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END SEMESTER EXAMINATION, JANUARY-2018**PROGRAM : B.TECH. FIRST SEMESTER****COURSE CODE : GES112****COURSE TITLE : ENVIRONMENTAL STUDIES****[Time allotted: Two hours]****[Max. Marks : 50]****Note:** Attempt all Sections & Questions.**Section (A)****Q. 1.** Attempt all questions.**(1 x 10 = 10)**

- a. What is the average temperature of earth's surface?
- b. Define biosphere.
- c. What is cryopreservation?
- d. Write two causes of ecological succession.
- e. Name two pesticides.
- f. The term ecosystem was coined by
- g. What is the pH of acid rain?
- h. In which year "Environmental Protection Act" was enacted?
- i. Write the name of two biosphere reserves present in India.
- j. What is Red data book?

Section (B)**Q. 2.** Attempt any 4 questions.**(4 x 5 = 20)**

- a. What do you mean by environmental quality and sustainable life style?
- b. What are the values of biodiversity?
- c. Write short note on hazardous waste.
- d. Enlist any five environmental acts.
- e. Write chemical reactions take that place in stratosphere.
- f. What the main functions of ecosystem?

Section (C)

Attempt any 2 questions.

(10 x 2 = 20)**Q. 3.** a. What are the impacts of dams on environment and society?

b. What are the advantages and disadvantages of using hydrogen as fuel?

Q. 4. a. Describe the composition and structure of atmosphere.

b. Describe water pollution control methods.

Q. 5. a. Discuss the importance of 3R's concept.

b. What do you mean by term environmental toxicology? Name three toxic metals.

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END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH. FIRST SEMESTER

COURSE CODE : GHV115

COURSE TITLE : HUMAN VALUES AND PROFESSIONAL ETHICS

[Time allotted: Two hours]

[Max. Marks : 50]

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt **all** questions.

(1 x 10 = 10)

- a. Alienation meaning
- b. is the second pillar of professional ethics.
- c. Health- leads to
- d. Advance expertise includes and
- e. Self-exploration is a dialogue betweenand
- f. Who is the author of the book 'Human Values'?
- g. Who gave the theory of suicide?
- h. Define self-help skill.
- i. What is Slag code?
- j. Distinguish between Id and super ego in the establishment of harmony between self and body.

Section (B)

Q. 2. Attempt **any 4** questions.

(4 x 5 = 20)

- a. Discuss the establishment of harmony between self and body.
- b. Value crises at intellectual level.
- c. What do you understand by purusharthas? Discuss various types of it.
- d. Self- exploration is a process of self- evaluation through self-investigation' justify the statement.
- e. 'Justice- Preservation leads to co-existence and fearlessness'- justify the statement.
- f. Explain 'the theory of action' in harmony between self and body.

Section (C)

Attempt **any 2** questions.

(10 x 2 = 20)

- Q. 3.**
 - a. Define family. Discuss the nature and types of family.
 - b. What is engineering ethics? Explain engineering as a social experiment.
- Q. 4.**
 - a. Explain the roles of codes of professional ethics.
 - b. Discuss different types of yamas found in Hinduism.
- Q. 5.**
 - a. Define human values. Discuss different types of human values.
 - b. Define cyber ethics. Discuss different types of cyber-crime.

END SEMESTER EXAMINATIONS, JANUARY-2018

PROGRAM : B.TECH. FIRST SEMESTER

COURSE CODE : HEL110

COURSE TITLE : ENGLISH LANGUAGE & COMMUNICATION SKILLS

[Time allotted: Two hours]

[Max. Marks : 50]

Note: Attempt all Sections & Questions.

SECTION-A

(1 x 10 = 10)

Q. 1. Attempt all questions.

- Mention the features of Communication.
- Give two differences between Active and Passive Listening.
- Fill in the blanks with --- is / are / has / have:
 - One of the workers _____ seriously hurt.
 - Every child _____ given a gift.
 - Twenty thousand rupees _____ a big sum of money.
 - Many girls _____ invited for the function.
- Mention any four ways to improve Listening Skills.
- Rewrite the sentence using the words given in brackets:
Work hard for your exams or you may fail. (if)
- Insert Articles in the following sentence where required:
Please pass me eraser, I have made mistake.
- Explain 'Chronemics' as a kind of Non Verbal Communication.
- Which is more important - Reading or Writing? Give a reason for your answer.
- What is the role of language in Communication?
- Identify the Parts of Speech of each word in the given sentence: Honesty is the best policy.

SECTION-B

(4 x 5 = 20)

Q. 2. Attempt any 4 questions.

a. Use the following words in meaningful sentences :-

- | | | | | |
|--------------|------------|-------------------|------------|------------|
| (i) alter | (ii) hoard | (iii) sore | (iv) idle | (v) cite |
| (vi) counsel | (vii) lose | (viii) complement | (ix) caste | (x) course |

b. What do you understand by the following :-

- Communication Competence
- Grapevine

c. Use the following idioms in sentences of your own :-

- in black and white
- by hook or by crook
- cry over spilt milk
- the lion's share
- once in a blue moon

d. (1) Fill in the blanks using the correct form of the given verbs :-

- Last night, my friend and I (have) _____ some free time, so we _____ (go) to a show.
- The policeman _____ the motorist to move his car as it was _____ the road. (ask, block)
- Yesterday, at a Restaurant, I (see) _____ Pam, an old friend of mine. I (see, not) _____ her in years.
At first, I (do) _____ not recognize her as she had (lose) _____ a lot of weight.
- Right now, I (look) _____ at Janet. She (look) _____ angry. I wonder what's the matter. She (have) _____ a frown on her face and John (try) _____ to please her.

(2) Fill in the blanks with suitable Prepositions :-

Yesterday Trisha went _____ an evening walk. _____ the way, she came _____ an old friend _____ hers and together they went _____ a restaurant _____ coffee. Finally, when she returned home _____ 8 p.m., her mother was very angry _____ her.

e. Define 'Reading'. Explain the various Styles of Reading in detail with the aid of examples. Also, suggest any two ways to improve Reading Skills.

f. (1) Write two synonyms each for the following :-

- | | | | | |
|--------------|------------|------------|----------------|------------|
| (i) abundant | (ii) agony | (iii) mock | (iv) adversity | (v) offend |
|--------------|------------|------------|----------------|------------|

(2) Write an antonym for the following :-

- | | | | | |
|-------------------|-------------|------------------|-------------|-------------|
| (i) amateur | (ii) tragic | (iii) urban | (iv) tragic | (v) deficit |
| (vi) conventional | (vii) like | (viii) obstinate | (ix) reveal | (x) deny |

SECTION-C

Attempt **any 2** questions.

(10 x 2 = 20)

Q 3. Write on any one of the following topics: (300-350 words)

- (i) Write about your childhood memories, describing some of the most interesting incidents.
- (ii) Influence of Bollywood on society

Q. 4. Read the following passage carefully and answer the questions given below: -

The Census 2001 Report makes one thing clear – India cannot be counted among the great nations of the world as long as its women are looked upon as liabilities. The worsening child sex ratio in the country presents an alarming picture of an entire section of society that faces discrimination from the very moment of their creation. This is unfortunately a problem that afflicts the northern belt, but the worst offenders are prosperous north-western states of Delhi, Haryana and Punjab, and its best-off inhabitants – the Sikh Community. Currently, the Sikhs have the lowest proportion of women, 893 to 1000 males, but the future is even bleaker since the Census figures show that the ratio among children between 0 and 6 years is only 786. This is a community well known for its progressive views and practices. Indeed, the Akal Takht, the highest Sikh religious body, issued an edict threatening to excommunicate those indulging in female foeticide in 2001. However, there is nothing to indicate that the community leaders have acted to implement this with the seriousness that it deserves. Clearly, a lot more needs to be done to change the age old negative attitude towards women and a preference for a male child. While constant surveillance to provide illegal sex determination tests is needed, governments and religious and civil society groups need to push social awareness programs aimed at changing negative social attitudes. In some measures, the initiative must come from women themselves, who are often both the victim and vehicle of discrimination against their own sex.

- (i) How are women looked upon in India? Explain. (2)
- (ii) What steps must be taken by the Government to check sex determination? (2)
- (iii) What edict has been issued by Akal Takht in 2001 and why? (3)
- (iv) Find words in the passage that convey similar meanings- (3)
 - a) Making a difference between (c) to exclude a person from his community (e) burden
 - b) Supervision (d) People living in a place (f) darker/worse

Q5 Write a Formal letter on any one topic:

- i) You had issued a Library book from the College Library two weeks ago but have lost it somewhere. Write an application to the Librarian of your College informing him about the lost Library book.
- ii) You are Ms. Neerja /Mr. Neeraj, the proprietor of *Mount Everest Ice-cream Parlour*, a newly inaugurated ice-cream outlet. Draft a letter to be sent to the Chief of Marketing, Amul India Ltd. enquiring about the various varieties of icecreams available with them, rates, etc. Also ask about financial aid and/or marketing/advertising support that they provide. The letter should be written on the letter head of your Company.

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END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM: B.TECH. FIRST SEMESTER

COURSE CODE : AMA102

COURSE TITLE : APPLIED MATHEMATICS-I

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt all questions.

(2 x 10 = 20)

- Show that $F = (3y^4z^2)i + (4x^3z^2)j - (3x^2y^2)k$ is solenoidal.
- State Euler's theorem for homogenous functions.
- Find ∇f at point (1, 2, 3) if $f = x^2yz^2$.
- How many loops will be there in a polar curve $r = a \cos 3\theta$.
- What is a conservative field?
- Find the n^{th} derivative of $y = x^m$.
- Find $\Gamma(10)$.
- If $u = x^2 + y^2$ then find $\frac{\partial^2 u}{\partial x \partial y}$.
- Find $\lim_{x \rightarrow 0, y \rightarrow 0} (x^2 + y^3)$.
- Transformation between a line integral and a surface integral is given by
(i) Green's theorem (ii) Stokes's theorem (iii) Gauss divergence theorem (iv) Leibnitz's theorem.

Section (B)

Q. 2. Attempt any 5 questions.

(7 x 5 = 35)

- Prove that: $\text{curl grad } \phi = 0$.

$$u = \sin^{-1} \left[\frac{x^2 + y^2}{x + y} \right]$$

- If $u = \sin^{-1} \left[\frac{x^2 + y^2}{x + y} \right]$ then find the value of $xu_x + yu_y$.
- Find the maxima or minima of the following function
- $f(x, y) = x^2 + y^2 + 6x + 12$.

- Evaluate the integral $\int_0^{\pi/2} \sin^5 \theta \cos^6 \theta d\theta$.

- Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point P (2, -1, 2).

