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(20514)

Roll No.

B.Tech. II Sem.

G-31

B.Tech. Examination, May 2014

EC/EI/CS/IT/ME/CE

Engineering Physics-II

(BT-204)

Time : Two Hours /

/Maximum Marks : 50

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

1. (a) Calculate the velocity and kinetic energy of an electron having de-Broglie wavelength 1\AA . [$\hbar = 6.62 \times 10^{-34} \text{ J}\cdot\text{sec}$]

5

- (b) Calculate the uncertainty in the velocity of an electron which is confined in a 10\AA box.

5

G-31\100\3

P.T.O.

2. (a) Obtain time independent Schrodinger's wave equation. Explain ψ . 5
(b) Explain why compton shift is not observed with visible light? 5
3. Derive the electromagnetic wave equations in vaccum. Hence show that the wave travel at a speed of light. 10
4. Describe the Langevin's theory for a diamagnetic magnetic materials. Using this derive the expression for magnetic susceptibility of diamagnetic material. 10
5. What is ultrasonics? Explain magnetostriiction method of producing ultrasonic wave. Also describe its advantage over the piezoelectric method. 10
6. (a) A super conducting Sn has a critical temperature of 3.7K in zero magnetic field

and a critical field of 0.0306 T at OK.

Find the critical of $2k$.

5

- (b) What is Meissner effect? Prove that Meissner effect and the disappearance of resistivity in a superconductor are mutually consistent. 5

7. Derive an expression for internal field due to polarization in case of solid and hence derive Clausius-Mossotti's relation. 10

8. (a) What are carbon nano tubes? What are their different types. 5

(b) What is nanotechnology? Explain its application. 5

9. Write short notes on any two : 5+5

(i) Hysteresis loss

(ii) Poynting vector

(iii) Cooper Pairs

(iv) Piezoelectric effect

10. Explain any **two** of the following : 5+5

- (i) Compton Scattering
- (ii) Matter waves
- (iii) Types of super conductors
- (iv) Carbon buckyballs
- (v) Dielectric Polarization

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Roll No.

B.Tech.-II Sem.

TU-434

B.Tech. Examination, May 2014

CS, EI, CH, EC, IT, BRANCH

Engineering Physics-II

[BT-204(N)]

Time : Two Hours /

/Maximum Marks : 50

Note: Attempt any five questions. Use of calculator is permitted.

1. (a) Discuss seven crystal systems and
fourteen Bravais lattices. 5
- (b) Determine lattice constant for NaCl crystal if density of crystal is 2189 Kg/m^3
and Avogadro's number $N=6.02\times 10^{26}$
per Kg atom. 5

P.T.O.

2. (a) Determine packing factor for simple cubic. 5
- (b) Find Miller indices for the plane which intercepts x,y, & z axes in the ratio $a : 3b : -2c$, where a,b,c , are primitive vectors? 5
3. Derive Claussius- Mossotti equation. 10
4. Derive the equation of local (internal) fields in liquid and solids. 10
5. (a) Define poynting vector and deduce an expression for it. 6
- (b) Calculate skin depth for a frequency of 10^{10} Hz for silver, given $\sigma=2\times 10^7$ S/m and $\mu=4\pi\times 10^{-7}$ H/m. 4
6. Establish equation of motion for plane electromagnetic wave in free space and show that $c = \frac{1}{\sqrt{\epsilon_0 \mu_0}}$ 10

TU-434\400\2

7. Derive the expression for densities of free electrons and holes in an intrinsic semi conductor. 10
8. What are super conductors? And how their resistivity varies with temperature? 10
9. Explain carbon nano tubes on the basis of structure and how can be classified? 10
10. Attempt any **two** short notes :
 - (a) Miller indias
 - (b) Dielectric losses
 - (c) Type I & II super conductors
 - (d) Bucky balls

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B.Tech. II Sem.

Roll No.

TU-415(E)

B.Tech. Examination, May 2014

E.C./E.I.

Engg. Physics II

[Code No. BT-204 (E)]

Time : Three Hours

[Maximum Marks : 80]

Note: Attempt any five questions. Three questions from Section-A and rest Two questions from Section-B. All questions carry equal marks.

Section-A

1. Explain Heisenberg's uncertainty principle by the help of ultra-microscope and discuss its importance in Quantum theory. 16

(1)

TU-415 (E) / 100

2. Describe an experiment for accurate determination of de-Broglie wavelength of a free "e" of energy 10^4 electron volts. Calculate the velocity of such electrons. 16
3. What are the Bucky balls? Discuss their properties and application. 16
4. Explain the construction and working of Carbon nanotube. 16
5. Distinguish between dia, para and ferromagnetic materials and also explain the behaviour of these substances. 16
6. What do you mean by dielectric constant? Define dielectric susceptibility and also derive the relation between them.

Section-B

7. What is optical fiber? Explain the structure of an optical fiber. 16

8. What is the acceptance angle and acceptance cone?
Derive an expression for acceptance angle. 16
9. Draw the neat block diagram and explain the principle
of optic communication. 16
10. Explain Fermi-Dirac probability. 16

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Roll No.

B.Tech. II Sem.

TU-431

B.Tech. (II Semester) Examination,

May 2014

C.S, E.I., CH, EC., IT Branch

Professional Communication

BT-201(N)

Time : Three Hours / Maximum Marks : 100

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

1. What do you understand by technical communication? How does the flow of communication affect the speaker?
2. How does communication flow? Explain downward, upward, and lateral communication.

P.T.O.

3. Discuss in detail the difference between technical and general writing.
4. What do you understand by technical proposal? Discuss the significance, types, characteristics, and parts of good technical proposal.
5. Discuss the structure of report writing explaining front matter, main body, and back matter.
6. Discuss the role of body language in oral presentation.
7. Discuss the devices of good paragraph-unity, coherence, and emphasis.
8. What is claim letter? Draft a claim letter for damaged computer system supplied by Delhi based firm in the capacity of purchase officer, Prakash Computers, Lucknow. Invent details.

9. Discuss the relationship between 'man and nature', emphasizing their complementary character.
10. Critically analyze Barry Commoner's views about 'science and survival'.

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Roll No.

B.Tech. II Sem.

G-37

B.Tech. Examination, May 2014

CS/EC/EI/IT/ME/CE

Professional Communication

BT-201(O)

Time : Three Hours / Maximum Marks : 100

Note: Attempt all questions. Distribution of marks has been mentioned with each question.

1. Attempt any two of the following: $10 \times 2 = 20$
 - (a) Describe the process of communication, indicating clearly the role of each constituent element.
 - (b) Discuss the salient features of technical communication. How technical communication is different from general communication?

P.T.O.

- (c) Discuss any three barriers that lead to miscommunication.
2. (a) Give antonyms of the following: $1 \times 5 = 5$
- (i) Blunt
 - (ii) Arrogant
 - (iii) Economical
 - (iv) Belief
 - (v) Plenty
- (b) Correct the following sentences: $1 \times 5 = 5$
- (i) I could neither contact Lila or Sarla.
 - (ii) I hope that you are well now.
 - (iii) You wait here unless the train arrives.
 - (iv) Keep your body fit like I do.
 - (v) As the started late, she will miss the train
- (c) Change the following as directed: $1 \times 5 = 5$
- (i) His mother (die) three months ago.
(Use correct form of verb)
 - (ii) He has repaired the car.
(Change into Passive Voice)

(iii) He said, "Man is Mortal".

(Change into Indirect Speech)

(iv) Walk Carefully. You may fall.

(Combine into one sentence)

(v) He was very tired but he kept on
working.

(Turn this into a simple sentence)

(d) Differentiate between the following pairs
of Homophones: $1 \times 5 = 5$

(i) Heel-Heal

(ii) Hole-Whole

(iii) Lose-Loose

(iv) Pray-Prey

(v) Peace-Piece

3. In the capacity of a branch manager, write a
letter to the Head Office recommending a
loan to a customer. 20

OR

Draft an application for the post of the Sec-
retary of a large public limited company.

4. Draft a report on the need to introduce some Incentive schemes to boost the sales of the company. 20

OR

Discuss the role of audio-visual aids in making the communication effective. Also, give examples of some audio-visual aids.

5. How are Humanistic and Scientific Approaches to Human activity different according to Moody, E Prior? 10

OR

What does J. Bronowski say about Man and Nature?

6. What does Prior say about the aims of Science and Humanities? 10

OR

Summarize B. Commoner's views as given in his essay, "Science and Survival".

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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

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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. 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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Roll No.

B.Tech.-II Sem.

TU-433

B. Tech. Examination, May 2014

CS, EI, CH, EC, IT Branch

Computer Programming - in - C

BT-202(N)

Time : Three Hours / Maximum Marks : 100

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

1. (a) What is digital computer? Draw block diagram of digital computer and explain each component of it. 10
(b) (i) What are different data types in C-language? Explain range, memory size of each with its format specifier. 5
(ii) What is the difference between identifier and keyword, explain with example. 5
2. (a) (i) Differentiate variable declaration and initialization with example. 5
(ii) What is an operating system? Give

P.T.O.

the name of any five operating system.

