y + 9z = b \text{ have}$$

- (i) No solution
- (ii) a unique solution
- (iii) an infinite number of solutions

10. (a) Find the Eigen values and Eigen vectors of the matrix :

10×2=20

$$A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 6 \end{bmatrix}$$

- (b) State Cayley-Hamilton theorem. Find the characteristic equations of the matrix

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$

and hence compute A^{-1} .

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(20514)

Roll No.

B.Tech.- II Sem.

G-43D

B.Tech. Examination, May 2014

Agricultural Engineering

Surveying & Levelling

(BT-217N)

Time : Three Hours] [Maximum Marks : 100

Note : There are eight questions in the paper.

Candidate has to attempt any five questions. Question No. 1 is compulsory. Use of scientific calculator is permitted.

- | | |
|---------------------------------|-------|
| 1. Define the following terms : | 20 |
| (a) Change point | |
| (b) Datum surface | |
| (c) Reduced level | |

P.T.O.

- (d) Bench Mark
- (e) Fore sight
2. (a) Calculate the correct length, if measured length of line AB is 850.5 metre measured by a metric chain 15cm too short. 10
- (b) The distance between two points as measured by a 30m chain was 5000 metre. If the chain was 20cm too short, determine the correct distance. 10
3. The following bearings were observed while running a compass traverse. Calculate the interior angles of the traverse. 20

Line	Fore bearing	Back bearing
AB	$45^{\circ}15'$	$225^{\circ}15'$
BC	$123^{\circ}15'$	$303^{\circ}15'$
CD	$181^{\circ}0'$	$1^{\circ}0'$
DA	$289^{\circ}30'$	$109^{\circ}30'$

4. A and B are two point 0.20Km apart on the near bank of the river which flow East to West. The bearings of the tree on the far bank as observed from A & B are N 60° E & N 45° W. Determine the width of the river.

20

5. Explain the different accessories used in chain surveying. 20
6. Write in details the characteristics and uses of contours. 20
7. Enlist the different types of levels used in levelling. Give their relative advantages and disadvantages. 20
8. Explain the steps that are required for conducting the following types of plane table

surveying :

20

- (I) Radiation
- (ii) Intersection
- (iii) Traversing

Draw explanatory sketches.

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(Printed Pages 6)

(20514)

Roll No.

B.Tech. II Sem.

G-41

B. Tech. Examination, May 2014

AG. ENGG. BRANCH

ENGINEERING MECHANICS

[BT-215 (O)]

Time : Three Hours / Maximum Marks : 100

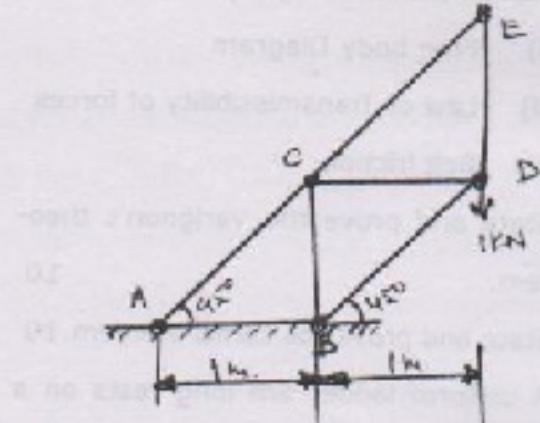
Note: Attempt any five questions.

1. (a) Explain the following : 10
 - (i) Free body Diagram
 - (ii) Law of Transmissibility of forces
 - (iii) Belt friction
(b) State and prove the Varignon's theorem. 10
2. (a) State and prove the Lami's theorem. 10
(b) A uniform ladder 5m long rests on a horizontal ground and leans against a

P.T.O.

smooth-vertical wall at an angle 70° with the horizontal. The weight of the ladder is 300N. The ladder is on the verge of sliding when a man weighing 750N stands on a rung 1.5 m high. Calculate the coefficient of friction between the ladder and the floor. 10

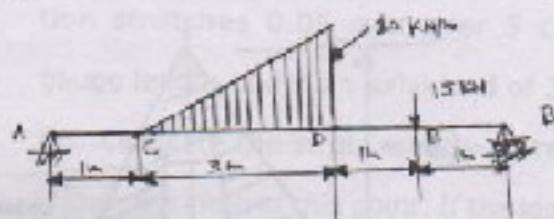
3. Determine the axial forces in the bars of a plane truss loaded as shown in the figure.



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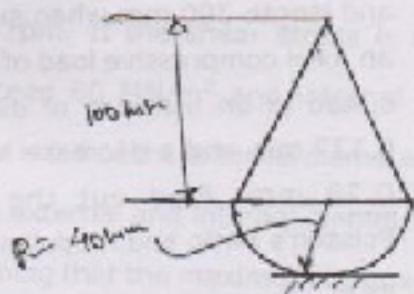
4. (a) What do you mean by truss? Explain how to analyze truss through method of section. 10

(b)



5. (a) Derive an equation for MI of a circular disc. 10

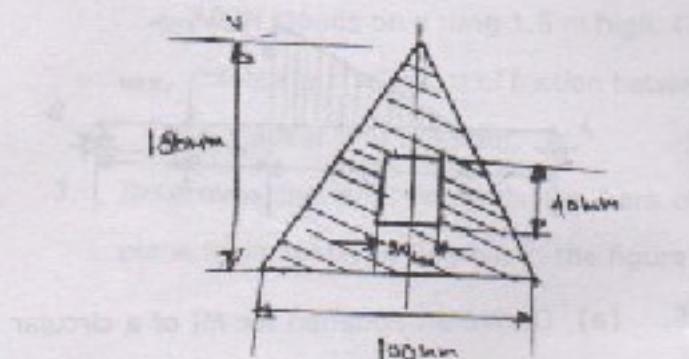
(b) Find out the centre of Gravity of a given body. 10



6. (a) Explain with proof parallel axis theorem.

10

(b) Find the MI of a given figure about its base.



7. (a) Derive a relation between E, C & K. 10

(b) A concrete cylinder of diameter 150 mm and length 300 mm when subjected to an axial compressive load of 240KN resulted in an increase of diameter by 0.127 mm and a decrease in length of 0.28 mm. Find out the value of Poisson's Ratio and modulus of Elasticity E.

8. (a) Derive strain Energy in Simple Tension and compression. 10 ..
- (b) A steel specimen 1.5 cm^2 in cross-section stretches 0.05 mm over 5 cm gauge length under an axial load of 30 KN. Calculate the strain energy stored in the specimen at this point. If the load at the elastic limit for specimen is 50 KN, calculate the elongation at the elastic limit and the resilience. 9
9. (a) Derive a Bending Equation. 10
- (b) A hollow shaft is to transmit 300 KW at 80 rpm. If the shear stress is not to exceed 60 MN/m^2 and internal diameter is 0.6 of the external diameter. Find the external and internal diameters assuming that the maximum torque is 1.4 times the mean. 1

10. (a) Derive the Torsion Equation. 10
- (b) Determine the dimensions of Joist of a timber for span 8m to carry a brick wall 200 mm thick and 5m high, if the density of brick work is 1850 Kg/m^3 and the maximum permissible stress is limited to 7.5 KN/m^2 . Given that the depth of Joist is twice of the width. 10

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(20514) Roll No.

B.Tech. - II Sem.

G-40

B.Tech. Examination, May 2014

Agricultural Engineering

Engineering Mathematics - II

[BT-216(Old)]

Time : Three Hours / Maximum Marks : 100

Note : (i) Attempt any **five** questions.

(ii) Marks are shown against each question.

1. (a) Find a unit vector normal to the surface $xy^3z^2 = 4$ at the point $(-1, -1, 2)$. 5
- (b) Find the directional derivative of $\phi = x^2yz + 4xz^2$ at the point $(1, -2, -1)$ in the direction of the vector $2\hat{i} - \hat{j} - 2\hat{k}$. 5
- (c) A vector field is given by $\mathbf{F} = (x^2 - y^2 + x)\hat{i} - (2xy + y)\hat{j}$. Show that the field is irrotational and find its scalar potential. 10

P.T.O.

2. (a) Verify Stoke's theorem for
 $F = (x^2 + y^2)\hat{i} - 2xy\hat{j}$ taken around the rectangle bounded by the lines
 $x = \pm a, y = 0, y = b$ 10

(b) Evaluate

$$\int_S F \cdot ds \text{ where } F = 4x\hat{i} - 2y^2\hat{j} + z^2\hat{k} \text{ and}$$

S is the surface bounding the region,
 $x^2 + y^2 = 4, z = 0$ and $z = 3$. 10

3. (a) Show that $f(z) = \bar{z}$ is non-analytic anywhere. 5

- (b) Show that $f(z) = xy + iy$ is continuous everywhere but not analytic. 5

- (c) State and prove necessary and sufficient conditions for the existence C-R equations. 10

4. (a) Determine whether the function $u = e^{-2xy} \sin(x^2 - y^2)$ is harmonic. If it is harmonic, find the conjugate harmonic function v such that $f(z) = u + iv$ is analytic. 10

(b) If $f(z) = \begin{cases} x^3y(y - ix) / (x^6 + y^2), & z \neq 0 \\ 0, & z = 0 \end{cases}$

prove that $[f(z) - f(0)]/z \rightarrow 0$ along any radius vector but not as $z \rightarrow 0$ along the curve $y = ax^3$. 10

5. (a) Find a Fourier series to represent $x - x^2$

from $x = -\pi$ to $x = \pi$. Also deduce that

$$\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots \quad 10$$

- (b) Express $f(x) = x$ as a half-range cosine series in $0 < x < 2$. 10

6. (a) Find the Fourier series for the periodic function : 10

$$f(x) = \begin{cases} 0, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$$

$$f(x + 2\pi) = f(x)$$

- (b) Obtain the constant term and the coefficients of the first sine and cosine terms in the Fourier expansion of y as given in the following table : 10

$$x : 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5$$

$$y : 9 \quad 18 \quad 24 \quad 28 \quad 26 \quad 20$$

7. (a) Solve : $(x^2 - y^2 - z^2)p + 2xyq = 2xz$. 5

- (b) Solve : $p(1+q) = qz$ 5

- (c) Solve : $(p^2 + q^2)y = qz$

by Charpit's method. 10

8. (a) Solve

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6 \frac{\partial^2 z}{\partial y^2} = y \cos x \quad 10$$

- (b) Solve $r^4 s + 4t = e^{2x+y}$. 10

9. (a) Using the method of separation of variables, solve 10

$$\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u,$$

where $u(x,0) = 6e^{-3x}$

- (b) Obtain the solution of the one-dimensional heat-flow equation 10

$$\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$$

by the method of separation of variables.

10. A tightly stretched string of length l with fixed end is initially in equilibrium position. It is set vibrating by giving each point a velocity $v_0 \sin^3 \frac{\pi x}{l}$. Find the displacement $y(x,t)$.

M

(Printed Pages 3)

(20514)

Roll No.

B.Tech. II Sem.

G-44'E'

B.Tech. Examination, May 2014

Ag Engg.

Thermodynamics

BT-218(N)

Time : Two Hours /

[Maximum Marks : 50]

Note: Attempt any five questions. All questions carry equal marks.

1. What is Intensive and Extensive properties of a system? State whether the following properties are intensive or extensive. 10

- (a) Area
- (b) pressure
- (c) Volume
- (d) Density
- (e) Specific heat
- (f) Specific density

P.T.O.

2. What is Kelvin-Planck statement of 2nd law of thermodynamics? How is it different from Clausius Statement.
3. What are boiler mounting and boiler accessories? Explain briefly any one of the boiler mountings. 10
4. State First law of thermodynamics. Differentiate between work and internal energy. 10
5. Explain with the help of a neat diagram "fire tube boiler"? 10
6. A 4-stroke petrol engine develops 50 kw of Indicated power and consumes 16 litres of petrol per hour of specific gravity 0.755. The Calorific value of fuel used is 44500KJ/Kg. Find its indicated thermal efficiency
If the engine runs at 300rpm. When it develops 50 kw power, find its bore and length of the stroke, if the indicated mean effective pressure is 5.2 bar,
Assume length of stroke = $1.1 \times \text{bore}$

7. Derive the efficiency and mean effective pressure of Otto cycle. 10
8. Differentiate between fire tube and water tube boiler. 10
9. Explain Rankine cycle with the help of P-V, T-S and h-s diagram 10
10. Write short note on any two: $5 \times 2 = 10$
 - (a) Boiler accessories
 - (b) First law of Thermodynamics
 - (c) Second law of Thermodynamics

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(Printed Pages 4)

(20514)

Roll No.

B.Tech. - II Sem.

G-40(A)

B.Tech. Examination, May 2014

Ag. Engg. Branch

Engineering Chemistry

BT-214(N)

Time : Three Hours / Maximum Marks : 100

Note : Attempt any five questions. All questions carry equal marks.

1. (a) Explain Additional and Condensational Polymers. 10
(b) Explain Vulcanization of natural rubber. 10
2. Explain Cement Manufacturing with the help of a diagram.

P.T.O.

3. (a) Explain fuel and characteristic of a good fuel. 10

(b) Explain gobar gas production. 10

4. Write notes on any four.

(a) Nylon 6

(b) Terelene

(c) Buna-N

(d) Teflon

(e) P.V.C.

(f) Butyl-Rubber

5. (a) Explain Corrosion and Stress Corrosion.

10

(b) Explain type of Lubricants. 10

6. Explain Lime-Soda or Zeolite process for Water Softening.

7. Write notes on : $5 \times 4 = 20$

- (a) Units of Hardness,
- (b) Units of Calorific Value,
- (c) Chemical bonding and type of bonding.
- (d) Hardness and type of Hardness.

8. Write notes on any two : $10 \times 2 = 20$

- (a) Coal gas
- (b) Oil gas
- (c) Glass and two type of glass

9. Calculate temp. and Permanent Hardness of Water Containing :

- (a) $MgCl_2$ - 9.5 Mg/L
- (b) $MgSO_4$ - 24.0 Mg/L
- (c) $CaCl_2$ - 22.2 Mg/L
- (d) $CaSO_4$ - 13.6 Mg/L
- (e) $Ca(HCO_3)_2$ - 8.1 Mg/L
- (f) $Mg(HCO_3)_2$ - 7.3 Mg/L

7. Write notes on : $5 \times 4 = 20$

- (a) Units of Hardness,
- (b) Units of Calorific Value,
- (c) Chemical bonding and type of bonding,
- (d) Hardness and type of Hardness.