- For $x = u(1 - v)$, $y = uv$, verify that: $J \left(\frac{u, v}{x, y} \right) \cdot J \left(\frac{x, y}{u, v} \right) = 1$.

- Check whether the following function is continuous at origin,

$$f(x, y) = \begin{cases} \frac{x^2 - y^2}{x^2 + y^2} & \text{when } x \neq 0, y \neq 0 \\ 0 & \text{when } x = 0, y = 0 \end{cases}$$

Section (C)

Attempt any 3 questions.

(15 x 3 = 45)

- Q. 3.** a. Expand the function $f(x, y) = \cos x \cos y$ up to third order terms. (7)
 b. If $y = \sin(m \sin^{-1} x)$, show that $y_n(0) = 0$ if n even and $y_n(0) = m(1^2 - m^2)(3^2 - m^2) \dots [(n-2)^2 - m^2]$ if n odd. (8)
- Q. 4.** a. Trace the curve: $r^2 = a^2 \cos 2\theta$. (8)
 b. Find the area bounded by the curves $y = x$ and $y = x^2$. (7)
- Q. 5.** a. Calculate the volume of the solid bounded by the surface $x = 0, y = 0, z = 0$ and $x + y + z = 1$. (9)
 b. If $f = xyi + xzj + yzk$, find $\int_C f \cdot dr$, where C is the curve $x = t^2, y = t, z = t^3, -1 \leq t \leq 1$. (6)
- Q. 6.** a. Find $\iint_S F \cdot n \, ds$ where $F = zi + xj - 3y^2zk$ and S is surface of the cylinder $x^2 + y^2 = 16$ included in the first octant between $z = 0$ and $z = 5$. (10)
 b. If $F = (2xy + z^3)i + x^2j + 3xz^2k$ is conservative field, then find the scalar potential function ϕ which is such that $F = \nabla \phi$. (5)
- Q. 7.** a. Verify Greens theorem in the plane for $\oint_C [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$, where C is the boundary of the region bounded by $x = 0, y = 0$ and $x + y = 1$. (10)
 b. Find the integral $\int_0^1 x^4 [\ln(1/x)]^3 dx$. (5)

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END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : B.TECH. I SEMESTER

COURSE CODE : ACH-101

COURSE TITLE : APPLIED CHEMISTRY

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

Section (A)

(2 X 10 = 20)

Q.1. Attempt all questions

- Explain heterolysis of bond with help of reactions.
- Explain the term degree of polymerization with suitable example.
- Explain molecularity of reaction.
- Explain term corrosion.
- Explain term auxochromes with suitable example.
- Explain flipping of proton in NMR spectroscopy.
- Define hard water and soft water.
- Draw MO diagram for H_2 molecule.
- Explain addition reaction with example.
- Explain term hyperchromic shift and hypochromic shift.

Section (B)

(7 X 5 = 35)

Q.2. Attempt any 5 questions

- Write a note on aldol condensation reaction.
- Draw molecular orbital diagram, calculate bond order and predict magnetic character of O_2^+ .
- Explain hybridization of PCl_5 molecule.
- Explain Mechanism, energy profile diagram for SN_2 reaction.
- Derive integrated rate equation for second order reaction $2A \rightarrow P$.
- Discuss preparation, properties and uses of phenol-formaldehyde resins.
- Write a note on biogas.

Section (C)

(15 x 3 = 45)

Attempt any 3 questions.

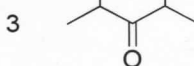
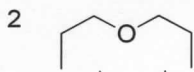
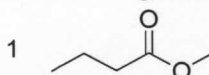
- Q.3. a. Write a note on pinacol-pinacolone rearrangement.
b. Enlist applications of IR spectroscopy.

7.5

7.5

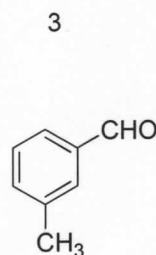
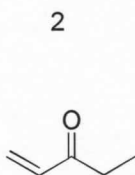
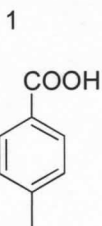
- Q.4. a. Draw low and high resolution NMR spectra of following compounds.

7.5

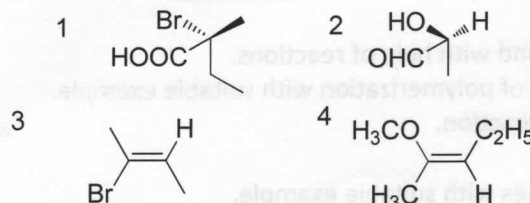


- b. Predict IR peaks for following compounds

7.5



- Q.5. a. Explain bomb calorimeter experiment to determine the calorific value of fuel. 7.5
- b. Explain synthesis of crepe and smoke rubber. Enlist drawbacks in properties. 7.5
- Q.6. a. Write configuration of compounds (R/S or E/Z) with suitable explanation. 7.5



- b. Explain principle of mass spectroscopy. 7.5
- Q.7. a. A gas has the following ultimate analysis data, C = 80%, H = 6.5 %, S = 2.5 %, N = 2.6 % and O = 8.4 %. Find the gross and net calorific values of fuel. Latent heat of steam is 587cal/g. 7.5
- b. In the Arrhenius equation for a certain reaction, the value of A and E_a are $4 \times 10^{13} \text{ s}^{-1}$ and 98.6 J/K/mol respectively. If the reaction is of first order; at what temperature will half-life period be 10 min? 7.5



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END SEMESTER EXAMINATIONS, JANUARY-2018

PROGRAM: B.TECH. FIRST SEMESTER

COURSE CODE : APH104

COURSE TITLE : PHYSICS-I

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt all questions.

(2 x 10 = 20)

- Give the two properties of coherence sources.
- What do you understand by population inversion in LASER?
- Write the four Maxwell's Equation in differential form with proper notations.
- Draw the Hysteresis curve with proper notations.
- Write the Meissner's effect.
- Write the inverse Lorentz transformation equations.
- In relativistic phenomena, if the kinetic energy of a body is twice of its rest mass energy, find its velocity.
- Define the matter waves or de Broglie waves.
- Give the physical significance of wave function.
- Calculate the lowest energy of the system consisting of three electrons in a one-dimensional potential box of length 1 Å.

Section (B)

Q. 2. Attempt any 5 questions.

(7 x 5 = 35)

- Derive the expression for the diameter of the bright rings are proportional to the square root of odd natural numbers.
- Explain Rayleigh criterion of resolution. Define limit of resolution and resolving power.
- Explain the phenomena of double refraction in a calcite crystal and give the properties of E & O Rays.
- A plane transmission grating has 1500 lines per inch. Find the resolving power of the grating and the smallest difference that can be resolved with a light of wavelength $6000\text{\AA}$ in the second order.
- Explain population inversion and components of lasers.
- Explain the principle and construction of Fibre optics and define angle of acceptance.
- Explain the Recording and Reconstruction of image in Holographic phenomena.

Section (C)

Attempt any 3 questions.

(15 x 3 = 45)

- Find the expressions for the diameters of n^{th} bright and dark fringes in Newton's ring experiment.
 - Deduce an expression of displacement of fringe, when a thin transparent plate is introduced in between one of the interfering beam in Fresnel's Biprism Experiment.
- Write the postulates of special theory of relativity and derive the relativistic Einstein's mass energy relation.
 - If a mass of a particle is 9 times the rest mass. Calculate the speed with particle is moving.
- Explain principle, construction and action as polarizer and analyzer of Nicol Prism.
 - Explain population inversion and give the construction of Ruby laser
- Establish relativistic Einstein's Mass Energy Relation.
 - Deduce an expression for length contraction & time dilation on the basis of L.T. equations and give an example to show that time dilation in real effect
- Derive the Schrodinger's Time independent equation.
 - Calculate the smallest possible uncertainty in the position of an electron moving with velocity $3 \times 10^7 \text{ m/s}$.

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END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : B.TECH. FIRST SEMESTER

COURSE CODE : GHV115**COURSE TITLE : HUMAN VALUES AND PROFESSIONAL ETHICS****[Time allotted: Two hours]****[Max. Marks: 50]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt all questions.**(1 x 10 = 10)**

- a. Means optimism for self.
- b. Dhriti is a type of
- c. Yamas are of types.
- d. The term anomie was given by
- e. Arjava means
- f. Diet is a type of
- g. Ethics related to computer is termed as
- h. Mechanical solidarity found in society.
- i. is the cycle of death and rebirth.
- j. is considered as the nucleus of social structure.

SECTION B**Q. 2.** Attempt any 4 questions.**(4 x 5 = 20)**

- a. Define Human Values. Explain various types of Human Values.
- b. What do you mean by codes of professional ethics? Explain any two roles of codes of professional ethics.
- c. Distinguish among the functioning of human brain, heart and mind.
- d. Distinguish between email spamming and email bombing.
- e. Define Niyamas. Explain its types.
- f. Explain the harmony between I and **Body** with special reference to **Id, Ego** and **Super Ego**.

SECTION C

Attempt any 2 questions.

(10 x 2 = 20)

Q. 3. a. Define family and its types.
b. Explain social solidarity.

Q. 4. a. Types of cyber-crime where the computer is used as a target.
b. What do you mean by email spoofing, cyber-squatting, logic bombs, web jacking and phone phishing?

Q. 5. a. Define profession. Explain the characteristics of professionalism.
b. Explain the types of purusharthas.

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END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : B.TECH. FIRST SEMESTER

COURSE CODE : AMA102**COURSE TITLE : APPLIED MATHEMATICS - I****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt all questions.**(2 x 10 = 20)**

- a. Find the n^{th} derivative of x^m .
- b. State Euler's theorem for homogenous functions.
- c. If $u = x^2 + y^2$ then find $\frac{\partial^2 u}{\partial x \partial y}$.
- d. Change the order of integration of the integral: $\int_0^a \int_x^a f(x, y) dy dx$.
- e. If $F = x^2 y i + y^2 z j + z^2 x k$. Find $\text{div } F$.
- f. Curve given by $x^3 + y^3 = 3axy$ is symmetrical about
 - (i) X- Axis
 - (ii) Y- Axis
 - (iii) line $y = x$
 - (iv) in opposite quadrants.
- g. Find $\int_0^{\pi/2} \sin^{10} \theta d\theta$.
- h. Check whether $F = (3x + 2y + 4z)i + (2x + 5y + 4z)j + (4x + 4y - 8z)k$ is irrotational.
- i. If $\phi = 2x^2 y - x^3 z^2 + c$ is the potential function for the conservative vector field F , then find the work done in moving an object in this field from $(1, 1, 1)$ to $(0, 0, 0)$.
- j. Transformation between a line integral and a surface integral is given by
 - (i) Green's theorem
 - (ii) Stokes's theorem
 - (iii) Gauss divergence theorem
 - (iv) Leibnitz's theorem.