5

- (b) What is a flow chart? Discuss advantages and limitation of flow chart. Draw a flow chart to generate first 20 number of the following sequence 10
 $0, 0, 1, 1, 2, 2, 3, 3, 4, 4 \dots$

3. (a) Convert the following : 10

- (i) $(11011101)_2$ to $(\quad)_{10}$
(ii) $(4567)_8$ to $(\quad)_2$
(iii) $(B678A)_{16}$ to $(\quad)_{10}$
(iv) $(125)_{10}$ to $(\quad)_2$
(v) $(3AC)_{16}$ to $(\quad)_8$

- (b) (i) Find the value of X in the equation

$$(1230)_4 = X_6 \quad 5$$

- (ii) Distinguish between compiler and interpreter. 5

4. (a) (i) What is a pointer? How pointer are declared in C programming language? Illustrate with a suitable example. 5

- (ii) What do you mean by call by reference technique for function call? Explain with example. 5

- (b) Write a program in C to calculate the

sum of the following series up to 50 terms. 10

$$\text{Sum} = -1^3 + 3^3 - 5^3 + 7^3 - 9^3 + 11^3 + \dots$$

5. (a) (i) Differentiate while and do while loop with example. 5
(ii) Differentiate break and continue statement with suitable example. 5
(b) Draw a flow chart and write a program in C to print the multiplication of two matrices A and B of size NxN. 10
6. (a) What is sorting explain any one sorting technique with the following data. 10
76, 89, 31, 11, -6, -15, 0, 17
(b) (i) Write an algorithm to find the largest of 3 numbers. 5
(ii) Write a program in C to swap two numbers without using third variable. 5
7. (a) (i) What do you mean by precedence and associativity explain with example. 5
(ii) What is the use of bitwise operator? Describe any two bitwise operator with example. 5
(b) What is the use of switch statement? Write the syntax of switch statement and explain how it is different from if statement. 10

8. (a) What is macros? How is it substituted?
Write a program that illustrates the use
of macros with argument. 10
- (b) What is the use of fopen () and fclose()
functions write a program to illustrate
the use of fputs(). 10
9. (a) What is the difference between sorting
and searching. Write a program for se-
quential search of any element. 10
- (b) What is a recursion? How it is different
from looping using for loop. Write a pro-
gram to print the fibonacci series upto
n terms using recursion. 10
10. (a) Define a structure to store employee
records e.g. employee ids employee
name and salary of employee. Using this
structure write a 'C' program to create
a file "employee.dat".
There must be one record for every em-
ployee in the file. Accept the data from
the user. Using the file "employee.dat"
display the details of employee whose
id is entered by the user. 10
- (b) What do you mean by conditional com-
piling. Write a program to illustrate the
concept of conditional compilation. 10

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Roll No.

B.Tech. II Sem.

TU-432

B. Tech. Examination, May 2014

CS, EI, CH, EC, IT, Branches

Environment & Ecology

BT-203(N)

Time : Two Hours / Maximum Marks : 50

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

1. Define Term Biodiversity. Also explain two main approach of Biodiversity Conservation.

10

OR

Explain following Term :

- (i) Bio-sphere reserve
- (ii) Endangered? Extinct species.

P.T.O.

2. What are the functions of Ecosystem, briefly
explain. 10

OR

Explain Term Ecological Pyramid along its
type.

3. Write short note on any **two** of the follow-
ing: 10

- (i) Producer, Consumer & Decomposer
- (ii) Single Channel Energy Flow Model
- (iii) Estuary Ecosystem.

4. Write brief note on any **one** of following : 10

- (i) Biomass Energy
- (ii) Hydrogen as an alternative Fuel

5. Write down the impact of Mining and Agricul-
ture activity on Environment. 10

6. Write brief essay on soil pollution. 10

OR

Define Term Noise Pollution and also briefly explain impact & control of Noise pollution.

7. Write brief note on **two** of following : 10

(i) Bio-indicators

(ii) Natural Disaster

(iii) Environment Impact Assessment (EIA)

8. Explain role of Government to control of Environmental Pollution. 10

9. Define term sustainable development and also explain its objective. 10

10. What is Ozone depletion, explain effect & cause of Ozone depletion. 10

OR

What is green house effect also explain effect of Global warming on environment.

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Roll No.

B.Tech. II Sem.

TU-418

B.Tech. Examination, May 2014

EC, CS, ME BRANCH

Energy Environment and Ecology

BT-203

Time : Three Hours / Maximum Marks : 80

Note: Attempt any eight questions. Every question carries 10 marks.

1. Define the term environment. Explain the importance of environmental studies in present context. 10
2. What is meant by structure of an ecosystem? Explain the various Component of ecosystem. Discuss the functions of an ecosystem also. 10

P.T.O.

3. What is meant by biodiversity? What is 'Red data Book'? How do we declare species threatened or endangered? Name two species each of endangered reptiles, birds, mammals and plant of our country. 10
4. What are the alternative energy resources? Differentiate between renewable and non-renewable natural resources. 10
5. Discuss population explosion in Indian context. What are major reasons of population explosion? 10
6. What do you understand by water pollution? Suggest various remedial and control measures to minimise water pollution. 10
7. What is air pollution? What are its effects on human health? Discuss the measures used for controlling air pollution. 10

8. Discuss the phenomenon of 'Green House Effect'. What are its effects? What remedial measures you suggest. 10
9. Explain water conservation, global warming, acidic-rain and ozone layer depletion. 10
10. Write short notes on- 10=5+5
- (a) Briefly discuss the salient features of Environment (Protection) Act 1986.
 - (b) Bhopal Gas tragedy.

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Roll No.

B.Tech. II Sem.

G - 039

EC,CS,ME,EI & IT Examination, May 2014

Environmental Ecology

[BT- 203 (O)]

Time : Two Hours]

[Maximum Marks : 50]

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

1. What do you understand by Environment & Explain different components of Environment in details? 10
2. Explain in detail about the Ecosystem & write down about the energy flow in any ecosystem. 10
3. What do you mean by natural resources. Explain different natural resources of Environment in details? 10

P.T.O.

4. Explain the pollution, mainly air pollution in detail with reference to primary & secondary pollutants & controlling measures? 10
5. What do you mean by Agricultural pollution. Explain different factors of Agricultural pollution & their remedies? 10
6. Explain water pollution. How dissolve oxygen level decreases in thermal pollution of water. Write in details? 10
7. What is environmental impact assessment (EIA) write down different steps of EIA & where EIA is used? 10
8. What do you mean by Global Environmental Problems, explain different Global Environmental problems in details? 10

9. Explain Acid rain, Global warming & Green House effect with concern Gases in details & reactions? 10

10. What do you mean by following short notes.

(Attempt any four). $5 \times 2 = 10$

- (A) Bio-chemical Oxygen Demand (BOD).
- (B) Chemical Oxygen Demand (COD).
- (C) Green House Gases (GHGs).
- (D) Cyclone Separators.
- (E) Sechi Disc.

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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 $J_{1/2}(x) = \sqrt{\frac{2}{\pi x}} \sin x \cdot 10$

(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 $D \in \frac{d}{dx}$ 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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Roll No.

B.Tech. II Sem.

G-30

B. Tech. Examination, May 2014

EC/EI/CS/IT/ME/CE

Mathematics-II

BT-205(O)

Time : Three Hours / Maximum Marks : 100

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

1. (a) Solve $x^2 \frac{d^2y}{dx^2} + 4x \cdot \frac{dy}{dx} + 2y = e^x$ 10

(b) Solve $\frac{d^2y}{dx^2} + \cot x \frac{dy}{dx} + 4y \cos \operatorname{ec}^2 x = 0$ by
changing the independent variables. 10

2. (a) Solve, by method of variation of parameters $\frac{d^2y}{dx^2} - y = e^{-2x} \cdot \sin(e^{-x})$ 10

P.T.O.

- (b) Solve the simultaneous differential equations 10

$$\frac{d^2x}{dt^2} - 4 \frac{dx}{dt} + 4x = y$$

$$\frac{d^2y}{dt^2} + 4 \frac{dy}{dt} + 4y = 25x + 16e^t$$

3. (a) A spring of negligible weight hangs vertically. A mass M is attached to the other end. If the mass is moving with velocity u when the spring is unstretched, find the velocity v as a function of the stretch x . 10

- (b) Prove that $J_{-n}(x) = (-1)^n J_n(x)$ where n is a positive integer. 10

4. (a) Show that 10

$$\int_{-1}^1 (1-x^2) P_m' P_n' dx = \begin{cases} 0, & m \neq n \\ \frac{2n(n+1)}{2n+1}, & m = n \end{cases}$$

- (b) Find the Laplace Transform of $t \cdot \sin ht$.

10

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5. Find the Laplace Transform of the waveform

$$f(t) = \frac{2t}{3}, \quad 0 \leq t \leq 3. \quad 20$$

6. (a) Using Laplace Transforms, find the solution of the initial value problem 10

$$y'' - 4y' + 4y = 64 \sin 2t$$

$$y(0) = 0, y'(0) = 1$$

(b) Find the Fourier sine - series for the function $f(x) = e^{ax}$ for $0 < x < \pi$, where a is a constant. 10

7. (a) Solve the differential equation 10

$$x^2 \frac{\partial z}{\partial x} + y^2 \frac{\partial z}{\partial y} = (x+y)z$$

(b) Solve the partial differential equation

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

8. (a) Solve

$$(D^2 - DD' - 2D'^2) z = (y - 1) e^x \quad 10$$

(b) Solve the following differential equation
by the method of separation of vari-
ables

10

$$\frac{\partial^2 u}{\partial x \partial t} = e^{-t} \cdot \cos x.$$

9. Solve completely the equation :

$\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$, representing the vibrations of
a string of length l , fixed at both ends, given
that $y(0,t) = 0$, $y(l,t) = 0$, $y(x,0) = f(x)$ and
 $\frac{\partial}{\partial t} y(x,0) = 0$; $0 < x < l$.