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- (d) $CaSO_4$ - 13.6 Mg/L
- (e) $Ca(HCO_3)_2$ - 8.1 Mg/L
- (f) $Mg(HCO_3)_2$ - 7.3 Mg/L

10. (a) Explain determination of calorific value
by Bomb Calorimeter. 10

(b) 0.80 gm. of a fuel, When burnt in a
bomb Calorimeter increased the temp.
of water from 25.8°C to 27.1°C . If
Calorimeter contains 320 gm. of water
and its water Equivalent is 100 gm. Cal-
culate the H.C.V. of the fuel. 10

M

(Printed Pages 3)

(20514)

Roll No.

B.Tech. II Sem.

G-38

B.Tech. Examination, May 2014

Manufacturing Processes

[BT-210(O)]

Time : Two Hours]

[Maximum Marks : 50

Note: Attempt any five questions.

1. (a) Explain the following terms: 5
Ductility, Brittleness, Toughness, Hardness, Malleability.
- (b) Classify different carbon steels on the basis of percentage of carbon. 5
2. (a) Write a short note on heat treatment of steels. 5
- (b) What is brass? Describe the compositions, properties and uses of a few important types of brasses. 5

P.T.O.

3. (a) What is hot working? What are its advantages and limitations? 5
- (b) What is hot extrusion? Describe direct extrusion and indirect extrusion in brief. 5
4. (a) What are the essential qualities of a good sand? What are its main constituents? 5
- (b) What are different casting defects and its remedies? 5
5. (a) Explain the term 'machining'. Which factors govern the selection of a machine tool? 5
- (b) Explain the construction, working of drilling or milling machine. 5
6. (a) Classify the different welding processes. 5

- (b) Explain the processes of soldering and brazing and its uses. 5
7. (a) What are the different types of production? Difference between production and productivity. 5
- (b) What are the difference between soft wood and hard wood? 5
8. (a) How plastics are classified? How do thermosetting plastics differ from thermoplastics? 5
- (b) What are the different methods of producing metal powders? Describe the atomisation process in detail. 5

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(Printed Pages 4)

(20514)

Roll No.

B.Tech. II Sem.

TU-006

B.Tech. Examination, May 2014

Remedical English Language

BT-206

Time : Two Hours]

[Maximum Marks : 50

Note : All questions are compulsory.

Unit -I

1. Fill in the correct form of noun given in bracket. 05
 - (i) Do you have _____? (scissors/scissor)
 - (ii) I do not wear _____(spectacle/spectacles)
 - (iii) Convey my _____to her. (thank/thanks)
 - (iv) I shall not give _____ to the poor. (alm/alm's)
 - (v) I like _____(music/musics)

P.T.O.

2. Fill in appropriate pronoun. 05
- (i) We scored as many goals as _____ (they/them)
 - (ii) Rama and _____ were present, (I/me)
 - (iii) Let you and _____ try what we can do. (I/me)
 - (iv) One should obey _____ parents. (one's/his)
 - (v) Nobody but _____ was present. (he/him)

3. Fill in appropriate preposition. 05
- (i) He is accused _____ theft.
 - (ii) I am not envious _____ you.
 - (iii) You should not be hostile _____ your classmates.
 - (iv) She is good _____ mathematics.
 - (v) One can rely _____ oneself.
4. Change the following into the passive. 05
- (i) Do you write a letter?
 - (ii) Why is he not singing a song?

- (iii) I gave him a gift.
- (iv) He will send a letter tomorrow.
- (v) People say figs are good for health.

Unit - II

5. Fill in the correct tense of modals. 05
- (i) If I drop it, it _____ explode. (will/would)
 - (ii) Even if I dropped it, it _____ not explode (will/would)
 - (iii) If he had delayed, the plane _____ have left, (will/would)
 - (iv) If you smoked in the classroom, the teacher _____ object (will/would)
 - (v) If she did not smoke so much, she _____ get rid of her cough (may/might)
6. Change the following sentence as per direction given in bracket. 05
- (i) There is my good brother. His name is Sohan. (combine into simple sentence)
 - (ii) In received no answer. I knocked sec-

ond time. (combine into simple sentence)

(iii) He felt tried. He laid his work aside.

(combine into simple sentence)

(iv) The way was long. The wind was cold.

(combine into compound sentence)

(v) He is poor. He is honest. (combine into

complex sentence)

Unit - III

7. Write a paragraph of about 100 words on any topic of your choice keeping in mind the concept of unity and coherence. 5

Unit - IV

8. Write an essay on any one the following topics in about 500 words. 15

(i) Information Technology: Its uses and abuses

(ii) Internet as a tool of communication

(iii) Noise Pollution

(iv) Engineering as a career

(v) Terrorism

M

(Printed Pages 3)

(20514)

Roll No.

B.Tech. II Sem.

G - 43

B.Tech. Examination, May 2014

Ag. Engg.

Surveying & Levelling

[BT- 217 (O)]

Time : Three Hours]

[Maximum Marks : 100]

Note: Attempt any five questions. All questions carry equal marks.

1. What do you mean by Surveying? Also classified it in detail. 20

2. Explain the instruments used in chain surveying and write the procedure of a chain survey executed in field. 20

3. Define Contouring and explain in detail about characteristics of Contouring. 20

P.T.O.

4. List the chaining. The true length of line measured from a plan as per scale was 1276.56 m. When the line was measured with a 30m long chain, the length was measured as 1274.54m. Find the true length of chain. 20
5. Discuss in brief about different methods of plain surveying and explain in detail any one.

20

6. What do you understand by levelling? Explain with help of neat diagram, working of dumpy level. 20
7. Explain with help of appropriate diagram working and use of prismatic compass.
8. The following consecutive readings were taken with a dumpy level –

G-43\6012

0.874 1.543 2.796 3.018 0.944 0.662

0.579 0.241 1.522 0.956 2.125
Total

The instrument was shifted after fourth and eighth reading. Bench mark of reduced level is 819.765. Solve the problem by Rise and Fall Methods.

20

9. Inlist various instruments required while do-

ing plain surveying and explain their work-
ing.

20

10. Write short notes on any four : $5 \times 4 = 20$

(i) Station

(ii) Traversing

(iii) Direct method of contouring

(iv) Bench mark

(v) Back and four sight

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(Printed Pages 3)

(20514)

Roll No.

B.Tech.- II Sem.

G-44

B.Tech. Examination, May 2014

Ag. Engg.

Workshop Technology

BT-213(O)

Time : Two Hours /

/Maximum Marks : 56

Note : Attempt any five questions.

1. Describe with neat sketches, the following

arc welding processes : 10

(a) TIG welding

(b) MIG welding

2. What do you understand by 'Gas Welding'?

Also, Describe with neat diagram different

types of oxy-acetylene flames. 10

P.T.O.

3. What is the Moulding Sand? Discuss the properties of Moulding Sand used in casting processes. 10
4. What is working principle of Lathe Machine?
How a centre lathe is specified? 10
5. Write short note on any 'two' of the following : 10
- (a) Drilling
 - (b) Boring
 - (c) Up-Milling
 - (d) Down-Milling
6. What are the main parts of the shaper? Label it on a block diagram of shaper. 10
7. Differentiate between column and knee type universal milling machine. 10

8. Explain Electric arc welding with suitable sketch. What do you understand by the polarity in welding? 10

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B.Tech. II Sem.

Roll No.

G-42

B.Tech. Examination, May 2014

Ag. Engg.

Thermodynamics & Heat Engines

[Code No. BT-212]

Time : Three Hours

[Maximum Marks : 100]

Note: Attempt any five questions. All questions carry equal marks.

1. Discuss the following terms : 10
 - (a) System, Surrounding and Boundary.
 - (b) Closed and open systems.

(1)

G-42/60

2. (a) State Zeroth law of thermodynamics with neat sketch and what is the significance of zeroth law of thermodynamics? 10
- (b) Derive Steady Flow Energy Equation (S.F.E.E.). 10
3. (a) State two major statements of second law of thermodynamics with neat sketches. 10
- (b) Explain Carnot cycle with neat sketches on P-V and T-S diagrams. Also write the equation for Carnot efficiency. 10
4. (a) State Carnot theorem and define entropy with example. 10
- (b) Find the C.O.P. and heat transfer rate in a condenser of a refrigerator in KJ/hr which has a regeneration capacity of 12000 KJ/hr when power input is 0.75KW. 10

5. (a) Define "Dryness fraction" and explain its significance. 5

(b) Explain the phase transformation of ice into vapour at constant pressure. 15

6. (a) List the various factors on the basis of which steam boilers are classified. 10

(b) What are boiler accessories? Mention and three boiler accessories. Explain any one boiler accessory with neat sketch. 10

7. (a) Derive an expression for Air standard efficiency of Otto cycle with P-V and T-S diagram. 10

(b) Explain Rankine cycle with neat sketch on P-V and T-S diagram. 10

8. (a) Explain B.P. and I.P. of an engine. 10
- (b) A two-stroke cycle Petrol engine has a piston diameter of 110mm and stroke length of 140mm. Mean effective pressure exerted on head of piston is 600 KN/M^2 . If it runs at 1000 r.p.m., find the I.P. of the engine. 10

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Roll No.

B.Tech.-II Sem.

G-41(B)

B.Tech. Examination, May 2014

AG. ENGG.

Engineering Mechanics

[BT-215(N)]

Time : Three Hours

/Maximum Marks : 100

Note: Attempt any five questions. All questions carry equal marks.

1. Explain following with suitable Figure. 5x4
 - (i) Coplaner force system
 - (ii) Non Coplaner force system
 - (iii) Condition of equilibrium
 - (iv) Vector and scalar quantities
2. (a) Two vectors A & B are given as 10
 $\vec{A} = 4i - 3j - 2k$
 $\vec{B} = 3i + 2j - k$

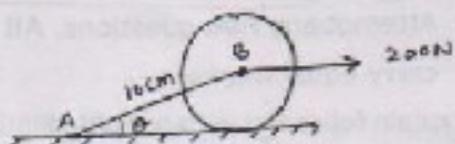
Determine Dot product and angle between them.

P.T.O.

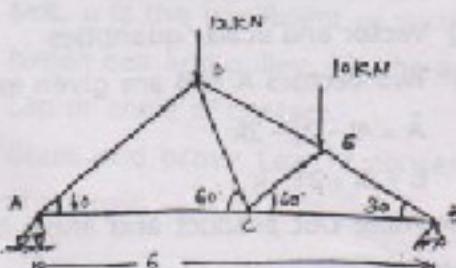
(b) State and prove Varignon's Theorem.

10

3. (a) State all types of assumption made during Truss / frames analysis. 10
(b) A circular roller of radius 6 cm and weight 10N rests on a smooth horizontal surface and held in a position by an inclined bar AB of length 10 cm as shown in fig. A horizontal force of 200 N is acting at B. Find the tension in the Bar AB and the vertical reaction at C. 10



4. Determine the axial forces in all members of the truss with loading as shown in fig. .20



G-41(B)\140\2

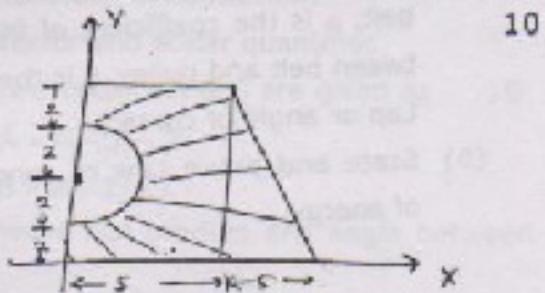
5. Define & Explain the following: 5x4

- (i) Laws of Machine
- (ii) Static & Dynamic Friction
- (iii) Mechanical advantage
- (iv) Angle of friction

6. (a) An uniform ladder of length 10m and weighing 20 N is placed against a smooth vertical wall with its lower end 8 m from the wall. In this Position the ladder is just to slip. Determine

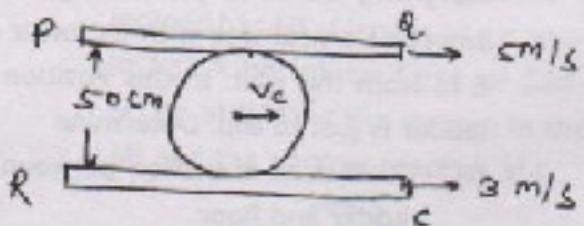
- (i) Coefficient of friction between the ladder and floor
- (ii) Frictional force acting on the ladder at the point of contact between ladder and floor 10

(b) Locate the centroid of the L-section as shown in fig., all dimensions are in mm.



7. A cylindrical roller 50 cm in diameter, is in contact with two conveyor belts at its top and bottom as shown in figure. If the belts run at uniform speed of 5m/sec and 3m/sec. Find the Linear velocity and angular velocity of the roller.

20



8. (a) Prove the relation $\frac{T_1}{T_2} = e^{\mu\theta}$, where T_1 is the tension in Tight side of the belts and T_2 is the tension in slack side of the belt, μ is the coefficient of friction between belt and pulley, θ is the angle of Lap or angle of contact.
- (b) State and prove Law of conservation of energy.

10

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Roll No.

B.Tech. II Sem.

G-42(C)

B.Tech. Examination, May 2014

Ag. Engg.

Engineering Mathematics-II

[BT-216(N)]

Time : Three Hours] Maximum Marks : 100

Note : Attempt any five questions.

1. (a) A particle moves along a curve whose parametric equation are $x = e^{-t}$, $y = 2 \cos 3t$, $z = 2 \sin 3t$, where t is the time. $10 \times 2 = 20$

- (i) Determine its velocity and the acceleration at any time.
(ii) Find the magnitude of velocity and acceleration at $t = 0$.

- (b) Show that :

$$\nabla \cdot \left(\frac{\vec{r}}{r^3} \right) = 0, \text{ where } \vec{r} = xi + yj + zk$$

P.T.O.