SECTION B

Q. 2. Attempt any 5 questions.**(7 x 5 = 35)**

- a. If $u = \sin^{-1}\left(\frac{x^3 + y^3}{\sqrt{x} + \sqrt{y}}\right)$ then find $xu_x + yu_y$.
- b. Expand $f(x, y) = x^2 y + 3y - 2$ in powers of $(x - 1)$ and $(y + 2)$ by Taylor's series.
- c. Find the area bounded by the curves $y = 3x - x^2$ and $y = x$ in xy -plane
- d. If $x = uv$ and $y = \frac{u+v}{u-v}$, find $\frac{\partial(u, v)}{\partial(x, y)}$.
- e. Use Gauss divergence theorem to evaluate the surface integral $\iint_S yz dydz + zx dzdx + xy dxdy$ where S is the sphere $x^2 + y^2 + z^2 = 4$.

- f. Find the directional derivative of $f = xy^2 + yz^3$ at the point $(2, -1, 1)$ in the direction of the normal to the surface $x \ln z - y^2 = -4$ at $(-1, 2, 1)$.
- g. Find $\int_C x^2 y dx + (x - z) dy + xyz dz$ where C is the arc of the curve $y = x^2$ in plane $z = 2$ from $A(0, 0, 2)$ to $B(1, 1, 2)$.

SECTION C

Attempt any 3 questions.

(15 x 3 = 45)

- Q. 3. If $y = (\sin^{-1} x)^2$, prove that:

(15)

- i. $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - n^2 y_n = 0$
- ii. $y_n(0) = 0$ when n is odd and $y_n(0) = 2 \cdot 2^2 \cdot 4^2 \cdot 6^2 \dots (n-2)^2$, $n \neq 2$ when n is even.

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

(9)

- b. Using Beta and Gamma Functions find the value of the integral: $\int_0^{\pi/2} \sin^6 \theta \cdot \cos^7 \theta d\theta$.

(6)

- Q. 5. a. Evaluate $\iint_S A \cdot n dS$ where $A = 18zi - 12j + 3yk$ and S is the part of the plane $2x + 3y + 6z = 12$ in the first octant.

(10)

- b. Examine the following function for its extreme values:

(5)

$$f(x, y) = x^2 + xy + 3x + 2y + 5.$$

- Q. 6. Verify Green's theorem in the plane for $\oint_C [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$, where C is the boundary of the region $x = 0, y = 0$ and $x + y = 1$.

(15)

- Q. 7. a. If $A = (2xy + z^3)i + x^2j + 3xz^2k$ is a conservative field then find the scalar potential function ϕ , such that $A = \nabla \phi$.

(8)

- b. Find the area of the curve $r = a(1 + \cos \theta)$.

(7)

Enrol. No. S R H U

Regn. No. D D

END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : B.TECH. FIRST SEMESTER

COURSE CODE : HEL110**COURSE TITLE : ENGLISH LANGUAGE & COMMUNICATION SKILLS****[Time allotted: Two hours]****[Max. Marks: 50]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt all questions.**(1 x 10 = 10)**

- a. Give any four psychological barriers to communication.
- b. Define informal communication.
- c. Give four examples of non-verbal communication.
- d. Give the antonyms of the following words :
(i) amateur (ii) brutal (iii) confess (iv) surplus
- e. Give one synonym for each of the following words :-
(i) adversity (ii) beautiful (iii) fatigue (iv) angry
- f. Give any two rules for effective writing.
- g. Fill in the blanks with prepositions :-
The patient was admitted _____ a hospital _____ the market. He was unable to walk as he had fractured his leg. His brother went _____ him so that he could be _____ some help.
- h. What is appreciative listening?
- i. Why is it important to have good communication skills?
- j. Explain skimming of text in reading.

SECTION B**Q. 2.** Attempt any 4 questions.**(4 x 5 = 20)**

- a. **Make sentences to show the difference in meaning of :-**
(i) eligible, ineligible (ii) considerate, considerable (iii) adopt, adept
(iv) board, bored (v) hire, higher
- b. **Define Reading and write any four purposes of reading. Also, explain any four undesirable reading habits.**
- c. **Use the following idioms in sentences of your own :-**
(i) by hook or by crook (ii) the lion's share (iii) live from hand to mouth
(iv) play with fire (v) a stone's throw
- d. **Define communication and explain its process. Also describe the role of language in communication.**
- e. (i) **Identify the Part of Speech of the underlined words :-** **(2.5)**
 1. The poor work hard for a living.
 2. We should help the poor.
 3. Wow! What a great performance.
 4. Gita writes neatly.
 5. Work hard or you will fail.
- (ii) **Fill in the blanks with the correct verb :-** **(2.5)**
 1. Every student _____ to participate in the program.
 2. Ten kilometres _____ is a long walk.
 3. Neither he nor I _____ wrong.
 4. Either the teacher or the students _____ done this.
 5. Two thirds of the city _____ destroyed by fire.
 6. Ramesh and Suresh _____ good friends.
 7. The management _____ finally decided the matter.
 8. None of my friends _____ coming to the program.
 9. Curry and rice _____ his favorite food.
 10. The cost of mangoes _____ risen.

- f. (i) Give any six differences between Active and Passive Listening. (3)
 (i) Write any four barriers to effective listening. (2)

SECTION C

Attempt any 2 questions.

(10 x 2 = 20)

Q. 3. Read the passage given below and answer the questions that follow:-

It is thus time for the Indian industry to enter into other areas of advanced ceramics as well. Ceramics are now entering into automobiles and aircraft engines; with the newer requirements for fuel efficiency, not only for economic reasons but for environmental reasons. As internal combustion engines and other energy conversion systems are likely to operate at higher and higher temperatures, Ceramics have also started competing with traditional machine tools. The cutting capability of Ceramics is good for a number of applications. Ceramics can also be engineered to be biocompatible and are being used as replacements for broken bones. Some of the readers may already be having ceramic caps on their teeth. Many may not be aware of the crucial role of ceramics in the electronics industry. They form the base, called substrate, for a number of miniature electronic devices which are coated or etched on such substrates, keeping up the trends of micro-miniaturization. Many ceramic materials are crucial for advanced sensors. The tiny microphones in your tape recorders or in a collar mike have elements of ceramic in the form of piezoelectric crystals.

- (i) What are the reasons for use of ceramics in automobile or aircraft engines? (2)
 (ii) What is meant by 'biocompatible'? (1)
 (iii) Give two examples of the use of ceramics in the human body. (1)
 (iv) Which quality of ceramics is useful in manufacturing collar mikes? (2)
 (v) Skim the text and write a summary of the above passage in approx. 60 words. (4)

Q. 4. You had recently applied for a job in XYZ Co. Ltd but did not get any response from them. Write a letter to the HR Manager asking about their response.

Q. 5. a. Fill in the blanks using the correct form of the given verbs :- (4)

- (i) As I _____ him, he turned and walked away. (approach)
 (ii) The Police _____ the house of the Minister tomorrow as he has _____ to Kanpur and _____ tonight. (raid, go, return)
 (iii) The policeman _____ the motorist to move his car as it was _____ the road. (ask, block)
 (iv) _____ anyone _____ where Raman has gone? (do, know)
 (v) We have been _____ about the film we _____ yesterday. (talk, see)
 (vi) The Bank Manager _____ in a large house. He _____ a teetotaler and _____ not like to _____ wine. (live, be, do, drink)
 (vii) Your secretary has _____ a letter to all the employees _____ them to submit their documents. (write, ask)

b. Write on any one of the given topics :-

- (i) Wonders of Science (ii) Corruption (iii) Co-education

Enrol. No. S R H U

Regn. No. D D

END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : B.TECH. FIRST SEMESTER

COURSE CODE : HEL110**COURSE TITLE : ENGLISH LANGUAGE & COMMUNICATION SKILLS****[Time allotted: Two hours]****[Max. Marks: 50]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt all questions.**(1 x 10 = 10)**

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The patient was admitted _____ a hospital _____ the market. He was unable to walk as he had fractured his leg. His brother went _____ him so that he could be _____ some help.
- h. What is appreciative listening?
- i. Why is it important to have good communication skills?
- j. Explain skimming of text in reading.

SECTION B**Q. 2.** Attempt any 4 questions.**(4 x 5 = 20)**

- a. Make sentences to show the difference in meaning of :-
(i) eligible, ineligible (ii) considerate, considerable (iii) adopt, adept
(iv) board, bored (v) hire, higher
- b. Define Reading and write any four purposes of reading. Also, explain any four undesirable reading habits.
- c. Use the following idioms in sentences of your own :-
(i) by hook or by crook (ii) the lion's share (iii) live from hand to mouth
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- d. Define communication and explain its process. Also describe the role of language in communication.
- e. (i) Identify the Part of Speech of the underlined words :- **(2.5)**
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 2. We should help the poor.
 3. Wow! What a great performance.
 4. Gita writes neatly.
 5. Work hard or you will fail.
- (ii) Fill in the blanks with the correct verb :- **(2.5)**
 1. Every student _____ to participate in the program.
 2. Ten kilometres _____ is a long walk.
 3. Neither he nor I _____ wrong.
 4. Either the teacher or the students _____ done this.
 5. Two thirds of the city _____ destroyed by fire.
 6. Ramesh and Suresh _____ good friends.
 7. The management _____ finally decided the matter.
 8. None of my friends _____ coming to the program.
 9. Curry and rice _____ his favorite food.
 10. The cost of mangoes _____ risen.

- f. (i) Give any six differences between Active and Passive Listening. (3)
 (i) Write any four barriers to effective listening. (2)

SECTION C

Attempt any 2 questions.

- Q. 3. Read the passage given below and answer the questions that follow:-

(10 x 2 = 20)

It is thus time for the Indian industry to enter into other areas of advanced ceramics as well. Ceramics are now entering into automobiles and aircraft engines; with the newer requirements for fuel efficiency, not only for economic reasons but for environmental reasons. As internal combustion engines and other energy conversion systems are likely to operate at higher and higher temperatures, Ceramics have also started competing with traditional machine tools. The cutting capability of Ceramics is good for a number of applications. Ceramics can also be engineered to be biocompatible and are being used as replacements for broken bones. Some of the readers may already be having ceramic caps on their teeth. Many may not be aware of the crucial role of ceramics in the electronics industry. They form the base, called substrate, for a number of miniature electronic devices which are coated or etched on such substrates, keeping up the trends of micro-miniaturization. Many ceramic materials are crucial for advanced sensors. The tiny microphones in your tape recorders or in a collar mike have elements of ceramic in the form of piezoelectric crystals.