20

10. A thin rectangular plate whose surface is im-
pervious to heat flow has $t = 0$ an arbitrary
distribution of temperature $f(x,y)$. Its four
edges $x = 0$, $x = a$, $y = 0$, $y = b$ are kept at
zero temperature. Determine the tempera-
ture at a point of the plate as t increases.

20

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Roll No.

B.Tech.-II Sem.

TU-435

B.Tech. Examination, May 2014

CS, EI, CH, EC, IT Branches

Mathematics Engineering-II

[BT-205(N)]

Time : Three Hours / Maximum Marks : 100

Note: Attempt any **five** questions.

1. (a) If $\vec{r} = \sin t \hat{i} + \cos t \hat{j} + \sin t \hat{k}$, Evaluate

the following: 10

$$(i) \frac{d\vec{r}}{dt}, \quad (ii) \frac{d^2\vec{r}}{dt^2},$$

$$(iii) \left| \frac{d\vec{r}}{dt} \right| \quad (iv) \left| \frac{d^2\vec{r}}{dt^2} \right|$$

(b) Find the grad ϕ , where

$$\phi(x, y, z) = x^2y + y^2x + z^2 \text{ at the}$$

point (1,1,1) 10

P.T.O.

2. (a) Given matrices $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 3 & 1 \\ 0 & 0 & 1 \end{bmatrix}$

$$B = \begin{bmatrix} 2 & 1 & 1 \\ 3 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$$

Justify your answer that it is true or
not $(A - B)^2 = A^2 + B^2 - 2AB$. 10

- (b) Give an example of skew symmetric matrix of odd order and find determinant of that matrix. 10

3. (a) Find the inverse of the given matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix} \quad 10$$

- (b) Find the curl ϕ , Div ϕ where

$$\phi(x, y, z) = 2x\hat{i} + 2y\hat{j} + 3z\hat{k} \quad 10$$

4. (a) Given matrices $A = \begin{bmatrix} 1 & 2 & 1 \\ 1 & 1 & 1 \\ 3 & 1 & 2 \end{bmatrix}$

$$B = \begin{bmatrix} -1 & 1 & 1 \\ -1 & 0 & 3 \\ 1 & 2 & 2 \end{bmatrix}$$

Verify that

(i) $|AB| = |A| \cdot |B|$

(ii) $|A+B| = |A| + |B|$ is true or not
justify your answer. 10

(b) Find the rank of the matrix in Echelon

form $A = \begin{bmatrix} 1 & 2 & 0 \\ 0 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$ 10

5. (a) Solve $\frac{dy}{dx} = 5e^{x+y}$ 10

(b) Solve $\frac{d^2y}{dx^2} + 4y = 0$ 10

6. (a) Solve 10

$$\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = x^2 + e^x + \cos 2x$$

(b) If $\vec{f}(t) = 5(2t-3)\hat{i} + 6t^2\hat{j} + (4t^3 - 9t^2)\hat{k}$

Evaluate $\int_2^5 \vec{f}(t) dt$ 10

7. (a) Find Eigenvalue and eigenvector of the

$$\text{matrix } \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \quad 10$$

(b) Solve partial differential eqⁿ.

$$2 \frac{\partial z}{\partial x} + 4 \frac{\partial z}{\partial y} = z \quad 10$$

8. Verify the Green's theorem in plane for

$$\oint_C (x^2 + 2xy) dx + (y^2 + x^3y) dy$$

where C is a square with vertices P(0,0)
Q(1,0), R(1,1) and S(0,1). 20

9. Verify Cayley-Hamilton theorem for

$$A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix} \quad 20$$

10. Define following with example : 20

(a) Unitary Matrix

(b) Skew Symmetric matrix

(c) Hermitian matrix

(d) Example of linear and non-linear differential equation.

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(Printed Pages 4)

(20514)

Roll No.

B.Tech.-II Sem.

TU-435

B.Tech. Examination, May 2014

CS, EI, CH, EC, IT Branches

Mathematics Engineering-II

[BT-205(N)]

Time : Three Hours / Maximum Marks : 100

Note: Attempt any five questions.

1. (a) If $\vec{r} = \sin t \hat{i} + \cos t \hat{j} + \sin t \hat{k}$, Evaluate

the following: 10

$$(i) \frac{d \vec{r}}{dt}, \quad (ii) \frac{d^2 \vec{r}}{dt^2},$$

$$(iii) \left| \frac{d \vec{r}}{dt} \right| \quad (iv) \left| \frac{d^2 \vec{r}}{dt^2} \right|$$

(b) Find the grad ϕ , where

$\phi(x, y, z) = x^2y + y^2x + z^2$ at the
point (1,1,1) 10

P.T.O.

2. (a) Given matrices $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 3 & 1 \\ 0 & 0 & 1 \end{bmatrix}$

$$B = \begin{bmatrix} 2 & 1 & 1 \\ 3 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$$

Justify your answer that it is true or
not $(A - B)^2 = A^2 + B^2 - 2AB$. 10

- (b) Give an example of skew symmetric
matrix of odd order and find determi-
nant of that matrix. 10

3. (a) Find the inverse of the given matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix} \quad 10$$

- (b) Find the curl ϕ , Div ϕ where

$$\phi(x, y, z) = 2x\hat{i} + 2y\hat{j} + 3z\hat{k} \quad 10$$

4. (a) Given matrices $A = \begin{bmatrix} 1 & 2 & 1 \\ 1 & 1 & 1 \\ 3 & 1 & 2 \end{bmatrix}$

$$B = \begin{bmatrix} -1 & 1 & 1 \\ -1 & 0 & 3 \\ 1 & 2 & 2 \end{bmatrix}$$

Verify that

(i) $|AB| = |A| \cdot |B|$

(ii) $|A+B| = |A| + |B|$ is true or not
justify your answer. 10

(b) Find the rank of the matrix in Echelon

form $A = \begin{bmatrix} 1 & 2 & 0 \\ 0 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$ 10

5. (a) Solve $\frac{dy}{dx} = 5e^{x+y}$ 10

(b) Solve $\frac{d^2y}{dx^2} + 4y = 0$ 10

6. (a) Solve 10

$$\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = x^2 + e^x + \cos 2x$$

(b) If $\overrightarrow{f(t)} = 5(2t-3)\hat{i} + 6t^2\hat{j} + (4t^3 - 9t^2)\hat{k}$

Evaluate $\int_2^5 \overrightarrow{f(t)} dt$ 10

7. (a) Find Eigenvalue and eigenvector of the

$$\text{matrix } \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \quad 10$$

(b) Solve partial differential eqn.

$$2 \frac{\partial z}{\partial x} + 4 \frac{\partial z}{\partial y} = z \quad 10$$

8. Verify the Green's theorem in plane for

$$\oint_C (x^2 + 2xy) dx + (y^2 + x^3y) dy$$

where C is a square with vertices P(0,0), Q(1,0), R(1,1) and S(0,1). 20

9. Verify Cayley-Hamilton theorem for

$$A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix} \quad 20$$

10. Define following with example : 20

- (a) Unitary Matrix
- (b) Skew Symmetric matrix
- (c) Hermitian matrix
- (d) Example of linear and non-linear differential equation.

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(20514)

Printed Pages : 6

B.Tech. II Sem.

Roll No.

TU-439

B.Tech. Examination, May 2014

CS, EI, CH, EC, IT Branch

Engg. Mechanics

[Code No. BT-211(iv)]

Time : Three Hours]

[Maximum Marks : 100]

Note: Attempt any five questions.

1. (a) Find the unknown force F_3 in magnitude and direction in the system of forces as shown in fig. 1, if $F_1 = 100\text{N}$, $F_2 = 150\text{N}$ and the resultant of these three forces (F_1 , F_2 and F_3) is 200 N. 10

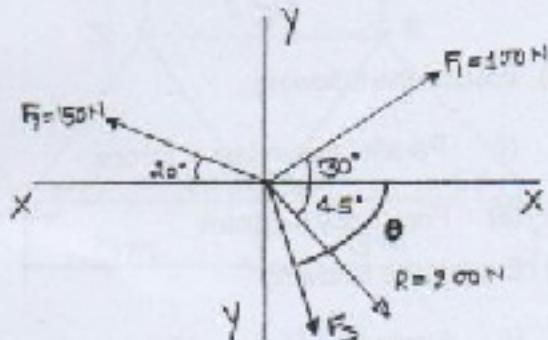


Fig. I

(1)

TU-439/220

(b) Explain the following - 10

(i) Lami's theorem

(ii) Moment and couple

2. (a) A roller shown in fig. 2 is of mass 150kg. What force P is necessary to start the roller over the block A ? P is applied through link which is connected to the centre C . 10

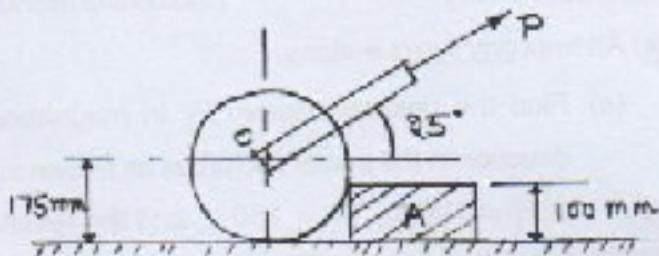


Fig. 2

(b) Explain the following : 10

(i) Parallelogram law of forces

(ii) Free body diagram

3. (a) Explain the following - 10

(i) Friction and Laws of Dry friction.