2. Verify divergence theorem for the function

$$\vec{F} = (x^2 - yz)\hat{i} + (y^2 - zx)\hat{j} + (z^2 - xy)\hat{k}$$

taken over the rectangular parallelopiped
 $0 \leq x \leq 1, 0 \leq y \leq 1, 0 \leq z \leq 1.$ 20

3. (a) Solve :

$$3e^x \tan y \, dx + (1 + e^x) \sec^2 y \, dy = 0,$$

given by $y = \pi/4$ when $x = 0.$

(b) Solve : 20

$$(1 + y^2) \, dx = (\tan^{-1} y - x) \, dy$$

4. (a) Solve the following differential equation:

$$\frac{d^3y}{dx^3} + 3\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + y = e^{-x} \quad 10 \times 2 = 20$$

(b) $(D^2 - 4D + 4)y = e^{-4x} + 5 \cos 3x,$

$$D = \frac{d}{dx},$$

5. (a) Solve the Homogeneous differential equation : 10 \times 2 = 20

$$x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \log x \sin(\log x)$$

(b) Evaluate by Green's theorem -

$$\int_C [(\cos x \sin y - xy)dx + (\sin x \cos y)dy]$$

where C is the circle $x^2 + y^2 = 1$

6. (a) Show that : $\int_{-1}^1 P_n(x) dx = 2$, $10 \times 2 = 20$
when $n = 0$ and 0 when $n \neq 0$.

- (b) Prove that $(1 - 2xz + z^2)^{-\frac{1}{2}}$ is a solution of the equation

$$z \frac{\partial^2}{\partial z^2}(zv) + \frac{\partial}{\partial x} \left[(1 - x^2) \frac{\partial v}{\partial x} \right] = 0$$

7. (a) Prove that : $10 \times 2 = 20$

$$x J_n' = n J_n - x J_{n+1}$$

- (b) Prove that :

$$J_{n+2} + J_{n+5} = \frac{2}{x} (n+4) J_{n+4}$$

8. (a) Reduce the matrix $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$.

to the upper triangular form by using
elementary transformation and also
compute its rank. 10

(b) Show that the system of equations

$$x + y + z = 3, \quad 3x + y - 2z = -2,$$

$$2x + 4y + 7z = 7 \text{ is not consistent.}$$

9. For what values of a and b do the equations :

20

$$x + 2y + 3z = 6$$

$$x + 3y + 5z = 9$$

$$2x + 5y + 9z = b \text{ have}$$

- (i) No solution
- (ii) a unique solution
- (iii) an infinite number of solutions

10. (a) Find the Eigen values and Eigen vectors of the matrix :

10×2=20

$$A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 6 \end{bmatrix}$$

- (b) State Cayley-Hamilton theorem. Find the characteristic equations of the matrix

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$

and hence compute A^{-1} .

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Roll No.

B.Tech.- II Sem.

G-43D

B.Tech. Examination, May 2014

Agricultural Engineering

Surveying & Levelling

(BT-217N)

Time : Three Hours] [Maximum Marks : 100

Note : There are eight questions in the paper.

Candidate has to attempt any five questions. Question No. 1 is compulsory. Use of scientific calculator is permitted.

- | | |
|---------------------------------|-------|
| 1. Define the following terms : | 20 |
| (a) Change point | |
| (b) Datum surface | |
| (c) Reduced level | |

P.T.O.

- (d) Bench Mark
- (e) Fore sight
2. (a) Calculate the correct length, if measured length of line AB is 850.5 metre measured by a metric chain 15cm too short. 10
- (b) The distance between two points as measured by a 30m chain was 5000 metre. If the chain was 20cm too short, determine the correct distance. 10
3. The following bearings were observed while running a compass traverse. Calculate the interior angles of the traverse. 20

Line	Fore bearing	Back bearing
AB	$45^{\circ}15'$	$225^{\circ}15'$
BC	$123^{\circ}15'$	$303^{\circ}15'$
CD	$181^{\circ}0'$	$1^{\circ}0'$
DA	$289^{\circ}30'$	$109^{\circ}30'$

4. A and B are two point 0.20Km apart on the near bank of the river which flow East to West. The bearings of the tree on the far bank as observed from A & B are N 60° E & N 45° W. Determine the width of the river.

20

5. Explain the different accessories used in chain surveying. 20
6. Write in details the characteristics and uses of contours. 20
7. Enlist the different types of levels used in levelling. Give their relative advantages and disadvantages. 20
8. Explain the steps that are required for conducting the following types of plane table

surveying :

20

- (I) Radiation
- (ii) Intersection
- (iii) Traversing

Draw explanatory sketches.

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(Printed Pages 6)

(20514)

Roll No.

B.Tech. II Sem.

G-41

B. Tech. Examination, May 2014

AG. ENGG. BRANCH

ENGINEERING MECHANICS

[BT-215 (O)]

Time : Three Hours / Maximum Marks : 100

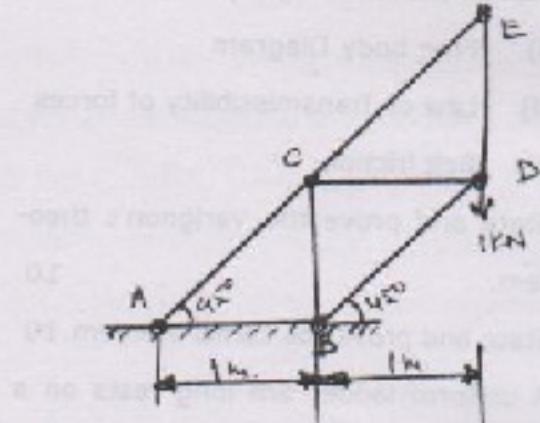
Note: Attempt any five questions.

1. (a) Explain the following : 10
 - (i) Free body Diagram
 - (ii) Law of Transmissibility of forces
 - (iii) Belt friction
(b) State and prove the Varignon's theorem. 10
2. (a) State and prove the Lami's theorem. 10
(b) A uniform ladder 5m long rests on a horizontal ground and leans against a

P.T.O.

smooth-vertical wall at an angle 70° with the horizontal. The weight of the ladder is 300N. The ladder is on the verge of sliding when a man weighing 750N stands on a rung 1.5 m high. Calculate the coefficient of friction between the ladder and the floor. 10

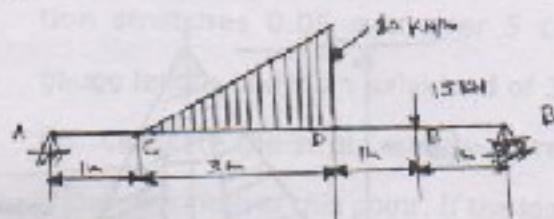
3. Determine the axial forces in the bars of a plane truss loaded as shown in the figure.



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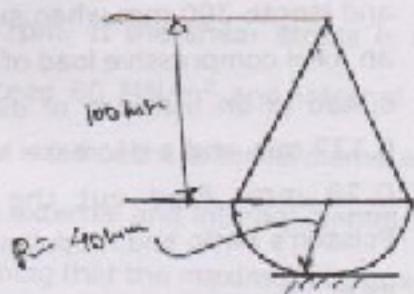
4. (a) What do you mean by truss? Explain how to analyze truss through method of section. 10

(b)



5. (a) Derive an equation for MI of a circular disc. 10

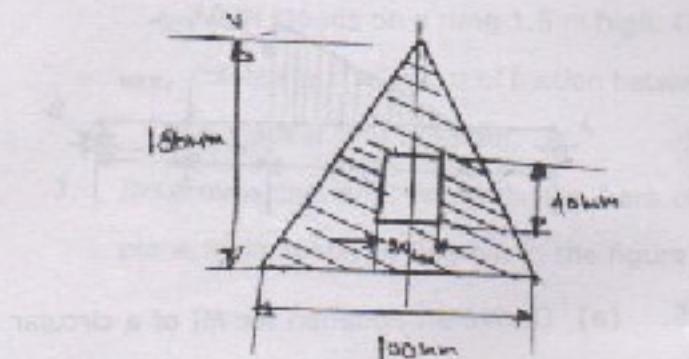
(b) Find out the centre of Gravity of a given body. 10



6. (a) Explain with proof parallel axis theorem.

10

(b) Find the MI of a given figure about its base.



7. (a) Derive a relation between E, C & K. 10

(b) A concrete cylinder of diameter 150 mm and length 300 mm when subjected to an axial compressive load of 240KN resulted in an increase of diameter by 0.127 mm and a decrease in length of 0.28 mm. Find out the value of Poisson's Ratio and modulus of Elasticity E.

8. (a) Derive strain Energy in Simple Tension and compression. 10 ..
- (b) A steel specimen 1.5 cm^2 in cross-section stretches 0.05 mm over 5 cm gauge length under an axial load of 30 KN. Calculate the strain energy stored in the specimen at this point. If the load at the elastic limit for specimen is 50 KN, calculate the elongation at the elastic limit and the resilience. 9
9. (a) Derive a Bending Equation. 10
- (b) A hollow shaft is to transmit 300 KW at 80 rpm. If the shear stress is not to exceed 60 MN/m^2 and internal diameter is 0.6 of the external diameter. Find the external and internal diameters assuming that the maximum torque is 1.4 times the mean. 1

10. (a) Derive the Torsion Equation. 10
- (b) Determine the dimensions of Joist of a timber for span 8m to carry a brick wall 200 mm thick and 5m high, if the density of brick work is 1850 Kg/m^3 and the maximum permissible stress is limited to 7.5 KN/m^2 . Given that the depth of Joist is twice of the width. 10

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(20514) Roll No.

B.Tech. - II Sem.

G-40

B.Tech. Examination, May 2014

Agricultural Engineering

Engineering Mathematics - II

[BT-216(Old)]

Time : Three Hours / Maximum Marks : 100

Note : (i) Attempt any **five** questions.

(ii) Marks are shown against each question.

1. (a) Find a unit vector normal to the surface $xy^3z^2 = 4$ at the point $(-1, -1, 2)$. 5
- (b) Find the directional derivative of $\phi = x^2yz + 4xz^2$ at the point $(1, -2, -1)$ in the direction of the vector $2\hat{i} - \hat{j} - 2\hat{k}$. 5
- (c) A vector field is given by $\mathbf{F} = (x^2 - y^2 + x)\hat{i} - (2xy + y)\hat{j}$. Show that the field is irrotational and find its scalar potential. 10

P.T.O.

2. (a) Verify Stoke's theorem for
 $F = (x^2 + y^2)\hat{i} - 2xy\hat{j}$ taken around the rectangle bounded by the lines
 $x = \pm a, y = 0, y = b$ 10

(b) Evaluate

$$\int_S F \cdot ds \text{ where } F = 4x\hat{i} - 2y^2\hat{j} + z^2\hat{k} \text{ and}$$

S is the surface bounding the region,
 $x^2 + y^2 = 4, z = 0$ and $z = 3$. 10

3. (a) Show that $f(z) = \bar{z}$ is non-analytic anywhere. 5

- (b) Show that $f(z) = xy + iy$ is continuous everywhere but not analytic. 5

- (c) State and prove necessary and sufficient conditions for the existence C-R equations. 10

4. (a) Determine whether the function $u = e^{-2xy} \sin(x^2 - y^2)$ is harmonic. If it is harmonic, find the conjugate harmonic function v such that $f(z) = u + iv$ is analytic. 10

(b) If $f(z) = \begin{cases} x^3y(y - ix) / (x^6 + y^2), & z \neq 0 \\ 0, & z = 0 \end{cases}$

prove that $[f(z) - f(0)]/z \rightarrow 0$ along any radius vector but not as $z \rightarrow 0$ along the curve $y = ax^3$. 10

5. (a) Find a Fourier series to represent $x - x^2$

from $x = -\pi$ to $x = \pi$. Also deduce that

$$\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots \quad 10$$

- (b) Express $f(x) = x$ as a half-range cosine series in $0 < x < 2$. 10

6. (a) Find the Fourier series for the periodic

function : 10

$$f(x) = \begin{cases} 0, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$$

$$f(x + 2\pi) = f(x)$$

- (b) Obtain the constant term and the coefficients of the first sine and cosine terms in the Fourier expansion of y as given in the following table : 10

$x :$ 0 1 2 3 4 5

$y :$ 9 18 24 28 26 20

7. (a) Solve : $(x^2 - y^2 - z^2)p + 2xyq = 2xz$. 5

- (b) Solve : $p(1+q) = qz$ 5

- (c) Solve : $(p^2 + q^2)y = qz$

by Charpit's method. 10

8. (a) Solve

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6 \frac{\partial^2 z}{\partial y^2} = y \cos x \quad 10$$

- (b) Solve $r^4 s + 4t = e^{2x+y}$. 10

9. (a) Using the method of separation of variables, solve 10

$$\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u,$$

where $u(x,0) = 6e^{-3x}$

- (b) Obtain the solution of the one-dimensional heat-flow equation 10

$$\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$$

by the method of separation of variables.

10. A tightly stretched string of length l with fixed end is initially in equilibrium position. It is set vibrating by giving each point a velocity $v_0 \sin^3 \frac{\pi x}{l}$. Find the displacement $y(x,t)$.

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(20514)

Roll No.

B.Tech. II Sem.

G-44'E'

B.Tech. Examination, May 2014

Ag Engg.

Thermodynamics

BT-218(N)

Time : Two Hours /

[Maximum Marks : 50]

Note: Attempt any five questions. All questions carry equal marks.

1. What is Intensive and Extensive properties of a system? State whether the following properties are intensive or extensive. 10

- (a) Area
- (b) pressure
- (c) Volume
- (d) Density
- (e) Specific heat
- (f) Specific density

P.T.O.

2. What is Kelvin-Planck statement of 2nd law of thermodynamics? How is it different from Clausius Statement.
3. What are boiler mounting and boiler accessories? Explain briefly any one of the boiler mountings. 10
4. State First law of thermodynamics. Differentiate between work and internal energy. 10
5. Explain with the help of a neat diagram "fire tube boiler"? 10
6. A 4-stroke petrol engine develops 50 kw of Indicated power and consumes 16 litres of petrol per hour of specific gravity 0.755. The Calorific value of fuel used is 44500KJ/Kg. Find its indicated thermal efficiency
If the engine runs at 300rpm. When it develops 50 kw power, find its bore and length of the stroke, if the indicated mean effective pressure is 5.2 bar,
Assume length of stroke = $1.1 \times \text{bore}$

7. Derive the efficiency and mean effective pressure of Otto cycle. 10
8. Differentiate between fire tube and water tube boiler. 10
9. Explain Rankine cycle with the help of P-V, T-S and h-s diagram 10
10. Write short note on any two: $5 \times 2 = 10$
 - (a) Boiler accessories
 - (b) First law of Thermodynamics
 - (c) Second law of Thermodynamics

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(20514)

Roll No.