- (i) What are the reasons for use of ceramics in automobile or aircraft engines? (2)
 (ii) What is meant by 'biocompatible'? (1)
 (iii) Give two examples of the use of ceramics in the human body. (1)
 (iv) Which quality of ceramics is useful in manufacturing collar mikes? (2)
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- Q. 4. You had recently applied for a job in XYZ Co. Ltd but did not get any response from them. Write a letter to the HR Manager asking about their response.

- Q. 5. a. Fill in the blanks using the correct form of the given verbs :-

(4)

- (i) As I _____ him, he turned and walked away. (approach)
 (ii) The Police _____ the house of the Minister tomorrow as he has _____ to Kanpur and _____ tonight. (raid, go, return)
 (iii) The policeman _____ the motorist to move his car as it was _____ the road. (ask, block)
 (iv) _____ anyone _____ where Raman has gone? (do, know)
 (v) We have been _____ about the film we _____ yesterday. (talk, see)
 (vi) The Bank Manager _____ in a large house. He _____ a teetotaler and _____ not like to _____ wine. (live, be, do, drink)
 (vii) Your secretary has _____ a letter to all the employees _____ them to submit their documents. (write, ask)

- b. Write on any one of the given topics :-

(i) Wonders of Science

(ii) Corruption

(iii) Co-education

(6)

Enrol. No.

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END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : B.TECH. FIRST SEMESTER

COURSE CODE : AMA102**COURSE TITLE : APPLIED MATHEMATICS - I**

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

SECTION A**Q. 1. Attempt all questions.****(2 x 10 = 20)**

- a. Find the n^{th} derivative of x^m .
- b. State Euler's theorem for homogenous functions.
- c. If $u = x^2 + y^2$ then find $\frac{\partial^2 u}{\partial x \partial y}$.
- d. Change the order of integration of the integral: $\int_0^a \int_x^a f(x, y) dy dx$.
- e. If $F = x^2 y i + y^2 z j + z^2 x k$. Find $\text{div } F$.
- f. Curve given by $x^3 + y^3 = 3axy$ is symmetrical about
 - (i) X- Axis
 - (ii) Y- Axis
 - (iii) line $y = x$
 - (iv) in opposite quadrants.
- g. Find $\int_0^{\pi/2} \sin^{10} \theta d\theta$.
- h. Check whether $F = (3x + 2y + 4z)i + (2x + 5y + 4z)j + (4x + 4y - 8z)k$ is irrotational.
- i. If $\phi = 2x^2 y - x^3 z^2 + c$ is the potential function for the conservative vector field F , then find the work done in moving an object in this field from $(1, 1, 1)$ to $(0, 0, 0)$.
- j. Transformation between a line integral and a surface integral is given by
 - (i) Green's theorem
 - (ii) Stokes's theorem
 - (iii) Gauss divergence theorem
 - (iv) Leibnitz's theorem.

SECTION B**Q. 2. Attempt any 5 questions.****(7 x 5 = 35)**

- a. If $u = \sin^{-1} \left(\frac{x^3 + y^3}{\sqrt{x} + \sqrt{y}} \right)$ then find $xu_x + yu_y$.
- b. Expand $f(x, y) = x^2 y + 3y - 2$ in powers of $(x - 1)$ and $(y + 2)$ by Taylor's series.
- c. Find the area bounded by the curves $y = 3x - x^2$ and $y = x$ in xy -plane
- d. If $x = uv$ and $y = \frac{u+v}{u-v}$, find $\frac{\partial(u, v)}{\partial(x, y)}$.
- e. Use Gauss divergence theorem to evaluate the surface integral $\iint_S yz dydz + zx dzdx + xy dx dy$ where S is the sphere $x^2 + y^2 + z^2 = 4$.

- f. Find the directional derivative of $f = xy^2 + yz^3$ at the point $(2, -1, 1)$ in the direction of the normal to the surface $x \ln z - y^2 = -4$ at $(-1, 2, 1)$.
- g. Find $\int_C x^2 y dx + (x - z) dy + xyz dz$ where C is the arc of the curve $y = x^2$ in plane $z = 2$ from $A(0, 0, 2)$ to $B(1, 1, 2)$.

SECTION C

(15 x 3 =

Attempt any 3 questions.

- Q. 3. If $y = (\sin^{-1} x)^2$, prove that:

- $(1 - x^2)y_{n+2} - (2n+1)xy_{n+1} - n^2 y_n = 0$.
- $y_n(0) = 0$ when n is odd and $y_n(0) = 2 \cdot 2^2 \cdot 4^2 \cdot 6^2 \dots (n-2)^2$, $n \neq 2$ when n is even.

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

- b. Using Beta and Gamma Functions find the value of the integral: $\int_0^{\pi/2} \sin^6 \theta \cdot \cos^7 \theta d\theta$.

- Q. 5. a. Evaluate $\iint_S A \cdot n dS$ where $A = 18zi - 12j + 3yk$ and S is the part of the plane $2x + 3y + 6z = 12$ in the first octant.

- b. Examine the following function for its extreme values:

$$f(x, y) = x^2 + xy + 3x + 2y + 5.$$

- Q. 6. Verify Green's theorem in the plane for $\oint_C [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$, where C is the boundary of the region $x=0, y=0$ and $x+y=1$.

- Q. 7. a. If $A = (2xy + z^3)i + x^2 j + 3xz^2 k$ is a conservative field then find the scalar potential function ϕ , such that $A = \nabla \phi$.

- b. Find the area of the curve $r = a(1 + \cos \theta)$.

Enrol. No.

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END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : B.TECH. FIRST SEMESTER

COURSE CODE : GHV115**COURSE TITLE : HUMAN VALUES AND PROFESSIONAL ETHICS****[Time allotted: Two hours]****[Max. Marks: 50]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt all questions.**(1 x 10 = 10)**

- a. Means optimism for self.
- b. Dhriti is a type of
- c. Yamas are of types.
- d. The term anomie was given by
- e. Arjava means
- f. Diet is a type of
- g. Ethics related to computer is termed as
- h. Mechanical solidarity found in society.
- i. is the cycle of death and rebirth.
- j. is considered as the nucleus of social structure.

SECTION B**Q. 2.** Attempt any 4 questions.**(4 x 5 = 20)**

- a. Define Human Values. Explain various types of Human Values.
- b. What do you mean by codes of professional ethics? Explain any two roles of codes of professional ethics.
- c. Distinguish among the functioning of human brain, heart and mind.
- d. Distinguish between email spamming and email bombing.
- e. Define Niyamas. Explain its types.
- f. Explain the harmony between I and Body with special reference to Id, Ego and Super Ego.

SECTION C

Attempt any 2 questions.

(10 x 2 = 20)

- Q. 3.**
 - a. Define family and its types.
 - b. Explain social solidarity.
- Q. 4.**
 - a. Types of cyber-crime where the computer is used as a target.
 - b. What do you mean by email spoofing, cyber-squatting, logic bombs, web jacking and phone phishing?
- Q. 5.**
 - a. Define profession. Explain the characteristics of professionalism.
 - b. Explain the types of purusharthas.

Enrol. No. S R H U

Regn. No. D D

END SEMESTER EXAMINATION, JUNE - 2018 **PROGRAM: B.TECH. SECOND SEMESTER**

COURSE CODE : HEL111

COURSE TITLE: ENGLISH LANGUAGE & COMPOSITION SKILLS

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt all questions.

(1 x 10 = 10)

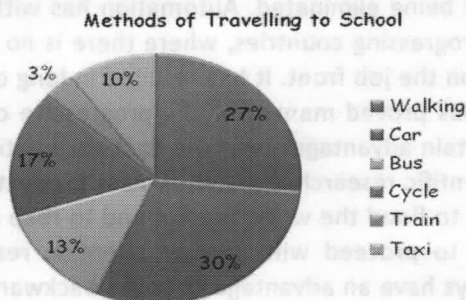
- a. Define Technical Communication.
- b. Explain any two ways of Word Formation.
- c. How should a Presentation be structured?
- d. Give any two reasons for making Reports.
- e. Give the morphological analysis of the word 'Standardization'.
- f. Give any two e-mails etiquettes.
- g. Punctuate : I would like to have a burger French fries and coke for dinner said Arjun sure said the waiter
- h. Form two compound words each with : (i) up (ii) shop
- i. What is Audience analysis? Why is it important?
- j. Discuss the purpose of writing a Resume'.

SECTION B

Q. 2. Attempt any 4 questions.

(4 x 5 = 20)

- a. You are the Student Affairs Secretary of your College. Write an e-mail to the Cultural, Literary & Sports Coordinators informing them about a meeting with the Vice Chancellor of the University. Give all required details.
- b. Write a Report based on the given Pie Chart :



Source : www. Ssrschool.com

- c. (I) **Change the voice of the following sentences from Active to Passive:** (3)
 - i) Who killed the snake? (iv) My friend has chosen a book.
 - ii) We should help the poor. (v) Shut the door.
 - iii) Who will open the gate? (vi) The lady is cooking food.

- (II) **Correct the following sentences :-** (2)

- i) I did not answered a one questions properly. (iii) I m not agree to you in this point.
- ii) Amar is more happy than some other boy in class. (iv) The table's legs is broke.

d. **Change as directed :-**

- i. She is too smart to be fooled by you. (Remove the Adverb 'too')
- ii. Oxygen is more useful than any other gas. (To Positive Degree)

- iii. No sooner did I start the game than it started raining. (Remove 'No sooner')
- iv. My friend said to me, "No other person is as good as you." (To Indirect Speech)
- v. The coach said to the boy, "You must workout for two hours everyday." (To Indirect Speech)
- vi. Gita told Rahul, "I received this letter on Monday." (To Indirect Speech)
- vii. The boy is playing in the field. (To Past Perfect Continuous)
- viii. The slave did a lot of work. (To Present Continuous)
- ix. I have lived here for five years. (To Present Tense)
- x. The master shouted at the worker. (To Future Continuous)

e. Explain the following :

- i. Origin & Development of Technical Communication
- ii. General Communication vs Technical Communication

f. Make a new word from each of the words given below and use it in a meaningful sentence :-

- i) accept ii) grow iii) depart iv) manage v) courage

SECTION C

Attempt **any 2** questions.

(10 x 2 = 20)

Q. 3. Write on any one of the following topics :-

- i. An original story that begins as : "It was a cold winter night....."
- ii. Describe a time when you had trouble in school or College. State how you solved the problem.