(ii) Angle of friction and angle of Repose.

- (b) A man climbs on a 5m long Ladder. The Ladder makes an angle of 60° from the horizontal. The other end of the Ladder is supported on a vertical wall. The coefficient of friction for all contact surfaces are 0.3. The weights of Ladder and man 150N and 800N, respectively. How far the man climb on the Ladder?

4. (a) Find the axial forces in all members of a truss as shown in fig. 3. 10

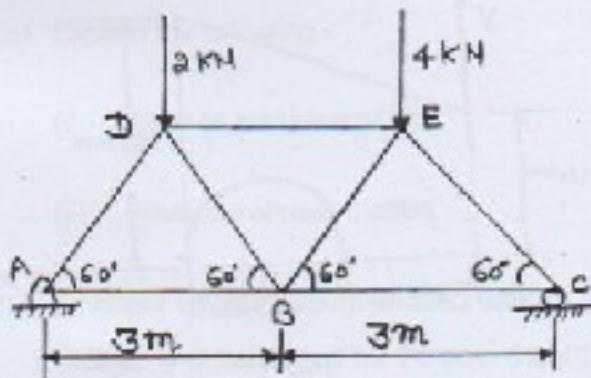


Fig. 3

(3)

F.T.O.

- (b) Draw the shear force and bending moment diagram
for the simply supported beam.

10

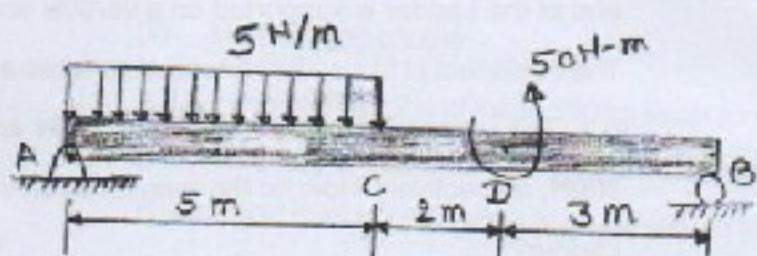


Fig. 4

5. (a) A semicircular area is removed from the trapezoid
as shown in fig. 5. Determine the centroid of the
remaining area.

10

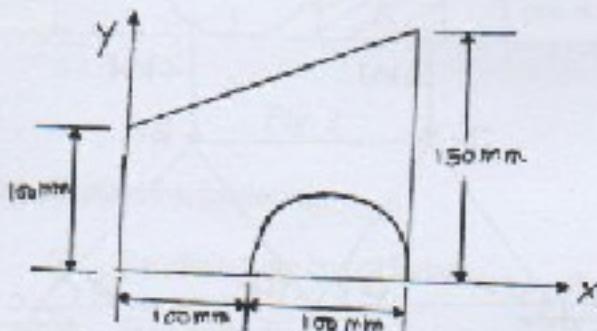


Fig. 5

- (b) Derive the formula for centroid of a semicircular arc
of radius R and central angle 2α .

10

6. Calculate the moment of inertia of the hatched section shown in fig. 6. about the centroidal X-X axis. 20

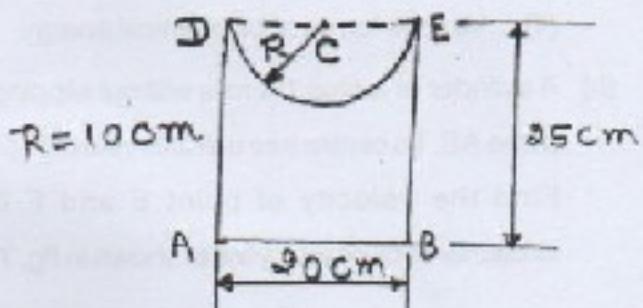


Fig. 6

7. Derive the formula for mass moment of inertia of sphere (Solid) about its diametrical axis. 20

8. (a) Explain the following - 10

(i) Kinetics and kinematics

(ii) Plane curvilinear motion

- (b) A wheel rotating about a fixed axis of 20rpm is uniformly accelerated for 70 sec. during which it makes 50 revolutions. Find angular velocity at the end of this interval and time required for speed to reach 100rpm. 10

9. (a) Explain the following - 10

- (i) D'Alembert's principle and Dynamic equilibrium.
- (ii) Various forms of Mechanical energy.
- (b) A cylinder of radius 1m rolls without slipping along plane AB. Its centre has uniform velocity of 20m/s. Find the velocity of point E and F on the circumference of the cylinder shown in fig. 7. 10

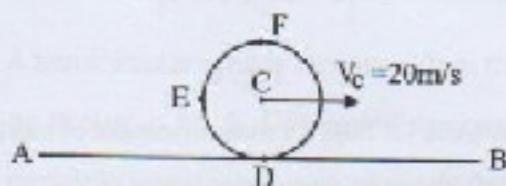


Fig. 7

10. (a) Plot tensile test diagram for mild steel and explain all salient points. 10

- (b) Determine the diameter of solid shaft which will transmit 450KW at 300rpm. The angle of twist must not exceed one degree per metre length and maximum torsional shear stress is to be limited to 40 N/mm^2 . Assume $G=80 \text{ KN/mm}^2$. 10

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(Printed Pages 3)

(20514)

Roll No.

B.Tech. II Sem.

TU-430

B.Tech. Examination, May 2014

C.S., E.I. C.H., E.C. I.T. Branch

Basic Mfg. Science

[BT-210(N)]

Time : Two Hours]

[Maximum Marks : 50

Note : Attempt any five questions. Each question carry 10 marks.

1. (a) Distinguish between Toughness and Hardness. 5
- (b) Write short note on:
 (i) Formability and
 (ii) Weld ability. 5

P.T.O.

2. (a) Why is timber seasoned? Explain any two types. 5
- (b) What is Hard Wood and Soft wood? Give two examples in each case. 5
3. Write short notes on types of flames in Gas welding processes, Explain with figure different Temperature Zones. 10
4. How is lathe specified? Explain with figure main parts of Lathe machine. 10
5. What are plain carbon steel? How are they classified? Give their properties and applications. 10
6. (a) Differentiate between Brass and Bronze and enumerate their properties. 5
- (b) Write short note on:
(I) Wrought Iron
(II) Gray Cast Iron 5

7. How does mild steel differ from High carbon steel? Also give their uses. 10
8. (a) Write short note on : 5
(i) Primary shaping process
(ii) Surface finishing process.
- (b) Explain the function of drills taps and wire gauge. 5
9. (a) What is the difference between shaper and planer. Give atleast four points. 5
(b) What is Grinding operation? How grinding wheel specify. 5
10. How do you specify a plant location. Differentiate between production and productivity. 10

M

(Printed Pages 4)

(20514)

Roll No.

B.Tech. II Sem.

TU-438

B. Tech. Examination, May 2014

CS, EI, CH, EC, IT BRANCH

Engineering Chemistry

BT-209 (N)

Time : Three Hours / Maximum Marks : 100

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

1. What is phase rule? Discuss different terms used in phase rule. Explain phase rule diagram for water system clearly. 20
2. What do you know about stereochemistry of organic compounds? Classify it and discuss optical isomerism with at least two examples. 20
3. Describe the determination of calorific value

P.T.O.

of fuel by bomb calorimeter with diagram.

Calculate the mass of air, containing 23% oxygen, needed for complete combustion of 5 kg of coal contain :

C=80%, H= 15% and rest oxygen.

10+10

4. What are the characteristics of boiler feed water? Discuss its treatment method.

A water sample contains the following impurities : Ca^{2+} = 20 ppm, Mg^{2+} = 18 ppm, HCO_3^- = 183 ppm and SO_4^{2-} = 24 ppm.

Calculate the amount of lime and soda needed for softening. 10+10

5. Write short notes on the following :

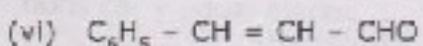
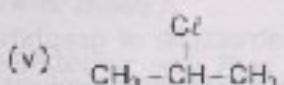
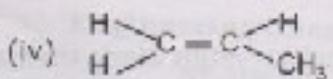
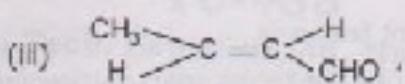
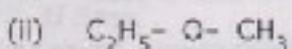
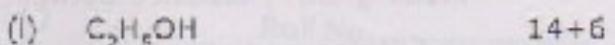
(i) Reverse Osmosis $5 \times 4 = 20$

(ii) Degree of Hardness in different units

(iii) Electronic transitions in UV spectroscopy

(iv) Bio mass

6. Discuss NMR spectroscopy. Predict the NMR signals in the following compounds :



7. Describe the term polymer. Discuss conducting polymers with their types and applications with suitable examples. 20

8. (a) Derive the equations for determine the density of cubic crystal cells. $5 \times 4 = 20$

(b) Calculate the value of Avogadro number.