B.Tech. - II Sem.

G-40(A)

B.Tech. Examination, May 2014

Ag. Engg. Branch

Engineering Chemistry

BT-214(N)

Time : Three Hours / Maximum Marks : 100

Note : Attempt any five questions. All questions carry equal marks.

1. (a) Explain Additional and Condensational Polymers. 10
(b) Explain Vulcanization of natural rubber. 10
2. Explain Cement Manufacturing with the help of a diagram.

P.T.O.

3. (a) Explain fuel and characteristic of a good fuel. 10

(b) Explain gobar gas production. 10

4. Write notes on any four.

(a) Nylon 6

(b) Terelene

(c) Buna-N

(d) Teflon

(e) P.V.C.

(f) Butyl-Rubber

5. (a) Explain Corrosion and Stress Corrosion.

10

(b) Explain type of Lubricants. 10

6. Explain Lime-Soda or Zeolite process for Water Softening.

7. Write notes on : $5 \times 4 = 20$

- (a) Units of Hardness,
- (b) Units of Calorific Value,
- (c) Chemical bonding and type of bonding.
- (d) Hardness and type of Hardness.

8. Write notes on any two : $10 \times 2 = 20$

- (a) Coal gas
- (b) Oil gas
- (c) Glass and two type of glass

9. Calculate temp. and Permanent Hardness of Water Containing :

- (a) $MgCl_2$ - 9.5 Mg/L
- (b) $MgSO_4$ - 24.0 Mg/L
- (c) $CaCl_2$ - 22.2 Mg/L
- (d) $CaSO_4$ - 13.6 Mg/L
- (e) $Ca(HCO_3)_2$ - 8.1 Mg/L
- (f) $Mg(HCO_3)_2$ - 7.3 Mg/L

7. Write notes on : $5 \times 4 = 20$

- (a) Units of Hardness,
- (b) Units of Calorific Value,
- (c) Chemical bonding and type of bonding,
- (d) Hardness and type of Hardness.

8. Write notes on any two : $10 \times 2 = 20$

- (a) Coal gas
- (b) Oil gas
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9. Calculate temp. and Permanent Hardness of Water Containing :

(a) $MgCl_2$ - 9.5 Mg/L

(b) $MgSO_4$ - 24.0 Mg/L

(c) $CaCl_2$ - 22.2 Mg/L

(d) $CaSO_4$ - 13.6 Mg/L

(e) $Ca(HCO_3)_2$ - 8.1 Mg/L

(f) $Mg(HCO_3)_2$ - 7.3 Mg/L

10. (a) Explain determination of calorific value
by Bomb Calorimeter. 10

(b) 0.80 gm. of a fuel, When burnt in a
bomb Calorimeter increased the temp.
of water from 25.8°C to 27.1°C . If
Calorimeter contains 320 gm. of water
and its water Equivalent is 100 gm. Cal-
culate the H.C.V. of the fuel. 10

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Roll No.

B.Tech. II Sem.

G-38

B.Tech. Examination, May 2014

Manufacturing Processes

[BT-210(O)]

Time : Two Hours]

[Maximum Marks : 50

Note: Attempt any five questions.

1. (a) Explain the following terms: 5
Ductility, Brittleness, Toughness, Hardness, Malleability.
- (b) Classify different carbon steels on the basis of percentage of carbon. 5
2. (a) Write a short note on heat treatment of steels. 5
- (b) What is brass? Describe the compositions, properties and uses of a few important types of brasses. 5

P.T.O.

3. (a) What is hot working? What are its advantages and limitations? 5
- (b) What is hot extrusion? Describe direct extrusion and indirect extrusion in brief. 5
4. (a) What are the essential qualities of a good sand? What are its main constituents? 5
- (b) What are different casting defects and its remedies? 5
5. (a) Explain the term 'machining'. Which factors govern the selection of a machine tool? 5
- (b) Explain the construction, working of drilling or milling machine. 5
6. (a) Classify the different welding processes. 5

- (b) Explain the processes of soldering and brazing and its uses. 5
7. (a) What are the different types of production? Difference between production and productivity. 5
- (b) What are the difference between soft wood and hard wood? 5
8. (a) How plastics are classified? How do thermosetting plastics differ from thermoplastics? 5
- (b) What are the different methods of producing metal powders? Describe the atomisation process in detail. 5

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(20514)

Roll No.

B.Tech. II Sem.

TU-006

B.Tech. Examination, May 2014

Remedical English Language

BT-206

Time : Two Hours]

[Maximum Marks : 50

Note : All questions are compulsory.

Unit -I

1. Fill in the correct form of noun given in bracket. 05
 - (i) Do you have _____? (scissors/scissor)
 - (ii) I do not wear _____(spectacle/spectacles)
 - (iii) Convey my _____to her. (thank/thanks)
 - (iv) I shall not give _____ to the poor. (alm/alm's)
 - (v) I like _____(music/musics)

P.T.O.

2. Fill in appropriate pronoun. 05

(i) We scored as many goals as _____ (they/them)

(ii) Rama and _____ were present, (I/me)

(iii) Let you and _____ try what we can do. (I/me)

(iv) One should obey _____ parents. (one's/his)

(v) Nobody but _____ was present. (he/him)

3. Fill in appropriate preposition. 05

(i) He is accused _____ theft.

(ii) I am not envious _____ you.

(iii) You should not be hostile _____ your classmates.

(iv) She is good _____ mathematics.

(v) One can rely _____ oneself.

4. Change the following into the passive. 05

(i) Do you write a letter?

(ii) Why is he not singing a song?

- (iii) I gave him a gift.
- (iv) He will send a letter tomorrow.
- (v) People say figs are good for health.

Unit - II

5. Fill in the correct tense of modals. 05
- (i) If I drop it, it _____ explode. (will/would)
 - (ii) Even if I dropped it, it _____ not explode (will/would)
 - (iii) If he had delayed, the plane _____ have left, (will/would)
 - (iv) If you smoked in the classroom, the teacher _____ object (will/would)
 - (v) If she did not smoke so much, she _____ get rid of her cough (may/might)
6. Change the following sentence as per direction given in bracket. 05
- (i) There is my good brother. His name is Sohan. (combine into simple sentence)
 - (ii) In received no answer. I knocked sec-

ond time. (combine into simple sentence)

- (iii) He felt tried. He laid his work aside.
(combine into simple sentence)
- (iv) The way was long. The wind was cold.
(combine into compound sentence)
- (v) He is poor. He is honest. (combine into complex sentence)

Unit - III

- 7. Write a paragraph of about 100 words on any topic of your choice keeping in mind the concept of unity and coherence. 5

Unit - IV

- 8. Write an essay on any one the following topics in about 500 words. 15
 - (i) Information Technology: Its uses and abuses
 - (ii) Internet as a tool of communication
 - (iii) Noise Pollution
 - (iv) Engineering as a career
 - (v) Terrorism

M

(Printed Pages 3)

(20514)

Roll No.

B.Tech. II Sem.

G - 43

B.Tech. Examination, May 2014

Ag. Engg.

Surveying & Levelling

[BT- 217 (O)]

Time : Three Hours]

[Maximum Marks : 100]

Note: Attempt any five questions. All questions carry equal marks.

1. What do you mean by Surveying? Also classified it in detail. 20

2. Explain the instruments used in chain surveying and write the procedure of a chain survey executed in field. 20

3. Define Contouring and explain in detail about characteristics of Contouring. 20

P.T.O.

4. List the chaining. The true length of line measured from a plan as per scale was 1276.56 m. When the line was measured with a 30m long chain, the length was measured as 1274.54m. Find the true length of chain. 20
5. Discuss in brief about different methods of plain surveying and explain in detail any one.

20

6. What do you understand by levelling? Explain with help of neat diagram, working of dumpy level. 20
7. Explain with help of appropriate diagram working and use of prismatic compass.
8. The following consecutive readings were taken with a dumpy level –

G-43\6012

0.874 1.543 2.796 3.018 0.944 0.662

0.579 0.241 1.522 0.956 2.125
Total

The instrument was shifted after fourth and eighth reading. Bench mark of reduced level is 819.765. Solve the problem by Rise and Fall Methods.

20

9. Inlist various instruments required while doing plain surveying and explain their working.

20

10. Write short notes on any four : $5 \times 4 = 20$

(i) Station

(ii) Traversing

(iii) Direct method of contouring

(iv) Bench mark

(v) Back and four sight

M

(Printed Pages 3)

(20514)

Roll No.

B.Tech.- II Sem.

G-44

B.Tech. Examination, May 2014

Ag. Engg.

Workshop Technology

BT-213(O)

Time : Two Hours /

/Maximum Marks : 56

Note : Attempt any five questions.

1. Describe with neat sketches, the following

arc welding processes : 10

(a) TIG welding

(b) MIG welding

2. What do you understand by 'Gas Welding'?

Also, Describe with neat diagram different

types of oxy-acetylene flames. 10

P.T.O.

3. What is the Moulding Sand? Discuss the properties of Moulding Sand used in casting processes. 10
4. What is working principle of Lathe Machine?
How a centre lathe is specified? 10
5. Write short note on any 'two' of the following : 10
- (a) Drilling
 - (b) Boring
 - (c) Up-Milling
 - (d) Down-Milling
6. What are the main parts of the shaper? Label it on a block diagram of shaper. 10
7. Differentiate between column and knee type universal milling machine. 10

8. Explain Electric arc welding with suitable sketch. What do you understand by the polarity in welding? 10

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Printed Pages : 4

(20514)

B.Tech. II Sem.

Roll No.

G-42

B.Tech. Examination, May 2014

Ag. Engg.

Thermodynamics & Heat Engines

[Code No. BT-212]

Time : Three Hours

[Maximum Marks : 100]

Note: Attempt any five questions. All questions carry equal marks.

1. Discuss the following terms : 10
 - (a) System, Surrounding and Boundary.
 - (b) Closed and open systems.

(1)

G-42/60

2. (a) State Zeroth law of thermodynamics with neat sketch and what is the significance of zeroth law of thermodynamics? 10
- (b) Derive Steady Flow Energy Equation (S.F.E.E.). 10
3. (a) State two major statements of second law of thermodynamics with neat sketches. 10
- (b) Explain Carnot cycle with neat sketches on P-V and T-S diagrams. Also write the equation for Carnot efficiency. 10
4. (a) State Carnot theorem and define entropy with example. 10
- (b) Find the C.O.P. and heat transfer rate in a condenser of a refrigerator in KJ/hr which has a regeneration capacity of 12000 KJ/hr when power input is 0.75KW. 10

5. (a) Define "Dryness fraction" and explain its significance. 5

(b) Explain the phase transformation of ice into vapour at constant pressure. 15

6. (a) List the various factors on the basis of which steam boilers are classified. 10

(b) What are boiler accessories? Mention and three boiler accessories. Explain any one boiler accessory with neat sketch. 10

7. (a) Derive an expression for Air standard efficiency of Otto cycle with P-V and T-S diagram. 10

(b) Explain Rankine cycle with neat sketch on P-V and T-S diagram. 10

8. (a) Explain B.P. and I.P. of an engine. 10
- (b) A two-stroke cycle Petrol engine has a piston diameter of 110mm and stroke length of 140mm. Mean effective pressure exerted on head of piston is 600 KN/M^2 . If it runs at 1000 r.p.m., find the I.P. of the engine. 10

—X—

M

(Printed Pages 4)

(20514)

Roll No.

B.Tech.-II Sem.

G-41(B)

B.Tech. Examination, May 2014

AG. ENGG.

Engineering Mechanics

[BT-215(N)]

Time : Three Hours

/Maximum Marks : 100

Note: Attempt any five questions. All questions carry equal marks.

1. Explain following with suitable Figure. 5x4
 - (i) Coplaner force system
 - (ii) Non Coplaner force system
 - (iii) Condition of equilibrium
 - (iv) Vector and scalar quantities
2. (a) Two vectors A & B are given as 10
 $\vec{A} = 4i - 3j - 2k$
 $\vec{B} = 3i + 2j - k$

Determine Dot product and angle between them.

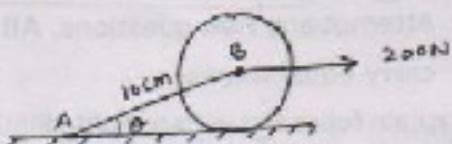
P.T.O.

(b) State and prove Varignon's Theorem.

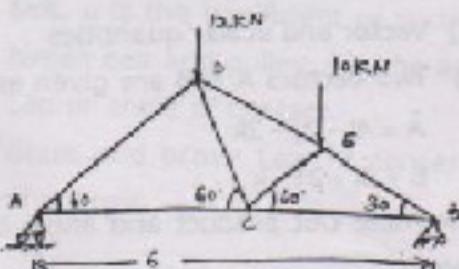
10

3. (a) State all types of assumption made during Truss / frames analysis. 10

(b) A circular roller of radius 6 cm and weight 10N rests on a smooth horizontal surface and held in a position by an inclined bar AB of length 10 cm as shown in fig. A horizontal force of 200 N is acting at B. Find the tension in the Bar AB and the vertical reaction at C. 10



4. Determine the axial forces in all members of the truss with loading as shown in fig. .20



G-41(B)\140\2

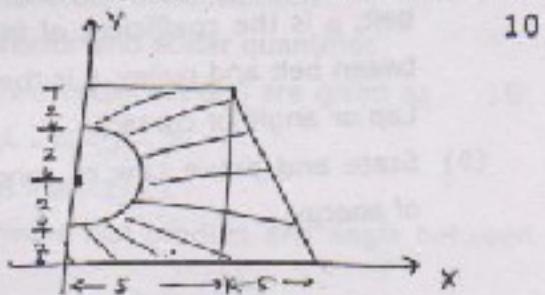
5. Define & Explain the following: 5x4

- (i) Laws of Machine
- (ii) Static & Dynamic Friction
- (iii) Mechanical advantage
- (iv) Angle of friction

6. (a) An uniform ladder of length 10m and weighing 20 N is placed against a smooth vertical wall with its lower end 8 m from the wall. In this Position the ladder is just to slip. Determine

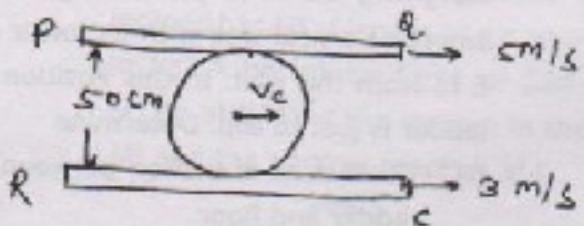
- (i) Coefficient of friction between the ladder and floor
- (ii) Frictional force acting on the ladder at the point of contact between ladder and floor 10

(b) Locate the centroid of the L-section as shown in fig., all dimensions are in mm.