Q. 4. Write your complete Resume'.

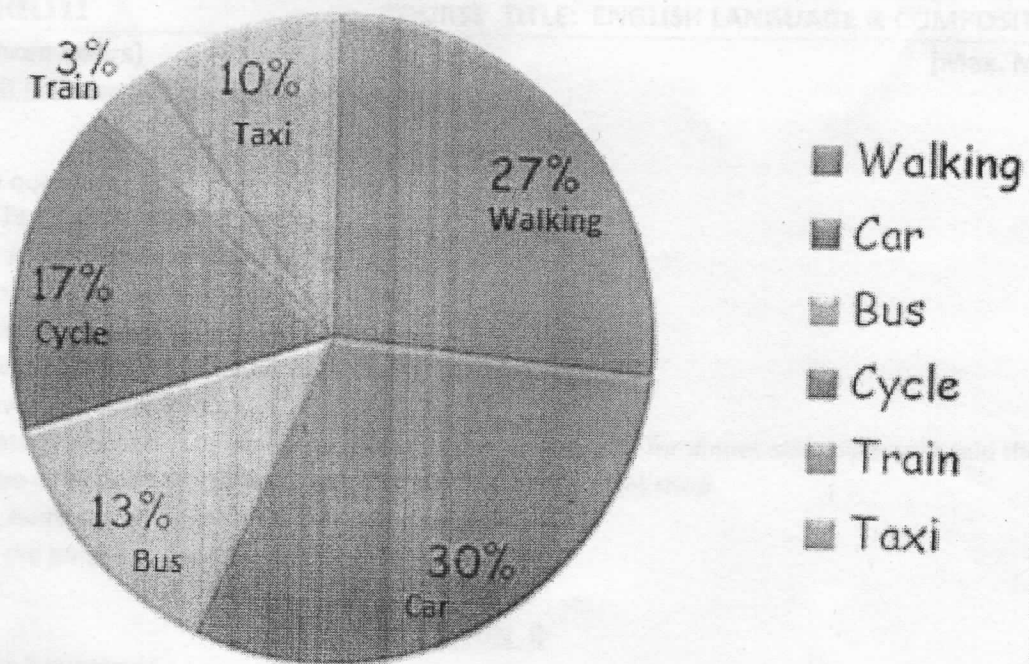
Q. 5. Read the given passage and attempt the questions which follow:

The march of scientific mechanization over industry, throughout the world, is unabated, so is the misery of the poor. Equally unchecked is the thriving of a few among the upper rungs of industrial hierarchy and the bureaucratic and political echelons. One feels proud of the scientific innovations in the manufacturing process where manpower is speedily being replaced by capital potential. The researches in the field are so swift that the labour factor is gradually being eliminated. Automation has withdrawn hazards from man but has offered him unemployment. In the progressing countries, where there is no check on population, scientific industrialization has become an eyesore on the job front. It has resulted in long queues at the employment exchanges. Scientific industrial development has proved manna for the progressive countries of Western Europe, Canada, the USA, and Japan. They reap certain advantages over the backward nations. It has provided a luxurious life even to the common man there. Scientific researches result in mass production of commodities. Thus the West has a huge surplus of finished goods to flood the world market and to reap profits. The resultant economic growth in these countries enables them to proceed with further scientific researches to make the industries more capital oriented. Thus they always have an advantage over the backward countries. Notwithstanding the backwardness or poverty, scientific industrialization is responsible for an increase in the Gross National Product in progressing countries like India too. But it creates two-fold problems. The advantages of this increase in Gross National Product are reaped by the rich, for it is they who have invested money. The growth of capital too is their prerogative. The profits and interest go to the coffers of the industrialists. The fruits of progress and mechanization do not go to the poor. It is only a class, a group that benefits from scientific development, not all.

Questions

- a. Who are benefited by scientific mechanization? (1)
- b. What are the advantages reaped by progressive countries? (2)
- c. What is the effect of economic growth in progressive countries? (1)
- d. Who profits by increase in GNP in backward countries? (1)
- e. Why do the profits of scientific development not go to the poor? (1)
- f. Suggest a suitable title for the passage and summarise it in a few lines. (3)

Methods of Travelling to School



B. Write a Report based on the given Pie Chart.

28/6/18

10/6/18

Enrol. No. S R H U

Regn. No. D D

END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: B.TECH.

SECOND SEMESTER

COURSE CODE : ACH101

COURSE TITLE : APPLIED CHEMISTRY

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

SECTION A

Q.1. Attempt all questions

(2 X 10 = 20)

- Explain free radical and give example of reaction in which free radical is formed.
- Explain weight average and number average molecular weight.
- Explain temperature coefficient.
- Define HCV or GCV of fuel.
- Explain isotopic peaks in mass spectroscopy.
- What is internal standard used in NMR spectroscopy? Give its structure.
- Explain term corrosion.
- Explain LCAO in molecular orbital theory.
- How is carbanion formed? Write about geometry of carbanion.
- Give formula for calculating number of modes of vibration of linear and non-linear molecule.

SECTION B

Q.2. Attempt any 5 questions

(7 X 5 = 35)

- Write a note on Beckmann rearrangement.
- Draw molecular orbital diagram, calculate bond order and predict magnetic character of N_2^+ and N_2 .
- Explain formation of electrovalent, covalent and co-ordinate covalent bond with help of examples.
- Explain Markonikoff's rule with mechanism.
- Derive integrated rate equation for second order reaction with two different reactants.
- Aromatic amines are less basic than aliphatic amines explain this fact with suitable theory.
- Write a note on use of biomass as fuel.

SECTION C

Attempt any 3 questions.

(15 x 3 = 45)

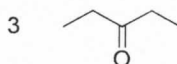
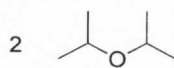
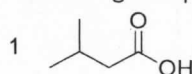
- Q.3.
 - Write a note on hyper-conjugation and electromeric effect.
 - Explain with suitable examples reaction of carbonyl compounds with NH_2-Z type of compounds.

7.5

7.5

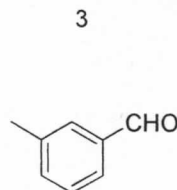
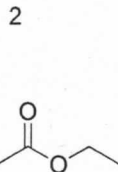
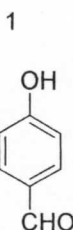
- Q.4.
 - Draw low and high resolution NMR spectra of following compounds:

7.5



- Predict IR peaks for following compounds:

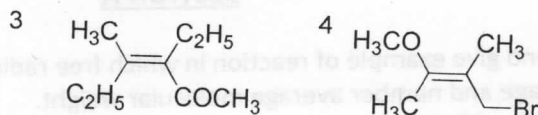
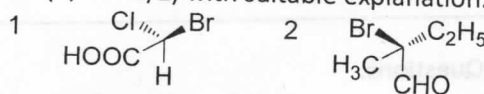
7.5



- Q.5. a. Explain bomb calorimeter experiment and give mathematical expression used in experiment.
b. Explain ion exchange process for purification of water.

7.5
7.5

- Q.6. a. Write configuration of compounds (R/S or E/Z) with suitable explanation.



- b. Explain following terms in UV-visible spectroscopy.
i. Auxochrome
ii. Chromophore
iii. Bathochromic and hypsochromic shift

7.5

- Q.7. a. Calculate the gross and net calorific values of a coal sample containing 68% carbon, 6.5 % Sulphur, 10% nitrogen, 11.5 % hydrogen and 4 % oxygen. Latent heat of steam is 587cal/g.
b. A second order reaction, where $a=b$, is 25 % complete in 700 seconds. How long will it take for the reaction to go for 75% completion?

7.5

7.5

Enrol. No. S R H U

Regn. No. D D

END SEMESTER EXAMINATIONS, JUNE - 2018
PROGRAM: B.TECH. SECOND SEMESTER

COURSE CODE : APH104**COURSE TITLE : APPLIED PHYSICS****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt all questions.**(2 x 10 = 20)**

- a. Write the formula for length contraction and time dilation.
- b. Define Population Inversion condition in laser.
- c. Write the condition for Gauss's Divergence and Stokes law.
- d. Define superconductivity of a material.
- e. Write the differential form of Maxwell's second equation.
- f. Define inertial frame of reference.
- g. What is meant by optically active substance?
- h. Write the formula for magnetic Susceptibility of material and show for diamagnetic material.
- i. Write the purpose of 'Canada Balsam' material used in between the Nicol prism.
- j. Give one example which shows the particle nature of light.

SECTION B

Q. 2. Attempt any 5 questions.**(7 x 5 = 35)**

- a. Explain formation of Hysteresis curve and draw the B-H curve for soft and hard magnetic material.
- b. Explain de Broglie wave length and Heisenberg uncertainty principle.
- c. How many order will be visible if the wavelength of the incident light is 5000 Angstrom and the number of lines per inch on the grating is 2620?
- d. Discuss length contraction and time dilations using Lorentz transformation equations.
- e. Calculate the smallest possible uncertainty in the position of an electron moving with velocity 3×10^7 m/s.
- f. Explain the limit of resolution and resolving power of optical instrument.
- g. Explain the theory of production of Plane, circularly and elliptically polarized light.

SECTION C

Attempt any 3 questions.

(15 x 3 = 45)

- Q. 3.** a. Derive the relation for thickness of Mica sheet using displacement of fringe in interference of light. **(10)**
b. A biprism is placed 5 cm away from a slit illuminated by sodium light $\lambda = 5890$ Angstrom. The width of the fringes obtained on a screen placed at a distance of 75cm from the biprism is 9.424×10^{-2} cm. What is the distance between the coherent sources? **(5)**
- Q. 4.** a. Explain the construction of a Nicol prism with proper notations. **(10)**
b. Calculate the minimum number of lines in a grating which will just resolve the lines of wavelengths 5890 and 5896 Angstrom, in the second order. **(5)**
- Q. 5.** a. Describe the construction and working of Ruby laser with a diagram. **(10)**
b. Explain the principle of Holography and its basic processes to produce the Hologram. **(5)**
- Q. 6.** a. Show that the Maxwell's fourth equation is the modified form of Ampere's law. **(10)**
b. Show that the $x^2 + y^2 + z^2 - c^2 t^2$ is invariant under Lorentz transformation. **(5)**
- Q. 7.** a. Give the derivation for Schrodinger's time independent wave equation. **(10)**
b. Explain the wave function ' ψ ' and give its physical significance. **(5)**

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END SEMESTER EXAMINATIONS, JUNE-2018
PROGRAM : B.TECH. SECOND SEMESTER

COURSE CODE : GES112**COURSE TITLE : ENVIRONMENTAL STUDIES****[Time allotted: Two hours]****[Max. Marks: 50]****Note:** Attempt all Sections and Questions.**SECTION A****Q. 1.** Attempt all questions.**(1 x 10 = 10)**

- a. What is thermal pollution?
- b. What is the criteria for defining biodiversity hotspot?
- c. Ozone layer found in _____ layer of the atmosphere.