- ber from the data. Density of NaCl = 2.165 g cm^{-3} , distance between Na^+ and Cl^- ions in NaCl crystal = 281 pm.
- (c) Explain band theory of solids with its salient features.
- (d) Describe the terms space lattice and unit cell.
9. (a) Discuss liquid crystals along their applications. 10
(b) Describe the structure of graphite and fullerenes along with their applications. 10
10. Classify the polymers on at least three basis. Explain the mechanism of addition polymerisation. Discuss preparation and properties of the following : 6+6+8
- (i) Nylon - 6 : 6
 - (ii) Nylon - 11
 - (iii) Terylene
 - (iv) PTFE

M

(Printed Pages 4)

(20514)

Roll No.

B.Tech.-II Sem.

TU-419

B. Tech. Examination, May 2014

E.I/I.T./C.E. Branch

Electrical Engineering

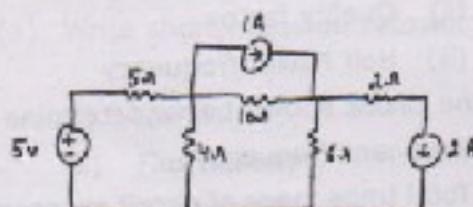
BT-207

Time : Three Hours]

[Maximum Marks : 100

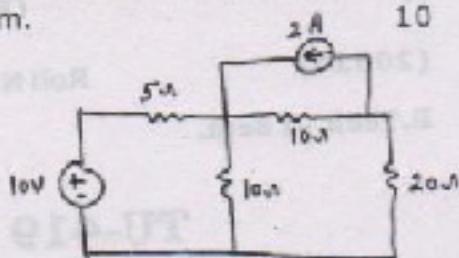
Note : Attempt any five questions.

1. (a) State and prove maximum power transfer theorem. 10
- (b) Find current in 10Ω by using Nodal analysis. 10



P.T.O.

2. (a) Find current in 2Ω by using Thevenin theorem.



- (b) Explain :

- (i) Linear and non-Linear elements. 5
- (ii) Active and Passive elements. 5

3. (a) Show that the average power demand in a purely inductive A.C. circuit is zero.

10

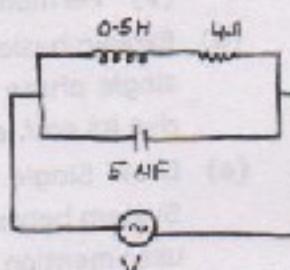
- (b) A series R-L-C circuit consists of a resistance of 1000Ω , an inductance of 100 mH and a capacitance of $10 \mu\text{F}$, then determine : 10

- (i) Resonant frequency
- (ii) Quality factor
- (iii) Half Power frequency

4. For the circuit shown below, determine : 20

- (i) Resonant frequency
- (ii) Total Impedance of circuit at resonance
- (iii) Bandwidth

(iv) Quality Factor



5. (a) Explain power factor measurement by means of two Wattmeters in a three phase AC circuit. 10
(b) Derive the relation between Line Voltage and Phase Voltage for star connection system. 10
6. (a) Explain the construction, operation and advantages of Permanent magnet moving coil. 10
(b) Compare the magnetic and electric circuit with their similarities and differences. 10
7. (a) Write short notes on following terms : 10
(i) M.M.F.
(ii) Flux density
(iii) Permeability
(iv) Reluctance

(v) Permeance

- (b) Explain basic principle of operation of a single phase transformer and also derive its emf. equation. 10
8. (a) Draw Single Line diagram of a Power System between generating station and user mention the different Voltage Levels. 10
- (b) Explain the Auto transformer. How it can be used in Step-up and Step-down mode. 10
9. (a) Explain the classification of DC generator. 10
- (b) Define 'Slip' in 3-Q Induction motor. Derive an expression for the frequency of the rotor current in 3-Q Induction motor. 10
10. (a) Why Single Phase Induction motor is not self starting? Write all the starting methods of single phase Induction motor and explain any one of them. 10
- (b) Explain principle of operation of 3 Q synchronous motor. Why It is not self starting. 10

M

(Printed Pages 4)

(20514)

Roll No.

B.Tech. II Sem.

G-36

B.Tech. Examination, May 2014

EC,EI,CS,IT,ME,CE.

Electronics Engg.

(BT-208)(O)

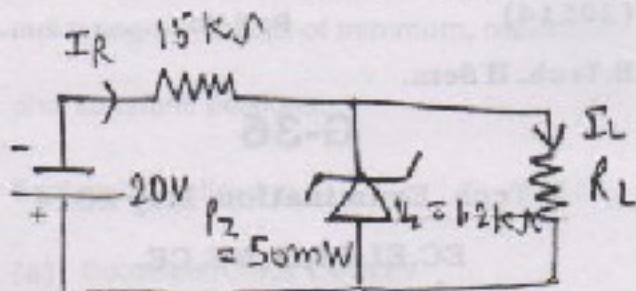
Time : Three Hours / Maximum Marks : 100

Note : Attempt any five questions.

1. Define and explain depletion layer in respect of p-n Junction, and explain why the reverse saturation current in a silicon diode is much smaller than that in a comparable germanium diode. 20
2. Draw the circuit diagram of full-wave Bridge Rectifier and calculate. Efficiency, AC Power, TVF and PIV. 20

P.T.O.

3. Explain "Avalanche" Break down. For the given zener diode network shown in fig. 20



4. Explain various method of Biasing of BJT. 20

5. Explain the working of JFET with neat sketch.

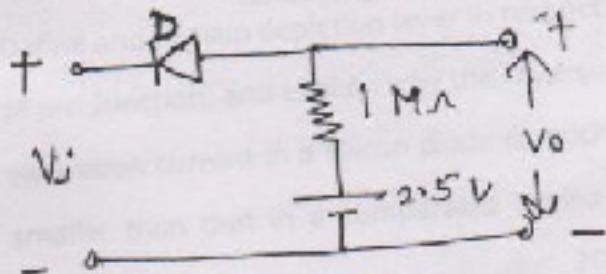
Also explain Pinch off voltage of a FET. 20

6. Draw the circuit diagram of Inverting and Non-Inverting amplifier and derive expression for output voltage. 20

7. With the help of block diagram explain the working of Digital multimeter and write down

the three major advantages of digital multimeter over analog multimeter. 20

6. Explain the working of CRO, and explain how do we measure the current and voltage using the CRO. 20
9. A Symmetrical 5 KHz squarewave that varies between +10V and -10V is impressed upon the clipping circuit of fig.



Assume $R_F = 0$, $R_v = 2\text{M}\Omega$, $V_i = 0$

G-36/80/3

P.T.O.

- Sketch the steady state output wave form indicating the values of minimum, maximum and constant portions. 20
10. Explain the following : 20
- Optoelectronics Devices
 - CMRR
 - Buffer Amplifier
 - Clamping Circuits.

M (Printed Pages 6)

(20514) Roll No.

B.Tech.-II Sem.

TU-420

B. Tech. Examination, May 2014

E.C./E.S./M.E. Branch

Electronics Engineering

[BT-208(N)]

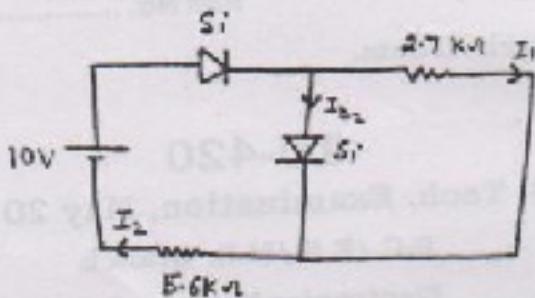
Time : Three Hours] Maximum Marks : 100

Note : Attempt any five questions. All questions carry equal marks. Assume suitable data if necessary.

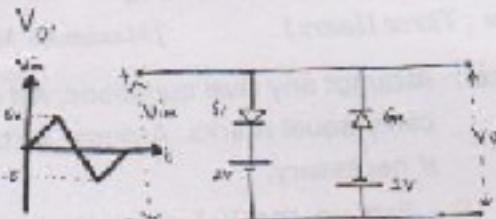
1. (i) Explain the V-I characteristics of PN Junction diode, define diode resistance and explain its graphically. What is the effect of temperature on the characteristics? Why is Si prefer over Ge. 10
- (ii) Draw the Bridge rectifier circuit and explain the operation. And also derive the expressions for average de Load Voltage and V_{RMS} . 10

P.T.O.

2. (i) Determine the currents I_1 , I_2 and I_{D2} for the network shown in the figure. Use second approximation of diode.



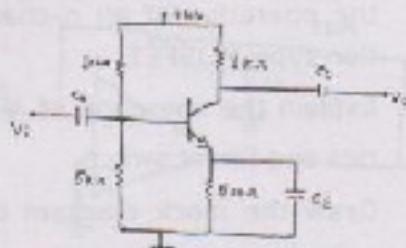
- (ii) Draw the output waveform of voltage V_O .