7. A cylindrical roller 50 cm in diameter, is in contact with two conveyor belts at its top and bottom as shown in figure. If the belts run at uniform speed of 5m/sec and 3m/sec. Find the Linear velocity and angular velocity of the roller.

20



8. (a) Prove the relation $\frac{T_1}{T_2} = e^{\mu\theta}$, where T_1 is the tension in Tight side of the belts and T_2 is the tension in slack side of the belt, μ is the coefficient of friction between belt and pulley, θ is the angle of lap or angle of contact.
- (b) State and prove Law of conservation of energy.

10

10

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(Printed Pages 4)

(20514)

Roll No.

B.Tech. II Sem.

G-42(C)

B.Tech. Examination, May 2014

Ag. Engg.

Engineering Mathematics-II

[BT-216(N)]

Time : Three Hours] Maximum Marks : 100

Note : Attempt any five questions.

1. (a) A particle moves along a curve whose parametric equation are $x = e^{-t}$, $y = 2 \cos 3t$, $z = 2 \sin 3t$, where t is the time. $10 \times 2 = 20$

- (i) Determine its velocity and the acceleration at any time.
(ii) Find the magnitude of velocity and acceleration at $t = 0$.

- (b) Show that :

$$\nabla \cdot \left(\frac{\vec{r}}{r^3} \right) = 0, \text{ where } \vec{r} = xi + yj + zk$$

P.T.O.

2. Verify divergence theorem for the function

$$\vec{F} = (x^2 - yz)\hat{i} + (y^2 - zx)\hat{j} + (z^2 - xy)\hat{k}$$

taken over the rectangular parallelopiped
 $0 \leq x \leq 1, 0 \leq y \leq 1, 0 \leq z \leq 1.$ 20

3. (a) Solve :

$$3e^x \tan y \, dx + (1 + e^x) \sec^2 y \, dy = 0,$$

given by $y = \pi/4$ when $x = 0.$

(b) Solve : 20

$$(1 + y^2) \, dx = (\tan^{-1} y - x) \, dy$$

4. (a) Solve the following differential equation:

$$\frac{d^3y}{dx^3} + 3\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + y = e^{-x} \quad 10 \times 2 = 20$$

(b) $(D^2 - 4D + 4)y = e^{-4x} + 5 \cos 3x,$

$$D = \frac{d}{dx},$$

5. (a) Solve the Homogeneous differential equation : 10 \times 2 = 20

$$x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \log x \sin(\log x)$$

(b) Evaluate by Green's theorem -

$$\int_C [(\cos x \sin y - xy)dx + (\sin x \cos y)dy]$$

where C is the circle $x^2 + y^2 = 1$

6. (a) Show that : $\int_{-1}^1 P_n(x) dx = 2$, $10 \times 2 = 20$
when $n = 0$ and 0 when $n \neq 0$.

- (b) Prove that $(1 - 2xz + z^2)^{-\frac{1}{2}}$ is a solution of the equation

$$z \frac{\partial^2}{\partial z^2}(zv) + \frac{\partial}{\partial x} \left[(1 - x^2) \frac{\partial v}{\partial x} \right] = 0$$

7. (a) Prove that : $10 \times 2 = 20$

$$x J_n' = n J_n - x J_{n+1}$$

- (b) Prove that :

$$J_{n+2} + J_{n+5} = \frac{2}{x} (n+4) J_{n+4}$$

8. (a) Reduce the matrix $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$.

to the upper triangular form by using
elementary transformation and also
compute its rank. 10

(b) Show that the system of equations

$$x + y + z = 3, \quad 3x + y - 2z = -2,$$

$$2x + 4y + 7z = 7 \text{ is not consistent.}$$

9. For what values of a and b do the equations :

20

$$x + 2y + 3z = 6$$

$$x + 3y + 5z = 9$$

$$2x + 5y + 9z = b \text{ have}$$

- (i) No solution
- (ii) a unique solution
- (iii) an infinite number of solutions

10. (a) Find the Eigen values and Eigen vectors of the matrix :

10×2=20

$$A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 6 \end{bmatrix}$$

- (b) State Cayley-Hamilton theorem. Find the characteristic equations of the matrix

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$

and hence compute A^{-1} .

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M

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(20514)

Roll No.

B.Tech.- II Sem.

G-43D

B.Tech. Examination, May 2014

Agricultural Engineering

Surveying & Levelling

(BT-217N)

Time : Three Hours] [Maximum Marks : 100

Note : There are eight questions in the paper.

Candidate has to attempt any five questions. Question No. 1 is compulsory. Use of scientific calculator is permitted.

- | | |
|---------------------------------|-------|
| 1. Define the following terms : | 20 |
| (a) Change point | |
| (b) Datum surface | |
| (c) Reduced level | |

P.T.O.

- (d) Bench Mark
- (e) Fore sight
2. (a) Calculate the correct length, if measured length of line AB is 850.5 metre measured by a metric chain 15cm too short. 10
- (b) The distance between two points as measured by a 30m chain was 5000 metre. If the chain was 20cm too short, determine the correct distance. 10
3. The following bearings were observed while running a compass traverse. Calculate the interior angles of the traverse. 20

Line	Fore bearing	Back bearing
AB	$45^{\circ}15'$	$225^{\circ}15'$
BC	$123^{\circ}15'$	$303^{\circ}15'$
CD	$181^{\circ}0'$	$1^{\circ}0'$
DA	$289^{\circ}30'$	$109^{\circ}30'$

4. A and B are two point 0.20Km apart on the near bank of the river which flow East to West. The bearings of the tree on the far bank as observed from A & B are N 60° E & N 45° W. Determine the width of the river.

20

5. Explain the different accessories used in chain surveying. 20
6. Write in details the characteristics and uses of contours. 20
7. Enlist the different types of levels used in levelling. Give their relative advantages and disadvantages. 20
8. Explain the steps that are required for conducting the following types of plane table

surveying :

20

- (I) Radiation
- (ii) Intersection
- (iii) Traversing

Draw explanatory sketches.

M

(Printed Pages 6)

(20514)

Roll No.

B.Tech. II Sem.

G-41

B. Tech. Examination, May 2014

AG. ENGG. BRANCH

ENGINEERING MECHANICS

[BT-215 (O)]

Time : Three Hours / Maximum Marks : 100

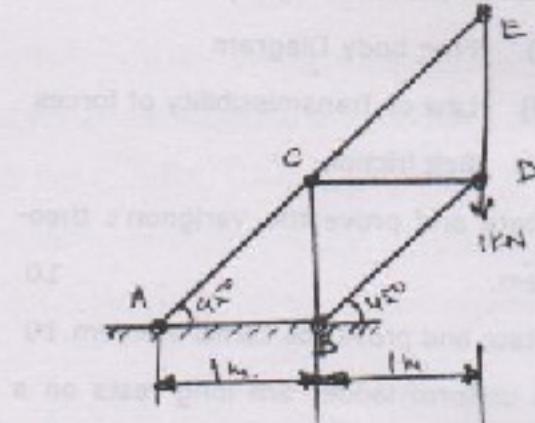
Note: Attempt any five questions.

1. (a) Explain the following : 10
 - (i) Free body Diagram
 - (ii) Law of Transmissibility of forces
 - (iii) Belt friction
(b) State and prove the Varignon's theorem. 10
2. (a) State and prove the Lami's theorem. 10
(b) A uniform ladder 5m long rests on a horizontal ground and leans against a

P.T.O.

smooth-vertical wall at an angle 70° with the horizontal. The weight of the ladder is 300N. The ladder is on the verge of sliding when a man weighing 750N stands on a rung 1.5 m high. Calculate the coefficient of friction between the ladder and the floor. 10

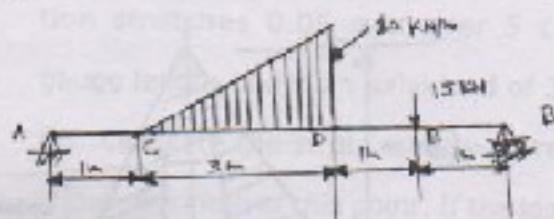
3. Determine the axial forces in the bars of a plane truss loaded as shown in the figure.



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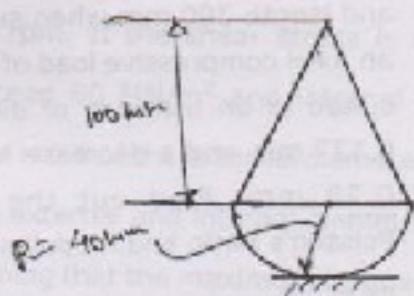
4. (a) What do you mean by truss? Explain how to analyze truss through method of section. 10

(b)



5. (a) Derive an equation for MI of a circular disc. 10

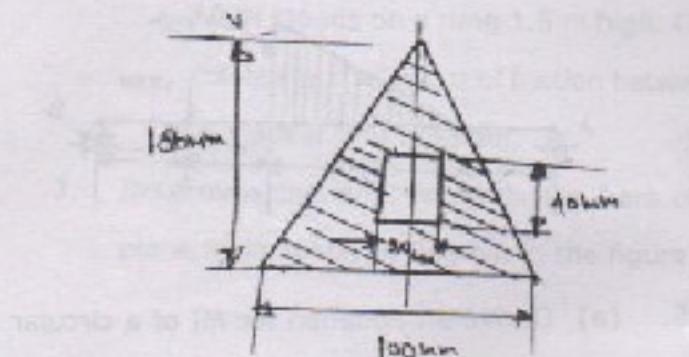
(b) Find out the centre of Gravity of a given body. 10



6. (a) Explain with proof parallel axis theorem.

10

(b) Find the MI of a given figure about its base.



7. (a) Derive a relation between E, C & K. 10

(b) A concrete cylinder of diameter 150 mm and length 300 mm when subjected to an axial compressive load of 240KN resulted in an increase of diameter by 0.127 mm and a decrease in length of 0.28 mm. Find out the value of Poisson's Ratio and modulus of Elasticity E.

8. (a) Derive strain Energy in Simple Tension and compression. 10 ..
- (b) A steel specimen 1.5 cm^2 in cross-section stretches 0.05 mm over 5 cm gauge length under an axial load of 30 KN. Calculate the strain energy stored in the specimen at this point. If the load at the elastic limit for specimen is 50 KN, calculate the elongation at the elastic limit and the resilience. 9
9. (a) Derive a Bending Equation. 10
- (b) A hollow shaft is to transmit 300 KW at 80 rpm. If the shear stress is not to exceed 60 MN/m^2 and internal diameter is 0.6 of the external diameter. Find the external and internal diameters assuming that the maximum torque is 1.4 times the mean. 1

10. (a) Derive the Torsion Equation. 10
- (b) Determine the dimensions of Joist of a timber for span 8m to carry a brick wall 200 mm thick and 5m high, if the density of brick work is 1850 Kg/m^3 and the maximum permissible stress is limited to 7.5 KN/m^2 . Given that the depth of Joist is twice of the width. 10

M (Printed Pages 4)

(20514) Roll No.

B.Tech. - II Sem.

G-40

B.Tech. Examination, May 2014

Agricultural Engineering

Engineering Mathematics - II

[BT-216(Old)]

Time : Three Hours / Maximum Marks : 100

Note : (i) Attempt any **five** questions.

(ii) Marks are shown against each question.

1. (a) Find a unit vector normal to the surface $xy^3z^2 = 4$ at the point $(-1, -1, 2)$. 5
- (b) Find the directional derivative of $\phi = x^2yz + 4xz^2$ at the point $(1, -2, -1)$ in the direction of the vector $2\hat{i} - \hat{j} - 2\hat{k}$. 5
- (c) A vector field is given by $\mathbf{F} = (x^2 - y^2 + x)\hat{i} - (2xy + y)\hat{j}$. Show that the field is irrotational and find its scalar potential. 10

P.T.O.

2. (a) Verify Stoke's theorem for
 $F = (x^2 + y^2)\hat{i} - 2xy\hat{j}$ taken around the rectangle bounded by the lines
 $x = \pm a, y = 0, y = b$ 10

(b) Evaluate

$$\int_S F \cdot ds \text{ where } F = 4x\hat{i} - 2y^2\hat{j} + z^2\hat{k} \text{ and}$$

S is the surface bounding the region,
 $x^2 + y^2 = 4, z = 0$ and $z = 3$. 10

3. (a) Show that $f(z) = \bar{z}$ is non-analytic anywhere. 5

- (b) Show that $f(z) = xy + iy$ is continuous everywhere but not analytic. 5

- (c) State and prove necessary and sufficient conditions for the existence C-R equations. 10

4. (a) Determine whether the function $u = e^{-2xy} \sin(x^2 - y^2)$ is harmonic. If it is harmonic, find the conjugate harmonic function v such that $f(z) = u + iv$ is analytic. 10

(b) If $f(z) = \begin{cases} x^3y(y - ix) / (x^6 + y^2), & z \neq 0 \\ 0, & z = 0 \end{cases}$

prove that $[f(z) - f(0)]/z \rightarrow 0$ along any radius vector but not as $z \rightarrow 0$ along the curve $y = ax^3$. 10

5. (a) Find a Fourier series to represent $x - x^2$

from $x = -\pi$ to $x = \pi$. Also deduce that

$$\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots \quad 10$$

- (b) Express $f(x) = x$ as a half-range cosine series in $0 < x < 2$. 10

6. (a) Find the Fourier series for the periodic

function : 10

$$f(x) = \begin{cases} 0, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$$

$$f(x + 2\pi) = f(x)$$

- (b) Obtain the constant term and the coefficients of the first sine and cosine terms in the Fourier expansion of y as given in the following table : 10

$x :$ 0 1 2 3 4 5

$y :$ 9 18 24 28 26 20

7. (a) Solve : $(x^2 - y^2 - z^2)p + 2xyq = 2xz$. 5

- (b) Solve : $p(1+q) = qz$ 5

- (c) Solve : $(p^2 + q^2)y = qz$

by Charpit's method. 10

8. (a) Solve

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6 \frac{\partial^2 z}{\partial y^2} = y \cos x \quad 10$$

- (b) Solve $r^4 s + 4t = e^{2x+y}$. 10

9. (a) Using the method of separation of variables, solve 10

$$\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u,$$

where $u(x,0) = 6e^{-3x}$

- (b) Obtain the solution of the one-dimensional heat-flow equation 10

$$\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$$

by the method of separation of variables.