Match the following (d to j)

- | | |
|---------------------------------|-------------------|
| d. Air pollution | 1988 |
| e. Environment (Protection) Act | Uttarakhand |
| f. Hotspot | Walter G. Rosan |
| g. Chipko andolan | London smog |
| h. Biodiversity | Myres |
| i. The Motor Vehicle Act | 1986 |
| j. Water pollution | Minamata disaster |

SECTION B**Q. 2.** Attempt any 4 questions.**(4 x 5 = 20)**

- a. Discuss about the global warming and its impact on the environment.
- b. Write a note on 'food security and climate change'.
- c. How acid rain forms in the atmosphere? What are the main causes of acid rain formation?
- d. Explain segregation process of waste with the help of conceptual diagram.
- e. What do you understand by biogeochemical cycle? Discuss about the nitrogen cycle in detail.
- f. Write about the salient features of the site which you have visited during environmental field visit.

SECTION C

Attempt any 2 questions.

(10 x 2 = 20)

- Q. 3.**
 - a. What do you understand by forest resource? How are human beings dependent on forest resource?
 - b. Explain the major anthropogenic activities which are affecting forest resource.
- Q. 4.**
 - a. Define soil pollution? Discuss about the main causes of soil degradation.
 - b. How soil degradation can be prevented? Discuss its control methods with appropriate examples.
- Q. 5.**
 - a. Define Biodiversity. Kindly also discuss its contribution to human wellness with examples.
 - b. Write a detail note on conservation practices for biodiversity with the help of suitable examples.

30/6/18

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END SEMESTER EXAMINATIONS, JUNE-2018
PROGRAM : B.TECH. SECOND SEMESTER

COURSE CODE : AMA103**COURSE TITLE : APPLIED MATHEMATICS - II****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections and Questions.**SECTION A****(2 x 10 = 20)****Q. 1.** Attempt all questions.

- a. Check whether the following differential equation is exact

$$(3x^2y + \frac{y}{x})dx + (x^3 + \ln x)dy = 0.$$

- b. Write the one dimensional heat equation.

- c. Find the solution of following partial differential equation

$$\frac{\partial^2 z}{\partial x^2} + 6\frac{\partial^2 z}{\partial x \partial y} + 9\frac{\partial^2 z}{\partial y^2} = 0.$$

- d. Solve the differential equation
- $y'' + 2y' + y = 0$
- .

- e. If
- $f(x)$
- is a function defined in the interval
- $0 < x < L$
- , then write the half range Fourier sine series of
- $f(x)$
- .

- f. Find
- $L^{-1}\left[\frac{3}{s+4}\right]$
- .

- g. Find
- $L[2\cos(t-1)u(t-1)]$

- h. If a differential equation is of order
- n
- then how many arbitrary constants will be there in its solutions.

- i. Locate and classify the ordinary points, regular singular points and irregular singular points of the differential equation:
- $x^2(x^2 - 4)y'' + 2x^3y' + 3y = 0$
- .

- j.
- $f(x, y) = x^3 + \sin x \cdot e^y$
- is a homogeneous equation. (True/ False)

SECTION B**(7 x 5 = 35)****Q. 2.** Attempt any 5 questions.

- a. Solve the differential equation:
- $\frac{dy}{dx} = \frac{2x + 2y - 2}{3x + y - 5}$
- .

- b. Solve the following differential equation by the method of variation of parameters

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

- c. Find the Laplace transform of the following function

$$f(t) = \begin{cases} 0, & 0 < t < 5 \\ t-3, & t > 5. \end{cases}$$

- d. Find the Fourier series expansion of the function
- $f(x) = \begin{cases} 0, & -\pi < x \leq 0 \\ x, & 0 < x \leq \pi \end{cases}$
- .

- e. Find the inverse Laplace transform of given function:
- $\cot^{-1}\left(\frac{s+3}{2}\right)$
- .

- f. Find the solution of the differential equation
- $D^2(D-1)^3(D+1)y = e^x$
- .

- g. Find the Fourier sine transform of the function $f(x) = e^{-3x} + 3e^{-x}$.

SECTION C

Attempt any 3 questions.

(15 x 3 = 45)

- Q. 3. a. Obtain power series solution of the following differential equation about ordinary point $x = 0$

$$y'' - xy' + y = 0.$$

(8)

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

(7)

- Q. 4. a. Solve the following differential equation using Laplace transform

$$y'' + 6y' + 9y = 0, \quad y(0) = 0, y'(0) = 9.$$

(8)

- b. Solve the differential equation: $(x^2 + y^2)dx + 2xy dy = 0$.

(7)

- Q. 5. a. Find the Fourier series expansion for the following function

$$f(x) = \begin{cases} 1 & \text{if } 0 < x < 1 \\ 2 & \text{if } 1 < x < 2 \end{cases}$$

(8)

- b. Find the Fourier transform of the following function

$$f(x) = \begin{cases} 1 - x^2, & \text{if } |x| \leq 1 \\ 0, & \text{if } |x| > 1 \end{cases}$$

(7)

- Q. 6. a. Solve the following partial differential equation by method of separation of variables

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

(8)

- b. Evaluate $\int_0^{\infty} \frac{\cos 6t - \cos 4t}{t} dt$

(7)

- Q. 7. a. Find the solution of differential equation $\frac{d^2 y}{dx^2} + 2y = x^3 + x^2 + e^{-2x} + \cos 3x$.

(7)

- b. Solve the following differential equation by first finding the integrating factor

(8)

$$(3x^2 y^4 + 2xy)dx + (2x^3 y^3 - x^2) dy = 0.$$

Enrol. No. S R H U

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END SEMESTER EXAMINATION, JUNE - 2018

PROGRAM: B.TECH. SECOND SEMESTER

COURSE CODE : HEL111

COURSE TITLE: ENGLISH LANGUAGE & COMPOSITION SKILLS

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt all questions.

(1 x 10 = 10)

- Define Technical Communication.
- Explain any two ways of Word Formation.
- How should a Presentation be structured?
- Give any two reasons for making Reports.
- Give the morphological analysis of the word 'Standardization'.
- Give any two e-mails etiquettes.
- Punctuate : I would like to have a burger French fries and coke for dinner said Arjun sure said the waiter
- Form two compound words each with : (i) up (ii) shop
- What is Audience analysis? Why is it important?
- Discuss the purpose of writing a Resume'.

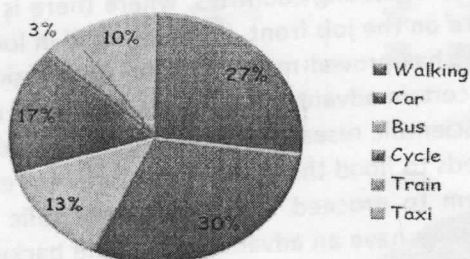
SECTION B

Q. 2. Attempt any 4 questions.

(4 x 5 = 20)

- You are the Student Affairs Secretary of your College. Write an e-mail to the Cultural, Literary & Sports Coordinators informing them about a meeting with the Vice Chancellor of the University. Give all required details.
- Write a Report based on the given Pie Chart :

Methods of Travelling to School



Source : www. Srschool.com

c. (I) Change the voice of the following sentences from Active to Passive:

(3)

- Who killed the snake?
- We should help the poor.
- Who will open the gate?
- My friend has chosen a book.
- Shut the door.
- The lady is cooking food.

(II) Correct the following sentences :-

(2)

- I did not answered a one questions properly.
- Amar is more happy than some other boy in class.
- I m not agree to you in this point.
- The table's legs is broke.

d. Change as directed :-

- She is too smart to be fooled by you. (Remove the Adverb 'too')
- Oxygen is more useful than any other gas. (To Positive Degree)

- iii. No sooner did I start the game than it started raining. (Remove 'No sooner')
 - iv. My friend said to me, "No other person is as good as you." (To Indirect Speech)
 - v. The coach said to the boy, "You must workout for two hours everyday." (To Indirect Speech)
 - vi. Gita told Rahul, "I received this letter on Monday." (To Indirect Speech)
 - vii. The boy is playing in the field. (To Past Perfect Continuous)
 - viii. The slave did a lot of work. (To Present Continuous)
 - ix. I have lived here for five years. (To Present Tense)
 - x. The master shouted at the worker. (To Future Continuous)
- e. Explain the following :
- i. Origin & Development of Technical Communication
 - ii. General Communication vs Technical Communication
- f. Make a new word from each of the words given below and use it in a meaningful sentence :-
- i) accept ii) grow iii) depart iv) manage v) courage

SECTION C

Attempt any 2 questions.

(10 x 2 = 20)

Q. 3. Write on any one of the following topics :-

- i. An original story that begins as : "It was a cold winter night....."
- ii. Describe a time when you had trouble in school or College. State how you solved the problem.

Q. 4. Write your complete Resume'.

Q. 5. Read the given passage and attempt the questions which follow:

The march of scientific mechanization over industry, throughout the world, is unabated, so is the misery of the poor. Equally unchecked is the thriving of a few among the upper rungs of industrial hierarchy and the bureaucratic and political echelons. One feels proud of the scientific innovations in the manufacturing process where manpower is speedily being replaced by capital potential. The researches in the field are so swift that the labour factor is gradually being eliminated. Automation has withdrawn hazards from man but has offered him unemployment. In the progressing countries, where there is no check on population, scientific industrialization has become an eyesore on the job front. It has resulted in long queues at the employment exchanges. Scientific industrial development has proved manna for the progressive countries of Western Europe, Canada, the USA and Japan. They reap certain advantages over the backward nations. It has provided a luxurious life even to the common man there. Scientific researches result in mass production of commodities. Thus the West has a huge surplus of finished goods to flood the world market and to reap profits. The resultant economic growth in the countries enables them to proceed with further scientific researches to make the industries more capital oriented. Thus they always have an advantage over the backward countries. Notwithstanding the backwardness or poverty, scientific industrialization is responsible for an increase in the Gross National Product in progressing countries like India too. But it creates two-fold problems. The advantages of this increase in Gross National Product are reaped by the rich, for it is they who have invested money. The growth of capital too is their prerogative. The profits and interest go to the coffers of the industrialists. The fruits of progress and mechanization do not go to the poor. It is only a class, a group that benefits from scientific development, not all.

Questions

- a. Who are benefited by scientific mechanization?
- b. What are the advantages reaped by progressive countries?
- c. What is the effect of economic growth in progressive countries?
- d. Who profits by increase in GNP in backward countries?
- e. Why do the profits of scientific development not go to the poor?
- f. Suggest a suitable title for the passage and summarise it in a few lines.

(1)
(2)
(1)
(1)
(1)
(3)

END SEMESTER EXAMINATION (JUNE - 2018)

PROGRAM: B.TECH.

SECOND SEMESTER

COURSE CODE: HELL15

COURSE TITLE: ENGLISH LANGUAGE & COMPOSITION SKILLS

(Time allotted: Three hours)

(Max. Marks: 100)

Note: Answer all Sections & Questions.

SECTION A

(10 x 10 = 100)

Q.1. Answer all questions.