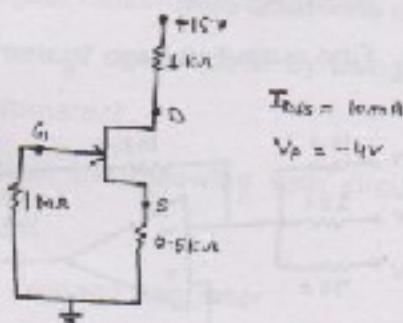
3. (i) Explain the working of n-p-n transistor in active region and show all current components. Draw the DC Load Line and also write down the stability factors for BJT Amplifier. 10
 (ii) For the circuit shown in figure B = 100 for the silicon transistor calculate V_{CE}

and I_C and its stability factor.

10



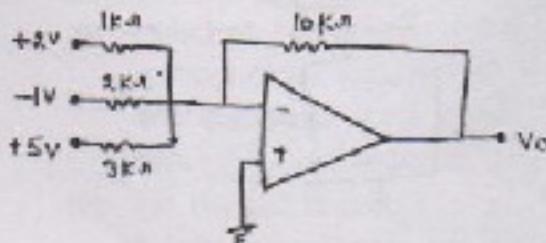
4. (i) Draw a circuit for obtaining drain and transfer characteristic of an P-Channel JFET. Define R_D , g_m and μ of JFET. 10
(ii) For a given circuit determine the following. 10
(a) I_D (b) V_{DS} (c) V_S



TU-420(100)3

P.T.O.

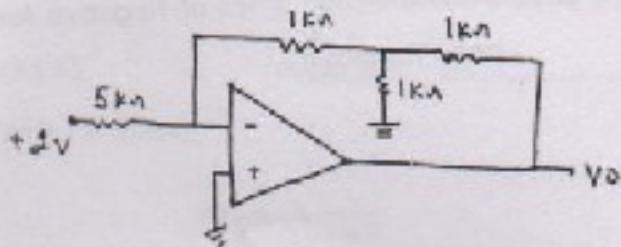
5. (i) With the help of neat diagram explain the operation of an n-channel Depletion type MOSFET. 10
- (ii) Explain the operation of JFET as a series and Shunt switch. 10
6. (i) Draw the block diagram of CRO and explain the function of various blocks. 10
- (ii) Describe the method of measurement of frequency, amplitude and phase using CRU. 10
7. (i) Write the characteristics of an ideal OP-amp. Draw and derive the expression for Integrator. 10
- (ii) Find output Voltage V_o . 10



TU-420(100)4

8. (i) Find V_o .

10



(ii) Draw and derive the expression for subtractor circuit. 10

9. (i) What are the different applications of function generator? Draw and Explain with the help of Block diagram. 10

(ii) Draw and explain the block diagram of a digital multimeter. What kind of measurement can be done by using digital multimeter? 10

10. (i) Explain the following with circuit diagram: 10

(a) Voltage Regulator

(b) Clamper Circuit

(II) Draw the four types of Negative feed-back Topologies.

10

TU-420(10016)

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(Printed Pages 4)

(20514)

Roll No.

B.Tech.-II Sem.

TU-436

B. Tech. Examination, May 2014

CS, EI, C.H., E.C., IT Branch

Electrical Engineering

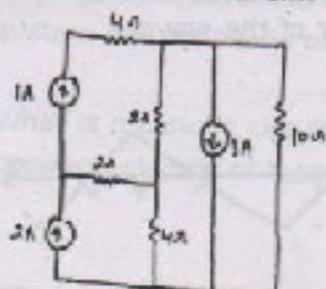
[BT-207(N)]

Time : Three Hours]

/Maximum Marks : 100

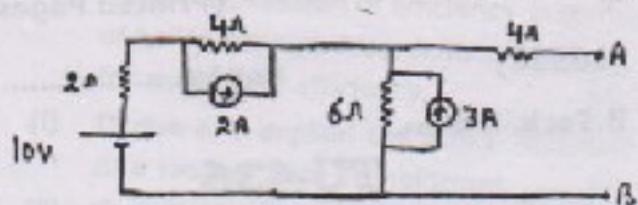
Note : Attempt any five questions. All questions carry marks.

1. (i) Discuss various types of sources. Differentiate between ideal voltage source and practical voltage source. 10
- (ii) Find current in 10Ω resistance by using super position theorem. 10



P.T.O.

2. (i) Find V_{Th} and R_{Th} for the circuit shown in figure across terminal A & B. 10



- (ii) State and explain Maximum Power Transfer theorem. 10

3. (i) A series R-L-C circuit consists of a resistance of 1000Ω , an inductance of $100mH$ and a capacitance of $10\mu F$, then determine : 10

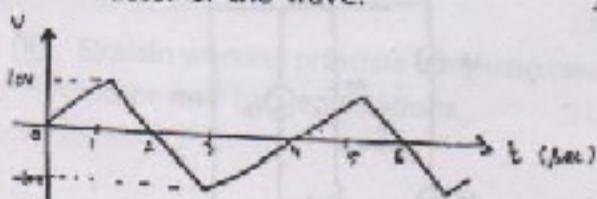
(i) Resonant frequency

(ii) Quality factor

(iii) Half power frequency

- (ii) Define resonance in parallel RLC circuit. Draw resonance curve. 10

4. (i) Find rms value, average value and Form factor of the wave. 10



TU-436\220\2

QTR

- (ii) Prove that in purely inductive circuit, current lags by 90° from supply voltage while it leads 90° from supply voltages in purely capacitive circuit. 10
5. (i) Derive the relation between Line Current, Phase Current and Line Voltage and Phase Voltage for star connected system. 10
- (ii) A 3-phase balanced load connected across a 3-Q, 400 V ac supply draws a line current of 10A. Two Wattmeters are used to measure input power. The ratio of two Wattmeter readings is 2:1. Find the reading of two Wattmeters. 10
6. (i) Discuss the constructional details and working of PMMC. Explain why PMMC type instruments belongs to Linear scale instrument. 10
- (ii) Draw general Layout of electrical power system and functions of its elements. 10
7. (i) What is magnetic circuit. Give Analogy between electric of magnetic circuits. 10

- (II) Define the efficiency of Transformer.
Obtain expression of efficiency in terms
of its VA ratings. Also deduce condition
for maximum efficiency. 10
8. (I) Derive and explain the e.m.f. equation
of a single Phase Transformer. 10
(II) Explain the Open Circuit and Short Cir-
cuit tests for the measurement of vari-
ous bases in Transformer. 10
9. (I) State and explain the expression of
back emf (E_b) and torque (T_b) in dc
machines. What are the basic role of
back emf in dc machine. 10
(II) Discuss the constructional details and
working principle of 3-Phase Induction
Motor. 10
10. (I) Explain why 1-Q Induction Motor are
not Self-Starting. Discuss various meth-
ods of starting of 1-Q Induction Motor.
10
(II) Explain working principle of synchronous
motor and two applications. 10

M

(Printed Pages 5)

(20514)

Roll No.

B.Tech.-II Sem.

TU-437

B. Tech. Examination, May 2014

CS, EI, CH, EC, IT Branch

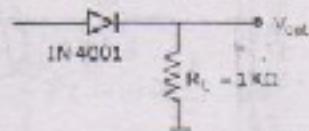
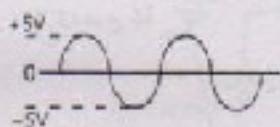
Electronics Engineering

BT-208(N)

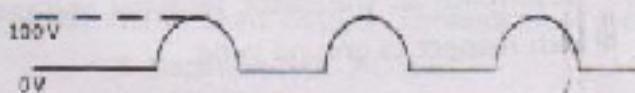
Time : Three Hours / Maximum Marks : 100

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

1. (a) Sketch the output voltage of rectifier for the indicated Input Voltage. 10

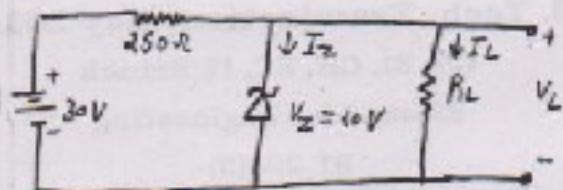


- (b) What is the average value of the half-wave rectified voltage in figure? 10



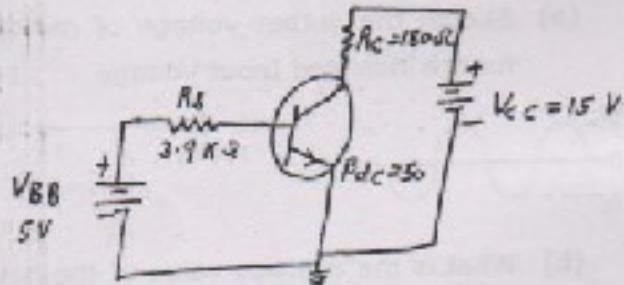
P.T.O.