10. A tightly stretched string of length l with fixed end is initially in equilibrium position. It is set vibrating by giving each point a velocity $v_0 \sin^3 \frac{\pi x}{l}$. Find the displacement $y(x,t)$.

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(Printed Pages 3)

(20514)

Roll No.

B.Tech. II Sem.

G-44'E'

B.Tech. Examination, May 2014

Ag Engg.

Thermodynamics

BT-218(N)

Time : Two Hours /

[Maximum Marks : 50]

Note: Attempt any five questions. All questions carry equal marks.

1. What is Intensive and Extensive properties of a system? State whether the following properties are intensive or extensive. 10

- (a) Area
- (b) pressure
- (c) Volume
- (d) Density
- (e) Specific heat
- (f) Specific density

P.T.O.

2. What is Kelvin-Planck statement of 2nd law of thermodynamics? How is it different from Clausius Statement.
3. What are boiler mounting and boiler accessories? Explain briefly any one of the boiler mountings. 10
4. State First law of thermodynamics. Differentiate between work and internal energy. 10
5. Explain with the help of a neat diagram "fire tube boiler"? 10
6. A 4-stroke petrol engine develops 50 kw of Indicated power and consumes 16 litres of petrol per hour of specific gravity 0.755. The Calorific value of fuel used is 44500KJ/Kg. Find its indicated thermal efficiency
If the engine runs at 300rpm. When it develops 50 kw power, find its bore and length of the stroke, if the indicated mean effective pressure is 5.2 bar,
Assume length of stroke = $1.1 \times \text{bore}$

7. Derive the efficiency and mean effective pressure of Otto cycle. 10
8. Differentiate between fire tube and water tube boiler. 10
9. Explain Rankine cycle with the help of P-V, T-S and h-s diagram 10
10. Write short note on any two: $5 \times 2 = 10$
 - (a) Boiler accessories
 - (b) First law of Thermodynamics
 - (c) Second law of Thermodynamics

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(Printed Pages 4)

(20514)

Roll No.

B.Tech. - II Sem.

G-40(A)

B.Tech. Examination, May 2014

Ag. Engg. Branch

Engineering Chemistry

BT-214(N)

Time : Three Hours / Maximum Marks : 100

Note : Attempt any five questions. All questions carry equal marks.

1. (a) Explain Additional and Condensational Polymers. 10
(b) Explain Vulcanization of natural rubber. 10
2. Explain Cement Manufacturing with the help of a diagram.

P.T.O.

3. (a) Explain fuel and characteristic of a good fuel. 10

(b) Explain gobar gas production. 10

4. Write notes on any four.

(a) Nylon 6

(b) Terelene

(c) Buna-N

(d) Teflon

(e) P.V.C.

(f) Butyl-Rubber

5. (a) Explain Corrosion and Stress Corrosion.

10

(b) Explain type of Lubricants. 10

6. Explain Lime-Soda or Zeolite process for Water Softening.

7. Write notes on : $5 \times 4 = 20$

- (a) Units of Hardness,
- (b) Units of Calorific Value,
- (c) Chemical bonding and type of bonding.
- (d) Hardness and type of Hardness.

8. Write notes on any two : $10 \times 2 = 20$

- (a) Coal gas
- (b) Oil gas
- (c) Glass and two type of glass

9. Calculate temp. and Permanent Hardness of Water Containing :

- (a) $MgCl_2$ - 9.5 Mg/L
- (b) $MgSO_4$ - 24.0 Mg/L
- (c) $CaCl_2$ - 22.2 Mg/L
- (d) $CaSO_4$ - 13.6 Mg/L
- (e) $Ca(HCO_3)_2$ - 8.1 Mg/L
- (f) $Mg(HCO_3)_2$ - 7.3 Mg/L

7. Write notes on : $5 \times 4 = 20$

- (a) Units of Hardness,
- (b) Units of Calorific Value,
- (c) Chemical bonding and type of bonding,
- (d) Hardness and type of Hardness,

8. Write notes on any two : $10 \times 2 = 20$

- (a) Coal gas
- (b) Oil gas
- (c) Glass and two type of glass

9. Calculate temp. and Permanent Hardness of Water Containing :

(a) $MgCl_2$ - 9.5 Mg/L

(b) $MgSO_4$ - 24.0 Mg/L

(c) $CaCl_2$ - 22.2 Mg/L

(d) $CaSO_4$ - 13.6 Mg/L

(e) $Ca(HCO_3)_2$ - 8.1 Mg/L

(f) $Mg(HCO_3)_2$ - 7.3 Mg/L

10. (a) Explain determination of calorific value
by Bomb Calorimeter. 10

(b) 0.80 gm. of a fuel, When burnt in a
bomb Calorimeter increased the temp.
of water from 25.8°C to 27.1°C . If
Calorimeter contains 320 gm. of water
and its water Equivalent is 100 gm. Cal-
culate the H.C.V. of the fuel. 10

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Roll No.

B.Tech. II Sem.

G-38

B.Tech. Examination, May 2014

Manufacturing Processes

[BT-210(O)]

Time : Two Hours]

[Maximum Marks : 50

Note: Attempt any five questions.

1. (a) Explain the following terms: 5
Ductility, Brittleness, Toughness, Hardness, Malleability.
- (b) Classify different carbon steels on the basis of percentage of carbon. 5
2. (a) Write a short note on heat treatment of steels. 5
- (b) What is brass? Describe the compositions, properties and uses of a few important types of brasses. 5

P.T.O.

3. (a) What is hot working? What are its advantages and limitations? 5
- (b) What is hot extrusion? Describe direct extrusion and indirect extrusion in brief. 5
4. (a) What are the essential qualities of a good sand? What are its main constituents? 5
- (b) What are different casting defects and its remedies? 5
5. (a) Explain the term 'machining'. Which factors govern the selection of a machine tool? 5
- (b) Explain the construction, working of drilling or milling machine. 5
6. (a) Classify the different welding processes. 5

- (b) Explain the processes of soldering and brazing and its uses. 5
7. (a) What are the different types of production? Difference between production and productivity. 5
- (b) What are the difference between soft wood and hard wood? 5
8. (a) How plastics are classified? How do thermosetting plastics differ from thermoplastics? 5
- (b) What are the different methods of producing metal powders? Describe the atomisation process in detail. 5

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Roll No.

B.Tech. II Sem.

TU-006

B.Tech. Examination, May 2014

Remedical English Language

BT-206

Time : Two Hours]

[Maximum Marks : 50

Note : All questions are compulsory.

Unit -I

1. Fill in the correct form of noun given in bracket. 05
 - (i) Do you have _____? (scissors/scissor)
 - (ii) I do not wear _____(spectacle/spectacles)
 - (iii) Convey my _____to her. (thank/thanks)
 - (iv) I shall not give _____ to the poor. (alm/alm's)
 - (v) I like _____(music/musics)

P.T.O.

2. Fill in appropriate pronoun. 05

(i) We scored as many goals as _____ (they/them)

(ii) Rama and _____ were present, (I/me)

(iii) Let you and _____ try what we can do. (I/me)

(iv) One should obey _____ parents. (one's/his)

(v) Nobody but _____ was present. (he/him)

3. Fill in appropriate preposition. 05

(i) He is accused _____ theft.

(ii) I am not envious _____ you.

(iii) You should not be hostile _____ your classmates.

(iv) She is good _____ mathematics.

(v) One can rely _____ oneself.

4. Change the following into the passive. 05

(i) Do you write a letter?

(ii) Why is he not singing a song?

- (iii) I gave him a gift.
- (iv) He will send a letter tomorrow.
- (v) People say figs are good for health.

Unit - II

5. Fill in the correct tense of modals. 05
- (i) If I drop it, it _____ explode. (will/would)
 - (ii) Even if I dropped it, it _____ not explode (will/would)
 - (iii) If he had delayed, the plane _____ have left, (will/would)
 - (iv) If you smoked in the classroom, the teacher _____ object (will/would)
 - (v) If she did not smoke so much, she _____ get rid of her cough (may/might)
6. Change the following sentence as per direction given in bracket. 05
- (i) There is my good brother. His name is Sohan. (combine into simple sentence)
 - (ii) In received no answer. I knocked sec-

ond time. (combine into simple sentence)

(iii) He felt tried. He laid his work aside.

(combine into simple sentence)

(iv) The way was long. The wind was cold.

(combine into compound sentence)

(v) He is poor. He is honest. (combine into

complex sentence)

Unit - III

7. Write a paragraph of about 100 words on any topic of your choice keeping in mind the concept of unity and coherence. 5

Unit - IV

8. Write an essay on any one the following topics in about 500 words. 15

(i) Information Technology: Its uses and abuses

(ii) Internet as a tool of communication

(iii) Noise Pollution

(iv) Engineering as a career

(v) Terrorism

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Roll No.

B.Tech. II Sem.

G - 43

B.Tech. Examination, May 2014

Ag. Engg.

Surveying & Levelling

[BT- 217 (O)]

Time : Three Hours]

[Maximum Marks : 100]

 Note: Attempt any **five** questions. All questions carry equal marks.

1. What do you mean by Surveying? Also classified it in detail. 20

2. Explain the instruments used in chain surveying and write the procedure of a chain survey executed in field. 20

3. Define Contouring and explain in detail about characteristics of Contouring. 20

P.T.O.

4. List the chaining. The true length of line measured from a plan as per scale was 1276.56 m. When the line was measured with a 30m long chain, the length was measured as 1274.54m. Find the true length of chain. 20
5. Discuss in brief about different methods of plain surveying and explain in detail any one.

20

6. What do you understand by levelling? Explain with help of neat diagram, working of dumpy level. 20
7. Explain with help of appropriate diagram working and use of prismatic compass.
8. The following consecutive readings were taken with a dumpy level –

G-43\6012

0.874 1.543 2.796 3.018 0.944 0.662

0.579 0.241 1.522 0.956 2.125
Total

The instrument was shifted after fourth and eighth reading. Bench mark of reduced level is 819.765. Solve the problem by Rise and Fall Methods.

20

9. Inlist various instruments required while do-

ing plain surveying and explain their work-
ing.

20

10. Write short notes on any four : $5 \times 4 = 20$

(i) Station

(ii) Traversing

(iii) Direct method of contouring

(iv) Bench mark

(v) Back and four sight

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(Printed Pages 3)

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Roll No.

B.Tech.- II Sem.

G-44

B.Tech. Examination, May 2014

Ag. Engg.

Workshop Technology

BT-213(O)

Time : Two Hours /

/Maximum Marks : 56

Note : Attempt any five questions.

1. Describe with neat sketches, the following

arc welding processes : 10

(a) TIG welding

(b) MIG welding

2. What do you understand by 'Gas Welding'?

Also, Describe with neat diagram different

types of oxy-acetylene flames. 10

P.T.O.

3. What is the Moulding Sand? Discuss the properties of Moulding Sand used in casting processes. 10
4. What is working principle of Lathe Machine?
How a centre lathe is specified? 10
5. Write short note on any 'two' of the following : 10
- (a) Drilling
 - (b) Boring
 - (c) Up-Milling
 - (d) Down-Milling
6. What are the main parts of the shaper? Label it on a block diagram of shaper. 10
7. Differentiate between column and knee type universal milling machine. 10

8. Explain Electric arc welding with suitable sketch. What do you understand by the polarity in welding? 10

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B.Tech. II Sem.

Roll No.

G-42

B.Tech. Examination, May 2014

Ag. Engg.

Thermodynamics & Heat Engines

[Code No. BT-212]

Time : Three Hours

[Maximum Marks : 100]

Note: Attempt any five questions. All questions carry equal marks.

1. Discuss the following terms : 10
(a) System, Surrounding and Boundary.
(b) Closed and open systems.

(1)

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2. (a) State Zeroth law of thermodynamics with neat sketch and what is the significance of zeroth law of thermodynamics? 10
- (b) Derive Steady Flow Energy Equation (S.F.E.E.). 10
3. (a) State two major statements of second law of thermodynamics with neat sketches. 10
- (b) Explain Carnot cycle with neat sketches on P-V and T-S diagrams. Also write the equation for Carnot efficiency. 10
4. (a) State Carnot theorem and define entropy with example. 10
- (b) Find the C.O.P. and heat transfer rate in a condenser of a refrigerator in KJ/hr which has a regeneration capacity of 12000 KJ/hr when power input is 0.75KW. 10

5. (a) Define "Dryness fraction" and explain its significance. 5

(b) Explain the phase transformation of ice into vapour at constant pressure. 15

6. (a) List the various factors on the basis of which steam boilers are classified. 10

(b) What are boiler accessories? Mention and three boiler accessories. Explain any one boiler accessory with neat sketch. 10

7. (a) Derive an expression for Air standard efficiency of Otto cycle with P-V and T-S diagram. 10

(b) Explain Rankine cycle with neat sketch on P-V and T-S diagram. 10

8. (a) Explain B.P. and I.P. of an engine. 10
- (b) A two-stroke cycle Petrol engine has a piston diameter of 110mm and stroke length of 140mm. Mean effective pressure exerted on head of piston is 600 KN/M^2 . If it runs at 1000 r.p.m., find the I.P. of the engine. 10

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(Printed Pages 4)

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Roll No.