1. Define Technical Communication.
2. Define the two ways of Word Formation.
3. How should a Presentation be structured?
4. How can you prepare for writing reports?
5. Give the morphological analysis of the word 'Standardization'.
6. What is a 'style guide'?
7. Paraphrase: 'I would like to have a burger, french fries and coke for dinner, said Arun. But said the waiter.
8. Give two compound words each with (i) co- (ii) sup-
9. What is 'cohesion' analysis? Why is it important?
10. Give the purpose of writing a Resume.

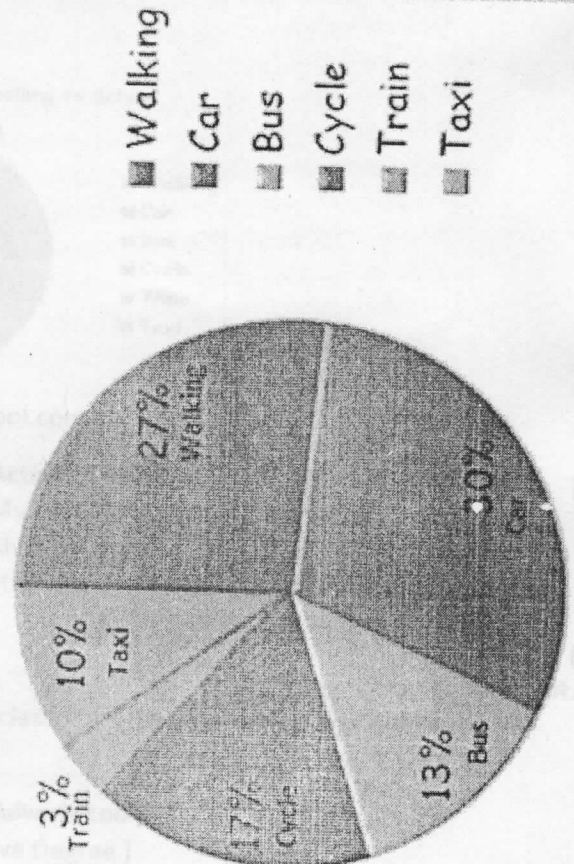
SECTION B

(4 x 5 = 20)

Q.2. Answer any 4 questions.

1. You are the Student Affairs Secretary of your College. Write a e-mail to the College, requesting Sports Commissioners informing them about a meeting with the Vice-Chancellor of the University. Give a subject line.
2. Write a report based on the given Pie Chart.

Methods of Travelling to School



70/6/10

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END SEMESTER EXAMINATIONS, JUNE - 2018
PROGRAM: B.TECH. SECOND SEMESTER

COURSE CODE : ACH101

COURSE TITLE : APPLIED CHEMISTRY

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

SECTION A

Q.1. Attempt **all** questions

(2 X 10 = 20)

- a. Explain free radical and give example of reaction in which free radical is formed.
- b. Explain weight average and number average molecular weight.
- c. Explain temperature coefficient.
- d. Define HCV or GCV of fuel.
- e. Explain isotopic peaks in mass spectroscopy.
- f. What is internal standard used in NMR spectroscopy? Give its structure.
- g. Explain term corrosion.
- h. Explain LCAO in molecular orbital theory.
- i. How is carbanion formed? Write about geometry of carbanion
- j. Give formula for calculating number of modes of vibration of linear and non-linear molecule.

SECTION B

Q.2. Attempt **any 5** questions

(7 X 5 = 35)

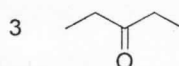
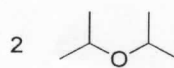
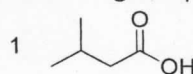
- a. Write a note on Beckmann rearrangement.
- b. Draw molecular orbital diagram, calculate bond order and predict magnetic character of N_2^+ and N_2 .
- c. Explain formation of electrovalent, covalent and co-ordinate covalent bond with help of examples.
- d. Explain Markonikoff's rule with mechanism.
- e. Derive integrated rate equation for second order reaction with two different reactants.
- f. Aromatic amines are less basic than aliphatic amines explain this fact with suitable theory.
- g. Write a note on use of biomass as fuel.

SECTION C

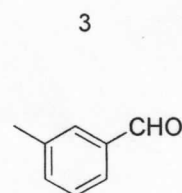
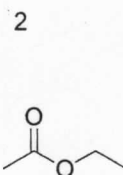
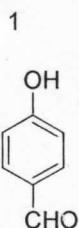
Attempt **any 3** questions.

(15 x 3 = 45)

- Q.3.**
 - a. Write a note on hyper-conjugation and electromeric effect. 7.5
 - b. Explain with suitable examples reaction of carbonyl compounds with NH_2-Z type of compounds. 7.5
- Q.4.**
 - a. Draw low and high resolution NMR spectra of following compounds: 7.5



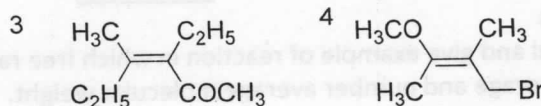
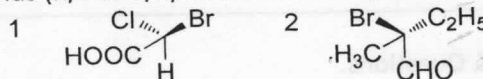
- b. Predict IR peaks for following compounds:



7.5

- Q.5. a. Explain bomb calorimeter experiment and give mathematical expression used in experiment.
b. Explain ion exchange process for purification of water.

- Q.6. a. Write configuration of compounds (R/S or E/Z) with suitable explanation.



- b. Explain following terms in UV-visible spectroscopy.

- Auxochrome
- Chromophore
- Bathochromic and hypsochromic shift

- Q.7. a. Calculate the gross and net calorific values of a coal sample containing 68% carbon, 6.5 % Sulphur, 10% nitrogen, 11.5 % hydrogen and 4 % oxygen. Latent heat of steam is 587cal/g.
b. A second order reaction, where $a=b$, is 25 % complete in 700 seconds. How long will it take for the reaction to go for 75% completion?

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END SEMESTER EXAMINATIONS, JUNE - 2018
PROGRAM: B.TECH. SECOND SEMESTER

COURSE CODE : APH104**COURSE TITLE : APPLIED PHYSICS****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt **all** questions.**(2 x 10 = 20)**

- a. Write the formula for length contraction and time dilation.
- b. Define Population Inversion condition in laser.
- c. Write the condition for Gauss's Divergence and Stokes law.
- d. Define superconductivity of a material.
- e. Write the differential form of Maxwell's second equation.
- f. Define inertial frame of reference.
- g. What is meant by optically active substance?
- h. Write the formula for magnetic Susceptibility of material and show for diamagnetic material.
- i. Write the purpose of 'Canada Balsam' material used in between the Nicol prism.
- j. Give one example which shows the particle nature of light.

SECTION B

Q. 2. Attempt **any 5** questions.**(7 x 5 = 35)**

- a. Explain formation of Hysteresis curve and draw the B-H curve for soft and hard magnetic material.
- b. Explain de Broglie wave length and Heisenberg uncertainty principle.
- c. How many order will be visible if the wavelength of the incident light is 5000 Angstrom and the number of lines per inch on the grating is 2620?
- d. Discuss length contraction and time dilations using Lorentz transformation equations.
- e. Calculate the smallest possible uncertainty in the position of an electron moving with velocity 3×10^7 m/s.
- f. Explain the limit of resolution and resolving power of optical instrument.
- g. Explain the theory of production of Plane, circularly and elliptically polarized light.

SECTION C

Attempt **any 3** questions.**(15 x 3 = 45)****Q. 3.** a. Derive the relation for thickness of Mica sheet using displacement of fringe in interference of light.**(10)**

- b. A biprism is placed 5 cm away from a slit illuminated by sodium light $\lambda = 5890$ Angstrom. The width of the fringes obtained on a screen placed at a distance of 75cm from the biprism is 9.424×10^{-2} cm. What is the distance between the coherent sources?

(5)**Q. 4.** a. Explain the construction of a Nicol prism with proper notations.**(10)**

- b. Calculate the minimum number of lines in a grating which will just resolve the lines of wavelengths 5890 and 5896 Angstrom, in the second order.

(5)**Q. 5.** a. Describe the construction and working of Ruby laser with a diagram.**(10)**

- b. Explain the principle of Holography and its basic processes to produce the Hologram.

(5)**Q. 6.** a. Show that the Maxwell's fourth equation is the modified form of Ampere's law.**(10)**

- b. Show that the $x^2 + y^2 + z^2 - c^2 t^2$ is invariant under Lorentz transformation.

(5)**Q. 7.** a. Give the derivation for Schrodinger's time independent wave equation.**(10)**

- b. Explain the wave function ' ψ ' and give its physical significance.

(5)

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END SEMESTER EXAMINATIONS, JUNE-2018
PROGRAM : B.TECH. SECOND SEMESTER

COURSE CODE : AMA103**COURSE TITLE : APPLIED MATHEMATICS - II****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections and Questions.**SECTION A****Q. 1.** Attempt **all** questions.**(2 x 10 = 20)**

- a. Check whether the following differential equation is exact

$$(3x^2y + \frac{y}{x})dx + (x^3 + \ln x)dy = 0.$$

- b. Write the one dimensional heat equation.

- c. Find the solution of following partial differential equation

$$\frac{\partial^2 z}{\partial x^2} + 6 \frac{\partial^2 z}{\partial x \partial y} + 9 \frac{\partial^2 z}{\partial y^2} = 0.$$

- d. Solve the differential equation $y'' + 2y' + y = 0$.

- e. If $f(x)$ is a function defined in the interval $0 < x < L$, then write the half range Fourier sine series of $f(x)$.

- f. Find $L^{-1}\left[\frac{3}{s+4}\right]$.

- g. Find $L[2\cos(t-1)u(t-1)]$

- h. If a differential equation is of order n then how many arbitrary constants will be there in its solutions.

- i. Locate and classify the ordinary points, regular singular points and irregular singular points of the differential equation: $x^2(x^2 - 4)y'' + 2x^3y' + 3y = 0$.

- j. $f(x, y) = x^3 + \sin x \cdot e^y$ is a homogeneous equation. (True/ False)

SECTION B**Q. 2.** Attempt **any 5** questions.**(7 x 5 = 35)**

- a. Solve the differential equation: $\frac{dy}{dx} = \frac{2x + 2y - 2}{3x + y - 5}$.

- b. Solve the following differential equation by the method of variation of parameters

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

- c. Find the Laplace transform of the following function

$$f(t) = \begin{cases} 0, & 0 < t < 5 \\ t-3, & t > 5. \end{cases}$$

- d. Find the Fourier series expansion of the function $f(x) = \begin{cases} 0, & -\pi < x \leq 0 \\ x, & 0 < x \leq \pi \end{cases}$.

- e. Find the inverse Laplace transform of given function: $\cot^{-1}\left(\frac{s+3}{2}\right)$.