2. (a) Drive the average d.c. value for full wave bridge rectifier circuit. 10
 (b) Drive the average d.c. value for half wave rectifier circuit. 10
 3. Determine I_L , I_Z , I if Load Resistance $R_L = 450\Omega$ given $P_z(\text{max}) = 500 \text{ mW}$. 20



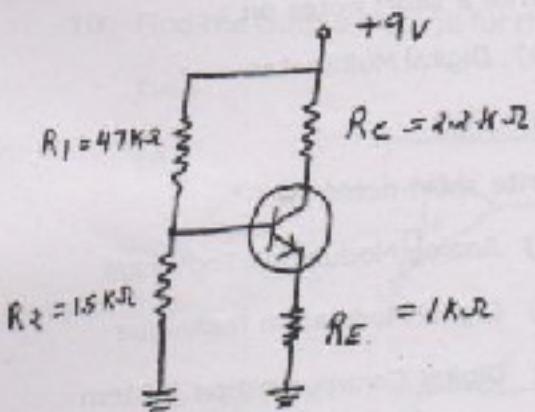
4. Find V_{CE} , V_{BE} and V_{CB} in the circuit of fig.

20

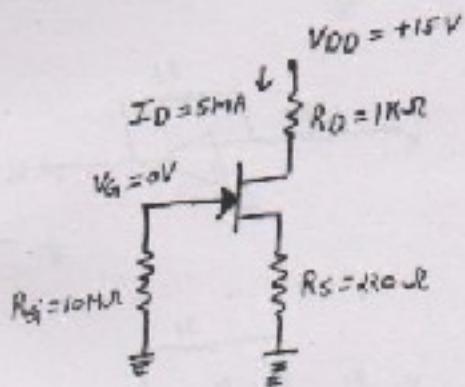


5. Determine all transistor terminal voltages with respect to ground in fig.

TU-437V12012



6. (a) Find V_{DS} and V_{GS} in fig.



(b) Write short note on Enhancement type
& Deplition type MOSFET. 10

7. Write a short notes on :

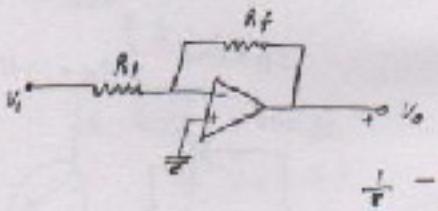
2. (a) Digital Multimeter 10
(b) CRO 10

8. Write short notes on :

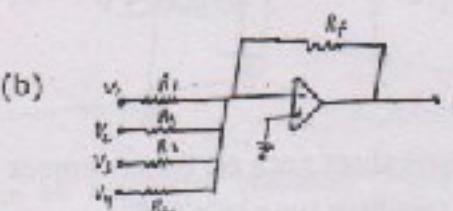
3. (a) Analog Modulation Technique 5
(b) Digital Modulation Technique 5
(c) Digital Communication System 5
(d) Friis Transmission Equation 5

9. Find the output voltage for the following circuits.

4. (a) 10



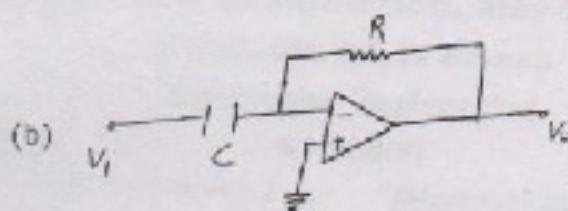
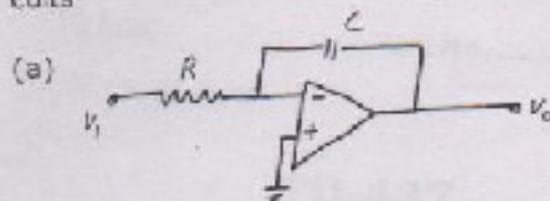
- (b) 10



TU-437112014

10. Find the Output Voltage for the following circuits

10 (es 5)



M

(Printed Pages 4)

(20514)

Roll No.

B.Tech. II Sem.

G-35

B. Tech. Examination, May 2014

EC.CS.ET.IT.ME

Electrical Engg.

[BT-207 (O)]

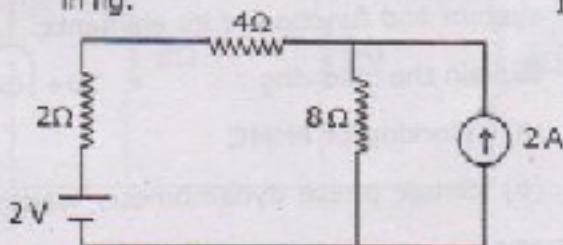
Time : Three Hours /

/Maximum Marks : 100

Note: Answer any five questions.

1. (a) Explain Maximum Power Transfer Theorem. 10

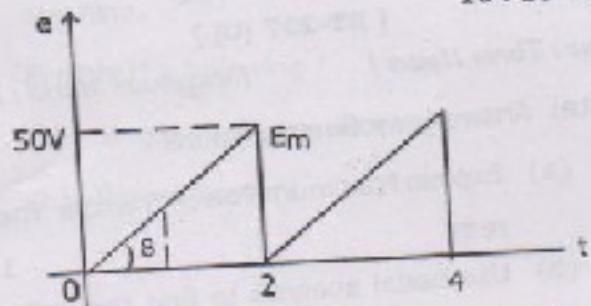
- (b) Use nodal analysis to find the voltage across and current through 4Ω resistor in fig. 10



P.T.O.

2. Find the following values of voltage and current : 20
- (a) Mean value
 - (b) RMS value
3. (a) Explain series parallel RLC circuit.
(b) Determine the form factor of the sawtooth wave. Shown in fig.

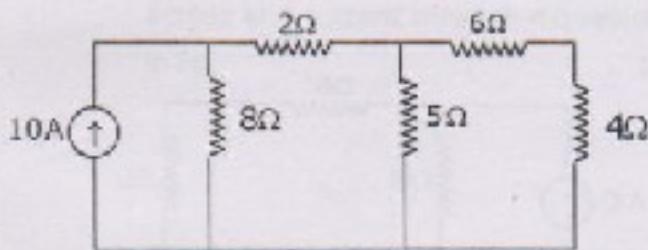
$10+10=20$



4. Describe General layout of electrical Power system and function of its elements. 20
5. Explain the following : $10+10=20$
- (a) Working of PMMC
 - (b) Single phase dynamometer wattmeter

G-35/80/2

6. (a) What are the advantages of star and delta connected system. 10
- (b) A balanced 3-phase load consist of three coils, each of resistance 6Ω and inductive reactance of 8Ω . Determine the line current and power absorbed when the coils are : 10
- (i) Star-connected
- (ii) delta-connected
- across 400V, 3-phase supply
7. Using Norton's theorem. Calculate the current in the 5Ω resistor in the circuit shown in fig. also verified with KVL. 20



G-35/8013

P.T.O.

8. (a) Show that when Thevenin equivalent circuit of a network is converted into Norton equivalent circuit, $I_N = E_{TH}/R_{TH}$ and $R_N = R_{TH}$. 10
- (b) Explain super position theorem. 10
9. Explain working of three phase induction motor. Also derive an equation for emf in a DC machine. 20
10. Explain the following : 20
- (a) Single phase transformer
- (b) Power Factor

M

(Printed Pages 5)

(20514)

Roll No.

B.Tech.-II Sem.

TU-421

B.Tech. Examination, May 2014

E.C., C.S. ME Branch

Engineering Mechanics

BT-211

Time : Three Hours / Maximum Marks : 100

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

1. (a) (i) State Newton's law of Gravitation.

5

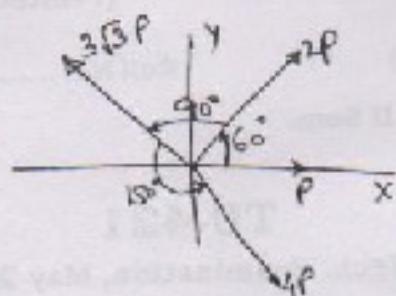
(ii) State principle of Transmissibility of forces. 5

(b) Find the Magnitude and direction of the resultant R of four concurrent forces

P.T.O.

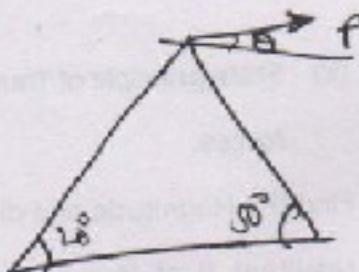
acting as shown in fig.

10



2. (a) State law of Coulomb friction, Dry friction and Belt friction. 10

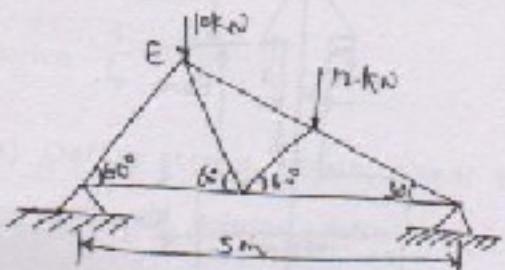
- (b) Two ropes are tied together at c. If the maximum permissible tension in each rope is 3.5 KN, What is the Maximum force p that can be applied and in what direction. 10



TU-421110012

3. Determine the forces in all members of the truss loaded and supported as shown in fig.

20



4. (a) Explain different types of supports for beams.

10

- (b) What are the various types of loads to which a beam can be subjected? Explain with diagram?