B.Tech.-II Sem.

G-41(B)

B.Tech. Examination, May 2014

AG. ENGG.

Engineering Mechanics

[BT-215(N)]

Time : Three Hours

/Maximum Marks : 100

Note: Attempt any five questions. All questions carry equal marks.

1. Explain following with suitable Figure. 5x4
 - (i) Coplaner force system
 - (ii) Non Coplaner force system
 - (iii) Condition of equilibrium
 - (iv) Vector and scalar quantities
2. (a) Two vectors A & B are given as 10
 $\vec{A} = 4\mathbf{i} - 3\mathbf{j} - 2\mathbf{k}$
 $\vec{B} = 3\mathbf{i} + 2\mathbf{j} - \mathbf{k}$

Determine Dot product and angle between them.

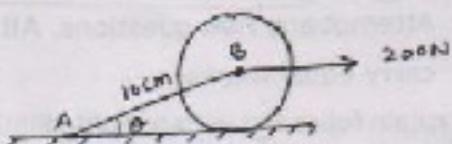
P.T.O.

(b) State and prove Varignon's Theorem.

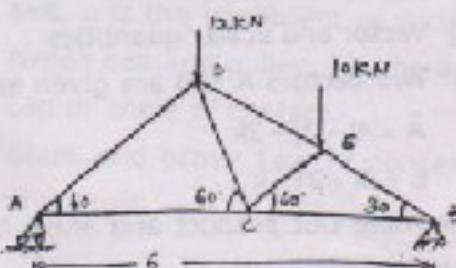
10

3. (a) State all types of assumption made during Truss / frames analysis. 10

(b) A circular roller of radius 6 cm and weight 10N rests on a smooth horizontal surface and held in a position by an inclined bar AB of length 10 cm as shown in fig. A horizontal force of 200 N is acting at B. Find the tension in the Bar AB and the vertical reaction at C. 10



4. Determine the axial forces in all members of the truss with loading as shown in fig. .20



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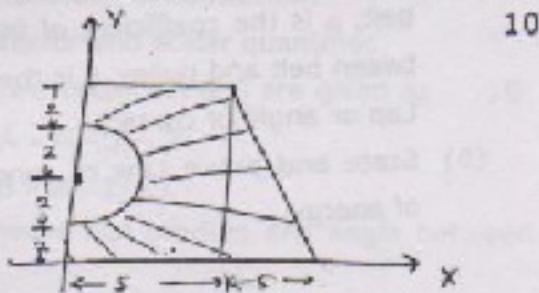
5. Define & Explain the following: 5x4

- (i) Laws of Machine
- (ii) Static & Dynamic Friction
- (iii) Mechanical advantage
- (iv) Angle of friction

6. (a) An uniform ladder of length 10m and weighing 20 N is placed against a smooth vertical wall with its lower end 8 m from the wall. In this Position the ladder is just to slip. Determine

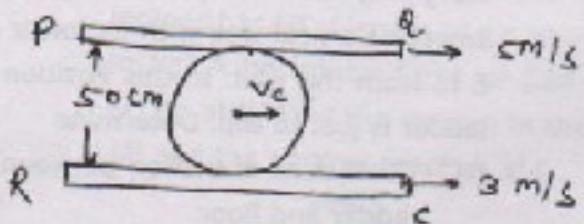
- (i) Coefficient of friction between the ladder and floor
- (ii) Frictional force acting on the ladder at the point of contact between ladder and floor 10

(b) Locate the centroid of the L-section as shown in fig., all dimensions are in mm.



7. A cylindrical roller 50 cm in diameter, is in contact with two conveyor belts at its top and bottom as shown in figure. If the belts run at uniform speed of 5m/sec and 3m/sec. Find the Linear velocity and angular velocity of the roller.

20



8. (a) Prove the relation $\frac{T_1}{T_2} = e^{\mu\theta}$, where T_1 is the tension in Tight side of the belts and T_2 is the tension in slack side of the belt, μ is the coefficient of friction between belt and pulley, θ is the angle of lap or angle of contact.
- (b) State and prove Law of conservation of energy.

10

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Roll No.

B.Tech. II Sem.

G-42(C)

B.Tech. Examination, May 2014

Ag. Engg.

Engineering Mathematics-II

[BT-216(N)]

Time : Three Hours] Maximum Marks : 100

Note : Attempt any five questions.

1. (a) A particle moves along a curve whose parametric equation are $x = e^{-t}$, $y = 2 \cos 3t$, $z = 2 \sin 3t$, where t is the time. $10 \times 2 = 20$

- (i) Determine its velocity and the acceleration at any time.
(ii) Find the magnitude of velocity and acceleration at $t = 0$.

- (b) Show that :

$$\nabla \cdot \left(\frac{\vec{r}}{r^3} \right) = 0, \text{ where } \vec{r} = xi + yj + zk$$

P.T.O.

2. Verify divergence theorem for the function

$$\vec{F} = (x^2 - yz)\hat{i} + (y^2 - zx)\hat{j} + (z^2 - xy)\hat{k}$$

taken over the rectangular parallelopiped
 $0 \leq x \leq 1, 0 \leq y \leq 1, 0 \leq z \leq 1.$ 20

3. (a) Solve :

$$3e^x \tan y \, dx + (1 + e^x) \sec^2 y \, dy = 0,$$

given by $y = \pi/4$ when $x = 0.$

(b) Solve : 20

$$(1 + y^2) \, dx = (\tan^{-1} y - x) \, dy$$

4. (a) Solve the following differential equation:

$$\frac{d^3y}{dx^3} + 3\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + y = e^{-x} \quad 10 \times 2 = 20$$

(b) $(D^2 - 4D + 4)y = e^{-4x} + 5 \cos 3x,$

$$D = \frac{d}{dx},$$

5. (a) Solve the Homogeneous differential equation : $10 \times 2 = 20$

$$x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \log x \sin(\log x)$$

(b) Evaluate by Green's theorem -

$$\int_C [(\cos x \sin y - xy)dx + (\sin x \cos y)dy]$$

where C is the circle $x^2 + y^2 = 1$

6. (a) Show that : $\int_{-1}^1 P_n(x) dx = 2$, $10 \times 2 = 20$
when $n = 0$ and 0 when $n \neq 0$.

- (b) Prove that $(1 - 2xz + z^2)^{-\frac{1}{2}}$ is a solution of the equation

$$z \frac{\partial^2}{\partial z^2}(zv) + \frac{\partial}{\partial x} \left[(1 - x^2) \frac{\partial v}{\partial x} \right] = 0$$

7. (a) Prove that : $10 \times 2 = 20$

$$x J_n' = n J_n - x J_{n+1}$$

- (b) Prove that :

$$J_{n+2} + J_{n+5} = \frac{2}{x} (n+4) J_{n+4}$$

8. (a) Reduce the matrix $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$.

to the upper triangular form by using
elementary transformation and also
compute its rank. 10

(b) Show that the system of equations

$$x + y + z = 3, \quad 3x + y - 2z = -2,$$

$$2x + 4y + 7z = 7 \text{ is not consistent. } 10$$

9. For what values of a and b do the equations : 20

$$x + 2y + 3z = 6$$

$$x + 3y + 5z = 9$$

$$2x + 5y + 9z = b \text{ have}$$

(i) No solution

(ii) a unique solution

(iii) an infinite number of solutions

10. (a) Find the Eigen values and Eigen vectors of the matrix : 10×2=20

$$A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 6 \end{bmatrix}$$

(b) State Cayley-Hamilton theorem. Find the characteristic equations of the matrix

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$

and hence compute A^{-1} .

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Roll No.

B.Tech.- II Sem.

G-43D

B.Tech. Examination, May 2014

Agricultural Engineering

Surveying & Levelling

(BT-217N)

Time : Three Hours] [Maximum Marks : 100

Note : There are eight questions in the paper.

Candidate has to attempt any five questions. Question No. 1 is compulsory. Use of scientific calculator is permitted.

- | | |
|---------------------------------|----|
| 1. Define the following terms : | 20 |
| (a) Change point | |
| (b) Datum surface | |
| (c) Reduced level | |

P.T.O.

- (d) Bench Mark
- (e) Fore sight
2. (a) Calculate the correct length, if measured length of line AB is 850.5 metre measured by a metric chain 15cm too short. 10
- (b) The distance between two points as measured by a 30m chain was 5000 metre. If the chain was 20cm too short, determine the correct distance. 10
3. The following bearings were observed while running a compass traverse. Calculate the interior angles of the traverse. 20

Line	Fore bearing	Back bearing
AB	$45^{\circ}15'$	$225^{\circ}15'$
BC	$123^{\circ}15'$	$303^{\circ}15'$
CD	$181^{\circ}0'$	$1^{\circ}0'$
DA	$289^{\circ}30'$	$109^{\circ}30'$

4. A and B are two point 0.20Km apart on the near bank of the river which flow East to West. The bearings of the tree on the far bank as observed from A & B are N 60° E & N 45° W. Determine the width of the river.

20

5. Explain the different accessories used in chain surveying. 20
6. Write in details the characteristics and uses of contours. 20
7. Enlist the different types of levels used in levelling. Give their relative advantages and disadvantages. 20
8. Explain the steps that are required for conducting the following types of plane table

surveying :

20

- (I) Radiation
- (ii) Intersection
- (iii) Traversing

Draw explanatory sketches.

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Roll No.

B.Tech. II Sem.

G-41

B. Tech. Examination, May 2014

AG. ENGG. BRANCH

ENGINEERING MECHANICS

[BT-215 (O)]

Time : Three Hours / Maximum Marks : 100

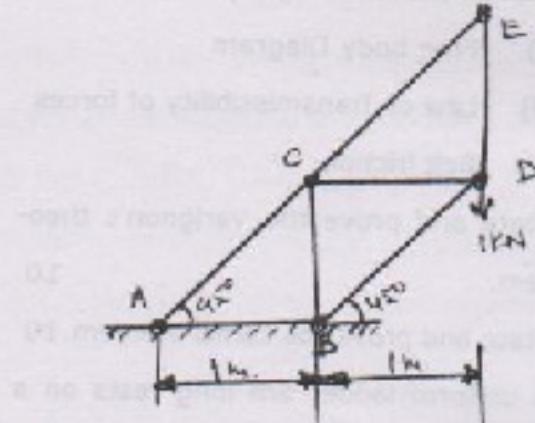
Note: Attempt any five questions.

1. (a) Explain the following : 10
 - (i) Free body Diagram
 - (ii) Law of Transmissibility of forces
 - (iii) Belt friction
(b) State and prove the Varignon's theorem. 10
2. (a) State and prove the Lami's theorem. 10
(b) A uniform ladder 5m long rests on a horizontal ground and leans against a

P.T.O.

smooth-vertical wall at an angle 70° with the horizontal. The weight of the ladder is 300N. The ladder is on the verge of sliding when a man weighing 750N stands on a rung 1.5 m high. Calculate the coefficient of friction between the ladder and the floor. 10

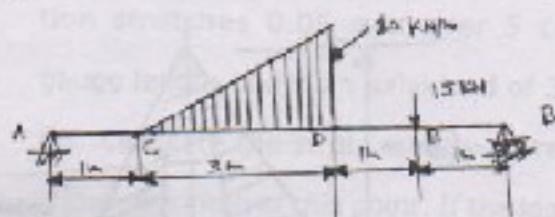
3. Determine the axial forces in the bars of a plane truss loaded as shown in the figure.



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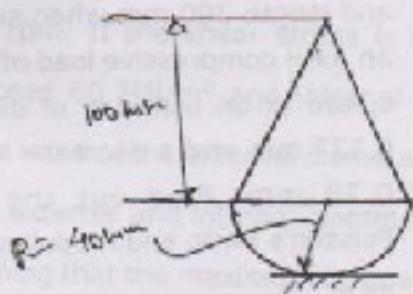
4. (a) What do you mean by truss? Explain how to analyze truss through method of section. 10

(b)



5. (a) Derive an equation for MI of a circular disc. 10

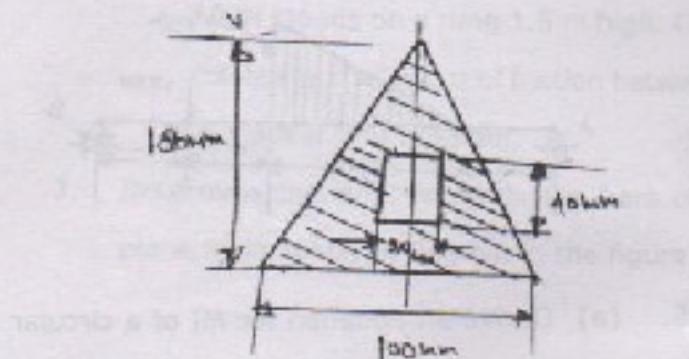
(b) Find out the centre of Gravity of a given body. 10



6. (a) Explain with proof parallel axis theorem.

10

(b) Find the MI of a given figure about its base.



7. (a) Derive a relation between E, C & K. 10

(b) A concrete cylinder of diameter 150 mm and length 300 mm when subjected to an axial compressive load of 240KN resulted in an increase of diameter by 0.127 mm and a decrease in length of 0.28 mm. Find out the value of Poisson's Ratio and modulus of Elasticity E.

8. (a) Derive strain Energy in Simple Tension and compression. 10 ..
- (b) A steel specimen 1.5 cm^2 in cross-section stretches 0.05 mm over 5 cm gauge length under an axial load of 30 KN . Calculate the strain energy stored in the specimen at this point. If the load at the elastic limit for specimen is 50 KN , calculate the elongation at the elastic limit and the resilience. 9
9. (a) Derive a Bending Equation. 10
- (b) A hollow shaft is to transmit 300 KW at 80 rpm . If the shear stress is not to exceed 60 MN/m^2 and internal diameter is 0.6 of the external diameter. Find the external and internal diameters assuming that the maximum torque is 1.4 times the mean. 1

10. (a) Derive the Torsion Equation. 10
- (b) Determine the dimensions of Joist of a timber for span 8m to carry a brick wall 200 mm thick and 5m high, if the density of brick work is 1850 Kg/m^3 and the maximum permissible stress is limited to 7.5 KN/m^2 . Given that the depth of Joist is twice of the width. 10

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(20514) Roll No.