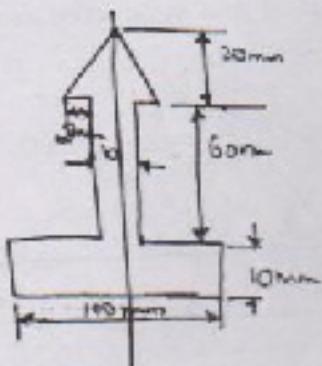
10

5. (a) State Parallel Axis Theorem, Perpendicular Axis Theorem and centre of gravity

10

(b) Locate the centroid of the section.

10



6. State the following: $5 \times 4 = 20$

(a) Varignan's Theorem

(b) Perfect, and Imperfect truss

(c) Polar Moment of Inertia

(d) Parallelogram law

(e) Polygon law

7. (a) What do you mean by Relative velocity. Explain with example.

10

- (b) Define work, power, potential energy,
Kinetic energy. 10
8. Derive $\frac{I}{I_0} = \frac{G \theta}{\ell} = \frac{\tau}{R}$ 20
9. (a) Define stress, strain, shear stress
resistance, Poisson's ratio. 10
- (b) Derive an expression for the strain en-
ergy stored. 10

M

(Printed Pages 6)

(20514)

Roll No.

B.Tech.-II Sem.

G-32

B.Tech. Examination, May 2014

EC / CS / ME

Engineering Mechanics

BT-211(O)

Time : Three Hours / Maximum Marks : 100

Note: Attempt any five questions. All questions carry equal marks. Assume suitable data if missing.

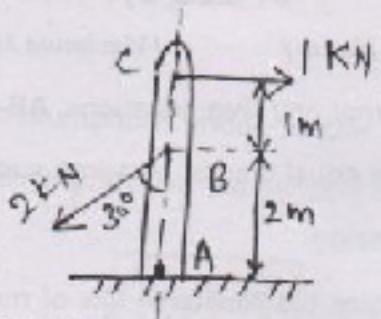
1. (a) State the Newton's law of motion. 10
- (b) Explain the principle of transmissibility in detail. 5
- (c) Explain polygon law of forces. With diagram. 5

P.T.O.

2. (a) What is equilibrium? Write down the equilibrium conditions for the following force system. 10

- (i) Coplanar Concurrent force system
- (ii) Coplanar Non-concurrent force system

(b) Find the moment of sum. of forces in figure about point A. 10

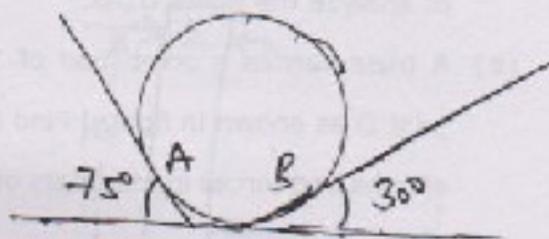


3. (a) Explain: 10

- (i) Coefficient of friction
- (ii) Angle of friction
- (iii) Angle of repose

- (b) A 100 N homogenous smooth spheres rests on two inclined planes as shown in figure. Determine the contact forces at A and B.

10

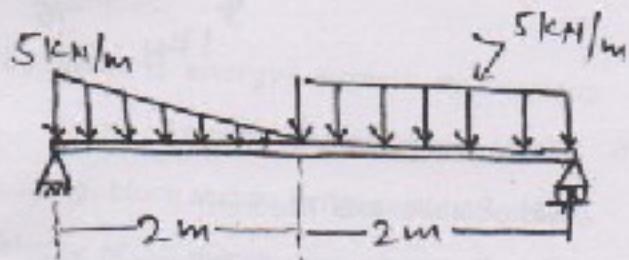


4. (a) Explain the different type of external load and their effect on beam with suitable diagram.

10

- (b) For the simply supported beam as shown in figure. Find the reaction at the support.

10.



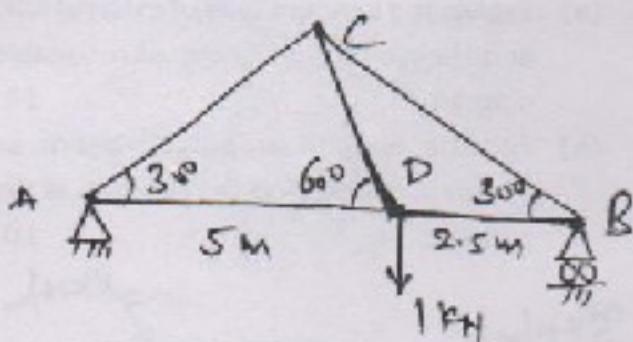
G-32110013

P.T.O.

5. (a) For perfect truss give the relationship between number of members and number of joint. Also write down the method of analyze the plane truss. 10

(b) A truss carries a point load of 1KN at joint D as shown in figure. Find the reactions and forces in members of truss.

10



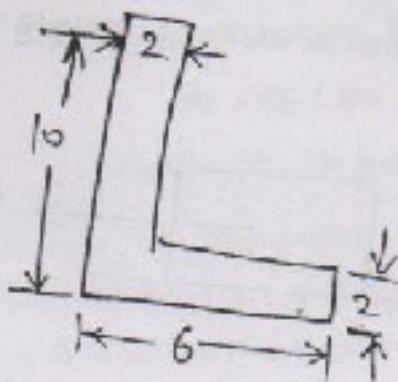
6. State and prove the following: 20

- (a) Parallel axis Theorem
- (b) Perpendicular axis theorem

G-32110014

7. Find the centroid of given figure. Also find the moment of inertia about the centroidal X - axis and Y - axis.

20



8. (a) What do you understand by term kinematics? Explain different types of plane motion of rigid bodies with suitable examples.

10

(b) What is energy? Explain the various forms of mechanical energies.

10

9. A 30 kg. block shown in figure is imparted a velocity of 10 m/sec. The coefficient of friction is 0.2.

y

z

a-

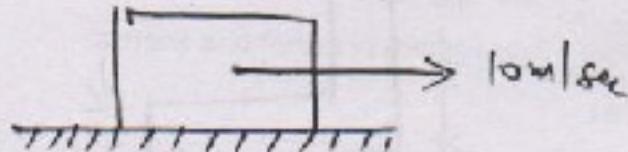
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o.

G-32110015

P.T.O.

netic friction between the block and floor is 0.28. Determine the distance covered by the block before it comes to rest and also time required for the box to come to rest. 20



10. State assumptions made in the theory of pure bending. Derive the bending formula:

20

$$\frac{M}{I} = \frac{\partial^2 \gamma}{y^2} = \frac{\gamma}{R}$$

M..... (Printed Pages 3)

(20514) Roll No.

B.Tech. - II Sem.

TU-423

B.Tech. Examination, May 2014

EC, CS, ME BRANCH

Introduction Bio Science

[BT-221]

Time : Three Hours / Maximum Marks : 80

Note : Attempt any five questions. One question is compulsory from each unit. All questions carry equal marks.

Unit - I

- | | |
|--------------------------------------------------------|----|
| 1. Write short note on: | 16 |
| (a) Plasma Membrane | |
| (b) TCA cycle and its Regulation | |
| 2. (a) Give a brief account on etc and its regulation. | 16 |

P.T.O.

(b) Give a detailed account on endoplasmic reticulum with suitable diagram and its functions.

Unit - II

3. Explain in detail structure and functions of DNA and its types. 16

4. Give a brief account on RNA structure and its functions. 16

Unit - III

5. Give a detailed account on mitosis with suitable diagram. 16

6. Explain in detail sexual reproduction in eukaryotes, differentiate sexual reproduction and asexual reproduction. 16

Unit - IV

7. Write short note on: $8 \times 2 = 16$

(a) Polymerase chain reaction

(b) Electrophoresis

8. Write short note on: $8 \times 2 = 16$

(a) Genetically modified food

(b) Stem cells

Unit - V

9. Write short note on : $8 \times 2 = 16$

(a) Fertilization and implantation

(b) Parturition and lactation.

10. Give a brief account on contraception. 16

M

(Printed Pages 3)

(20514)

Roll No.

B.Tech. II Sem.

TU-422

B.Tech. Examination, May 2014

EC, CS, ME

Manufacturing Practices

(BT-222)

Time : Two Hours / Maximum Marks : 50

Note: Attempt any five questions.

1. (a) What do you understand by seasoning and mention types of seasoning the wood. 5
(b) Draw and explain different types of Carpentry joints. 5
2. (a) What is the purpose of using surface plate and angle plate in fitting shop? 5
(b) How are files classified? Give their sketches also. 5

P.T.O.

3. (a) Explain the hand tools used in forging shop with neat diagrams. 5
- (b) What is difference between snithing and forging? 5
4. (a) Define welding. Give the classification of welding process. 5
- (b) Explain the principle used in Resistance welding with diagram. 5
5. (a) Explain different Sheet metal operations. 5
- (b) Write the short note on Sheet Metal working machines with diagram. 5
6. (a) What is difference between Lathe and Milling Machine? 5
- (b) Explain the construction and working of Milling machine. 5

7. (a) Explain in details the types of allowances provides to the pattern and their importance. 5

(b) Write a short notes on Moulding Process. 5

8. (a) Explain different parts of shaper with help of block diagram. 5

(b) Name and explain different casting defects. 5

(c) What do you understand by Reservoir and riser? Name three types of riser patterns. 5

(d) What is the purpose of using surface roughness and temperature in filing shop? 5

(e) How are turnings used? Give their applications. 5

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(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

M

(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