B.Tech. - II Sem.

G-40

B.Tech. Examination, May 2014

Agricultural Engineering

Engineering Mathematics - II

[BT-216(Old)]

Time : Three Hours / Maximum Marks : 100

Note : (i) Attempt any **five** questions.

(ii) Marks are shown against each question.

1. (a) Find a unit vector normal to the surface $xy^3z^2 = 4$ at the point $(-1, -1, 2)$. 5
- (b) Find the directional derivative of $\phi = x^2yz + 4xz^2$ at the point $(1, -2, -1)$ in the direction of the vector $2\hat{i} - \hat{j} - 2\hat{k}$. 5
- (c) A vector field is given by $\mathbf{F} = (x^2 - y^2 + x)\hat{i} - (2xy + y)\hat{j}$. Show that the field is irrotational and find its scalar potential. 10

P.T.O.

2. (a) Verify Stoke's theorem for
 $F = (x^2 + y^2)\hat{i} - 2xy\hat{j}$ taken around the rectangle bounded by the lines
 $x = \pm a, y = 0, y = b$ 10

(b) Evaluate

$$\int_S F \cdot ds \text{ where } F = 4x\hat{i} - 2y^2\hat{j} + z^2\hat{k} \text{ and}$$

S is the surface bounding the region,
 $x^2 + y^2 = 4, z = 0$ and $z = 3$. 10

3. (a) Show that $f(z) = \bar{z}$ is non-analytic anywhere. 5

- (b) Show that $f(z) = xy + iy$ is continuous everywhere but not analytic. 5

- (c) State and prove necessary and sufficient conditions for the existence C-R equations. 10

4. (a) Determine whether the function $u = e^{-2xy} \sin(x^2 - y^2)$ is harmonic. If it is harmonic, find the conjugate harmonic function v such that $f(z) = u + iv$ is analytic. 10

(b) If $f(z) = \begin{cases} x^3y(y - ix) / (x^6 + y^2), & z \neq 0 \\ 0, & z = 0 \end{cases}$

prove that $[f(z) - f(0)]/z \rightarrow 0$ along any radius vector but not as $z \rightarrow 0$ along the curve $y = ax^3$. 10

5. (a) Find a Fourier series to represent $x - x^2$

from $x = -\pi$ to $x = \pi$. Also deduce that

$$\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots \quad 10$$

- (b) Express $f(x) = x$ as a half-range cosine series in $0 < x < 2$. 10

6. (a) Find the Fourier series for the periodic

function : 10

$$f(x) = \begin{cases} 0, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$$

$$f(x + 2\pi) = f(x)$$

- (b) Obtain the constant term and the coefficients of the first sine and cosine terms in the Fourier expansion of y as given in the following table : 10

$x :$ 0 1 2 3 4 5

$y :$ 9 18 24 28 26 20

7. (a) Solve : $(x^2 - y^2 - z^2)p + 2xyq = 2xz$. 5

- (b) Solve : $p(1+q) = qz$ 5

- (c) Solve : $(p^2 + q^2)y = qz$

by Charpit's method. 10

8. (a) Solve

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6 \frac{\partial^2 z}{\partial y^2} = y \cos x \quad 10$$

- (b) Solve $r^4 s + 4t = e^{2x+y}$. 10

9. (a) Using the method of separation of variables, solve 10

$$\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u,$$

where $u(x,0) = 6e^{-3x}$

- (b) Obtain the solution of the one-dimensional heat-flow equation 10

$$\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$$

by the method of separation of variables.

10. A tightly stretched string of length l with fixed end is initially in equilibrium position. It is set vibrating by giving each point a velocity $v_0 \sin^3 \frac{\pi x}{l}$. Find the displacement $y(x,t)$.

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Roll No.

B.Tech. II Sem.

G-44'E'

B.Tech. Examination, May 2014

Ag Engg.

Thermodynamics

BT-218(N)

Time : Two Hours /

[Maximum Marks : 50]

Note: Attempt any five questions. All questions carry equal marks.

1. What is Intensive and Extensive properties of a system? State whether the following properties are intensive or extensive. 10

- (a) Area
- (b) pressure
- (c) Volume
- (d) Density
- (e) Specific heat
- (f) Specific density

P.T.O.

2. What is Kelvin-Planck statement of 2nd law of thermodynamics? How is it different from Clausius Statement.
3. What are boiler mounting and boiler accessories? Explain briefly any one of the boiler mountings. 10
4. State First law of thermodynamics. Differentiate between work and internal energy. 10
5. Explain with the help of a neat diagram "fire tube boiler"? 10
6. A 4-stroke petrol engine develops 50 kw of Indicated power and consumes 16 litres of petrol per hour of specific gravity 0.755. The Calorific value of fuel used is 44500KJ/Kg. Find its indicated thermal efficiency
If the engine runs at 300rpm. When it develops 50 kw power, find its bore and length of the stroke, if the indicated mean effective pressure is 5.2 bar,
Assume length of stroke = $1.1 \times \text{bore}$

7. Derive the efficiency and mean effective pressure of Otto cycle. 10
8. Differentiate between fire tube and water tube boiler. 10
9. Explain Rankine cycle with the help of P-V, T-S and h-s diagram 10
10. Write short note on any two: $5 \times 2 = 10$
 - (a) Boiler accessories
 - (b) First law of Thermodynamics
 - (c) Second law of Thermodynamics

M

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Roll No.

B.Tech. - II Sem.

G-40(A)

B.Tech. Examination, May 2014

Ag. Engg. Branch

Engineering Chemistry

BT-214(N)

Time : Three Hours / Maximum Marks : 100

Note : Attempt any five questions. All questions carry equal marks.

1. (a) Explain Additional and Condensational Polymers. 10
(b) Explain Vulcanization of natural rubber. 10
2. Explain Cement Manufacturing with the help of a diagram.

P.T.O.

3. (a) Explain fuel and characteristic of a good fuel. 10

(b) Explain gobar gas production. 10

4. Write notes on any four.

(a) Nylon 6

(b) Terelene

(c) Buna-N

(d) Teflon

(e) P.V.C.

(f) Butyl-Rubber

5. (a) Explain Corrosion and Stress Corrosion. 10

(b) Explain type of Lubricants. 10

6. Explain Lime-Soda or Zeolite process for Water Softening. 10

7. Write notes on : $5 \times 4 = 20$

- (a) Units of Hardness,
- (b) Units of Calorific Value,
- (c) Chemical bonding and type of bonding.
- (d) Hardness and type of Hardness.

8. Write notes on any two : $10 \times 2 = 20$

- (a) Coal gas
- (b) Oil gas
- (c) Glass and two type of glass

9. Calculate temp. and Permanent Hardness of Water Containing :

- (a) $MgCl_2$ - 9.5 Mg/L
- (b) $MgSO_4$ - 24.0 Mg/L
- (c) $CaCl_2$ - 22.2 Mg/L
- (d) $CaSO_4$ - 13.6 Mg/L
- (e) $Ca(HCO_3)_2$ - 8.1 Mg/L
- (f) $Mg(HCO_3)_2$ - 7.3 Mg/L

7. Write notes on : $5 \times 4 = 20$

- (a) Units of Hardness,
- (b) Units of Calorific Value,
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(e) $Ca(HCO_3)_2$ - 8.1 Mg/L

(f) $Mg(HCO_3)_2$ - 7.3 Mg/L

10. (a) Explain determination of calorific value
by Bomb Calorimeter. 10

(b) 0.80 gm. of a fuel, When burnt in a
bomb Calorimeter increased the temp.
of water from 25.8°C to 27.1°C . If
Calorimeter contains 320 gm. of water
and its water Equivalent is 100 gm. Cal-
culate the H.C.V. of the fuel. 10

M

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Roll No.

B.Tech. II Sem.

G-38

B.Tech. Examination, May 2014

Manufacturing Processes

[BT-210(O)]

Time : Two Hours]

[Maximum Marks : 50

Note: Attempt any five questions.

1. (a) Explain the following terms: 5
Ductility, Brittleness, Toughness, Hardness, Malleability.
- (b) Classify different carbon steels on the basis of percentage of carbon. 5
2. (a) Write a short note on heat treatment of steels. 5
- (b) What is brass? Describe the compositions, properties and uses of a few important types of brasses. 5

P.T.O.

3. (a) What is hot working? What are its advantages and limitations? 5
- (b) What is hot extrusion? Describe direct extrusion and indirect extrusion in brief. 5
4. (a) What are the essential qualities of a good sand? What are its main constituents? 5
- (b) What are different casting defects and its remedies? 5
5. (a) Explain the term 'machining'. Which factors govern the selection of a machine tool? 5
- (b) Explain the construction, working of drilling or milling machine. 5
6. (a) Classify the different welding processes. 5

- (b) Explain the processes of soldering and brazing and its uses. 5
7. (a) What are the different types of production? Difference between production and productivity. 5
- (b) What are the difference between soft wood and hard wood? 5
8. (a) How plastics are classified? How do thermosetting plastics differ from thermoplastics? 5
- (b) What are the different methods of producing metal powders? Describe the atomisation process in detail. 5

M

(Printed Pages 4)

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Roll No.

B.Tech. II Sem.

TU-006

B.Tech. Examination, May 2014

Remedical English Language

BT-206

Time : Two Hours]

[Maximum Marks : 50

Note : All questions are compulsory.

Unit -I

1. Fill in the correct form of noun given in bracket. 05
 - (i) Do you have _____? (scissors/scissor)
 - (ii) I do not wear _____(spectacle/spectacles)
 - (iii) Convey my _____to her. (thank/thanks)
 - (iv) I shall not give _____ to the poor. (alm/alm's)
 - (v) I like _____(music/musics)

P.T.O.

2. Fill in appropriate pronoun. 05
- (i) We scored as many goals as _____ (they/them)
 - (ii) Rama and _____ were present, (I/me)
 - (iii) Let you and _____ try what we can do. (I/me)
 - (iv) One should obey _____ parents. (one's/his)
 - (v) Nobody but _____ was present. (he/him)

3. Fill in appropriate preposition. 05
- (i) He is accused _____ theft.
 - (ii) I am not envious _____ you.
 - (iii) You should not be hostile _____ your classmates.
 - (iv) She is good _____ mathematics.
 - (v) One can rely _____ oneself.
4. Change the following into the passive. 05
- (i) Do you write a letter?
 - (ii) Why is he not singing a song?

- (iii) I gave him a gift.
- (iv) He will send a letter tomorrow.
- (v) People say figs are good for health.

Unit - II

5. Fill in the correct tense of modals. 05
- (i) If I drop it, it _____ explode. (will/would)
 - (ii) Even if I dropped it, it _____ not explode (will/would)
 - (iii) If he had delayed, the plane _____ have left, (will/would)
 - (iv) If you smoked in the classroom, the teacher _____ object (will/would)
 - (v) If she did not smoke so much, she _____ get rid of her cough (may/might)
6. Change the following sentence as per direction given in bracket. 05
- (i) There is my good brother. His name is Sohan. (combine into simple sentence)
 - (ii) In received no answer. I knocked sec-

ond time. (combine into simple sentence)

(iii) He felt tried. He laid his work aside.

(combine into simple sentence)

(iv) The way was long. The wind was cold.

(combine into compound sentence)

(v) He is poor. He is honest. (combine into

complex sentence)

Unit - III

7. Write a paragraph of about 100 words on any topic of your choice keeping in mind the concept of unity and coherence. 5

Unit - IV

8. Write an essay on any one the following topics in about 500 words. 15

(i) Information Technology: Its uses and abuses

(ii) Internet as a tool of communication

(iii) Noise Pollution

(iv) Engineering as a career

(v) Terrorism

M

(Printed Pages 3)

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Roll No.

B.Tech. II Sem.

G - 43

B.Tech. Examination, May 2014

Ag. Engg.

Surveying & Levelling

[BT- 217 (O)]

Time : Three Hours]

[Maximum Marks : 100]

Note: Attempt any five questions. All questions carry equal marks.

1. What do you mean by Surveying? Also classified it in detail. 20

2. Explain the instruments used in chain surveying and write the procedure of a chain survey executed in field. 20

3. Define Contouring and explain in detail about characteristics of Contouring. 20

P.T.O.

4. List the chaining. The true length of line measured from a plan as per scale was 1276.56 m. When the line was measured with a 30m long chain, the length was measured as 1274.54m. Find the true length of chain. 20
5. Discuss in brief about different methods of plain surveying and explain in detail any one.

20

6. What do you understand by levelling? Explain with help of neat diagram, working of dumpy level. 20
7. Explain with help of appropriate diagram working and use of prismatic campuss.
8. The following consecutive readings were taken with a dumpy level –

G-43\6012

0.874 1.543 2.796 3.018 0.944 0.662

0.579 0.241 1.522 0.956 2.125
Total

The instrument was shifted after fourth and eighth reading. Bench mark of reduced level is 819.765. Solve the problem by Rise and Fall Methods.

20

9. Inlist various instruments required while doing plain surveying and explain their working.

20

10. Write short notes on any four : $5 \times 4 = 20$

(i) Station

(ii) Traversing

(iii) Direct method of contouring

(iv) Bench mark

(v) Back and four sight

M

(Printed Pages 3)

(20514)

Roll No.

B.Tech.- II Sem.

G-44

B.Tech. Examination, May 2014

Ag. Engg.

Workshop Technology

BT-213(O)

Time : Two Hours /

/Maximum Marks : 56

Note : Attempt any five questions.

1. Describe with neat sketches, the following

arc welding processes : 10

(a) TIG welding

(b) MIG welding

2. What do you understand by 'Gas Welding'?

Also, Describe with neat diagram different

types of oxy-acetylene flames. 10

P.T.O.

3. What is the Moulding Sand? Discuss the properties of Moulding Sand used in casting processes. 10
4. What is working principle of Lathe Machine?
How a centre lathe is specified? 10
5. Write short note on any 'two' of the following : 10
- (a) Drilling
 - (b) Boring
 - (c) Up-Milling
 - (d) Down-Milling
6. What are the main parts of the shaper? Label it on a block diagram of shaper. 10
7. Differentiate between column and knee type universal milling machine. 10

8. Explain Electric arc welding with suitable sketch. What do you understand by the polarity in welding? 10