- f. Find the solution of the differential equation $D^2(D-1)^3(D+1)y = e^x$.

- g. Find the Fourier sine transform of the function $f(x) = e^{-3x} + 3e^{-x}$.

SECTION C

(15 x 3 = 45)

Attempt any 3 questions.

- Q. 3. a. Obtain power series solution of the following differential equation about ordinary point $x = 0$

$$y'' - xy' + y = 0. \quad (8)$$

- b. Solve the differential equation $(1 + y^2)dx = (\tan^{-1} y - x)dy$. (7)

- Q. 4. a. Solve the following differential equation using Laplace transform (8)

$$y'' + 6y' + 9y = 0, \quad y(0) = 0, y'(0) = 9.$$

- b. Solve the differential equation: $(x^2 + y^2)dx + 2xy dy = 0$. (7)

- Q. 5. a. Find the Fourier series expansion for the following function (8)

$$f(x) = \begin{cases} 1 & \text{if } 0 < x < 1 \\ 2 & \text{if } 1 < x < 2 \end{cases}$$

- b. Find the Fourier transform of the following function (7)

$$f(x) = \begin{cases} 1 - x^2, & \text{if } |x| \leq 1 \\ 0, & \text{if } |x| > 1 \end{cases}$$

- Q. 6. a. Solve the following partial differential equation by method of separation of variables (8)

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

- b. Evaluate $\int_0^{\infty} \frac{\cos 6t - \cos 4t}{t} dt$

- Q. 7. a. Find the solution of differential equation $\frac{d^2 y}{dx^2} + 2y = x^3 + x^2 + e^{-2x} + \cos 3x$. (7)

- b. Solve the following differential equation by first finding the integrating factor (8)

$$(3x^2 y^4 + 2xy)dx + (2x^3 y^3 - x^2) dy = 0.$$

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END SEMESTER EXAMINATIONS, JUNE-2018
PROGRAM : B.TECH. SECOND SEMESTER

COURSE CODE : GES112**COURSE TITLE : ENVIRONMENTAL STUDIES****[Time allotted: Two hours]****[Max. Marks : 100]****Note:** Attempt all Sections and Questions.

SECTION A

Q. 1. Attempt all questions.**(1 x 10 = 10)**

- a. What is thermal pollution?
- b. What is the criteria for defining biodiversity hotspot?
- c. Ozone layer found in _____ layer of the atmosphere.

Match the following (d to j)

- | | |
|---------------------------------|-------------------|
| d. Air pollution | 1988 |
| e. Environment (Protection) Act | Uttarakhand |
| f. Hotspot | Walter G. Rosan |
| g. Chipko andolan | London smog |
| h. Biodiversity | Myres |
| i. The Motor Vehicle Act | 1986 |
| j. Water pollution | Minamata disaster |

SECTION B

Q. 2. Attempt any 4 questions.**(4 x 5 = 20)**

- a. Discuss about the global warming and its impact on the environment.
- b. Write a note on 'food security and climate change'.
- c. How acid rain forms in the atmosphere? What are the main causes of acid rain formation?
- d. Explain segregation process of waste with the help of conceptual diagram.
- e. What do you understand by biogeochemical cycle? Discuss about the nitrogen cycle in detail.
- f. Write about the salient features of the site which you have visited during environmental field visit.

SECTION C

Attempt any 2 questions.

(10 x 2 = 20)

- Q. 3.**
 - a. What do you understand by forest resource? How are human beings dependent on forest resource?
 - b. Explain the major anthropogenic activities which are affecting forest resource.
- Q. 4.**
 - a. Define soil pollution? Discuss about the main causes of soil degradation.
 - b. How soil degradation can be prevented? Discuss its control methods with appropriate examples.
- Q. 5.**
 - a. Define Biodiversity. Kindly also discuss its contribution to human wellness with examples.
 - b. Write a detail note on conservation practices for biodiversity with the help of suitable examples.

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END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : B.TECH.

THIRD SEMESTER

COURSE CODE : AMA201

COURSE TITLE : APPLIED MATHEMATICS - III

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

SECTION AQ. 1. Attempt all questions.

(2 X 10 = 20)

- Define a Nilpotent matrix.
- What is the condition for a homogeneous system of linear equation to have infinite?
- If 3, 4 and -2 are the eigenvalues of a matrix A then find the determinant of A .
- What is the condition for a function to be harmonic?
- Find the Principal argument of $z = -1 - i$.

f. Find the singular points of the function $f(z) = \frac{z^3}{(z^2 + 2z + 5)}$.

g. Find $\int_C \frac{ze^z}{(z - 3/2)} dz$, where $C: |z| = \frac{1}{2}$.

h. Find the expansion of the function $\frac{e^{1/z}}{z}$ when $z \neq 0$.

i. What is the transformation representing magnification under a conformal mapping?

j. What type of singularity does the following function has $f(z) = \frac{1 - \cos z}{z^2}$?

SECTION BQ. 2. Attempt any 5 questions.

(7 x 5 = 35)

a. Find the rank of the following matrix by using elementary row operations

$$A = \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$$

b. Find the inverse of the given matrix A by using elementary row operations: $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$.

c. Verify that the following function is analytic. $f(z) = e^x (\cos y + i \sin y)$. Also, find its derivative

- d. Find the value of the following integral along the curve $y=x^2$ between the points (0, 0) and (3, 9)

$$\int_C (x+y) dx + x^2 y dy.$$

- e. Evaluate $\int_C z^4 e^{1/z} dz$ where $C: |z|=1$.

- f. Let the rectangular region R be bounded by $x=0, y=0, x=2, y=1$. Determine the region R' of w -plane into which R is mapped under the transformation $w=z+(1-2i)$.

- g. Determine the poles and residue at each pole of the function

$$f(z) = \frac{z^2}{(z+1)^2(z-2)}.$$

SECTION C

Attempt **any 3** questions.

(15 X 3 = 45)

- Q. 3. a. Evaluate the integral $\int_0^{2\pi} \frac{d\theta}{(5-4\sin\theta)}$.

(11)

- b. Using De-Moiver's formula find the value of $\sin 3\theta$.

(4)

- Q. 4. a. Find all the roots of $(-8i)^{1/3}$.

(9)

- b. Find the harmonic conjugate of the following function $u(x, y) = y^3 - 3x^2y$.

(6)

- Q. 5. For the following matrix

(15)

$$A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$$

Verify the Cayley-Hamilton theorem and hence find its inverse

- Q.6. Determine the algebraic and geometric multiplicity of matrix $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$

(15)

- Q.7. Expand the function: $f(z) = \frac{1}{(z^2 - 3z + 2)}$ in Laurent series valid in the following regions :

- (i) $|z| < 1$; (ii) $|z| > 2$; (iii) $1 < |z| < 2$.

(15)

Enrol. No. S R H U

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END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : B.TECH. THIRD SEMESTER

COURSE CODE : HSC210**COURSE TITLE : INDUSTRIAL SOCIOLOGY****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**SECTION A****(2 x 10 = 20)****Q. 1.** Attempt all questions.

Match the following:

- | | |
|---|---|
| a. Industrial Revolution | 1. 48 hrs |
| b. INC | 2. In 2000 |
| c. The New Economic Policy | 3. Predatory Union |
| d. Chief Executive in Grievance process | 4. In 1885 |
| e. The Information Technology Act | 5. Das Capital |
| f. Revolutionary Union | 6. Arnold Toynbee |
| g. Adjudication | 7. Chicago |
| h. Karl Marx | 8. Blue Print of the research |
| i. Hawthorne Experiment | 9. Ultimate legal remedy of dispute |
| j. Hypothesis | 10. Basic assumption about research outcome |
| | 11. 3 days |
| | 12. Globalization |

SECTION B**(7 x 5 = 35)****Q. 2.** Attempt any 5 questions.

- Explain industrial dispute resolution mechanism.
- Give a comparative analysis of domestics and factory system of Indian industrial society.
- Distinguish between open door and step ladder policy.
- Discuss 'The Industrial Dispute Act' in detail.
- Define Industrial Sociology. Explain the nature of Industrial Sociology.
- What is the process of legal prohibition of strike, explain it.
- Explain the Marxian concept of stages of development of society.

SECTION C**(15 x 3 = 45)**

Attempt any 3 questions.

- Define Industrialization with its causes.
 - Explain the impact of industrialization.
- Explain the role of industrial revolution in India.
 - Critically examine the labor laws of India.
- Define Industrial Dispute with its causes.
 - Explain the types of industrial disputes.
- Distinguish between internal and external relations in industrial sector.
 - Discuss grievance settlement process.
- Write down the development of Trade Unionism in India.
 - Give a comparative analysis on socio-psychological approach and Gandhian approach of trade unions.

Enrol. No. S R H U

Regn. No. D D

END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : B.TECH. FIFTH SEMESTER

COURSE CODE : AMA301**COURSE TITLE : COMPUTATIONAL METHODS IN ENGINEERING****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions. Only non-programmable calculators are allowed.**SECTION A****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- The number of significant digits in the number 9.00823 is.....
- In normalized floating point mode carry out the following operation and indicate if the result is overflow or underflow $0.87345E-95 * 0.6576E-6$
- An equation $X^3 + 8X - 6 = 0$ has ... negative real roots,positive real roots and ...complex roots.
- Rate of convergence of Secant method is.....
- Gauss-Seidel method convergesmuch faster than Jacobi's method for solution of SLE's.
- Interpolation formula are based on fundamental assumption that data can be expressed as
 (i) A linear function (ii) A quadratic function (iii) A polynomial function (iv) none of these.
- Gauss's forward interpolation formula contains the even order differences in the line and odd order differences in the line just.....the central line.
- To apply Simpson's $1/3^{rd}$ rule, the number of intervals must be multiple of
- In the Least squares method overall solution minimizes the sum of the squares of the.....
- Euler's method of solution for ODE's is equivalent toorder method.

SECTION B**Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- Apply Newton-Raphson method, to calculate the smallest positive root of the equation:
 $x \cdot \cos x + \log_{10} x = 0$, correct to 4D places.
- Apply Newton's Divided difference formula to obtain $f(9)$ from the following data:

x:	5	7	11	13	17
f(x):	150	392	1452	2366	5202
- Let $f(x)$ is a polynomial of degree 4 and given that $f(4)=270$, $f(5)=648$, $\Delta f(5)=682$, $\Delta^3 f(4)=132$ find the value of $f(5.8)$ using Gauss Backward formula.
- Find $\int_0^\pi \sin x + e^{\log_e x} dx$ correct up to 4 decimal places using trapezoidal rule with $n=5$.
- Find the solution of initial value problem $\frac{dy}{dx} = x^2 + y^2$, $y(0)=1$, for the range $0 \leq x \leq 0.3$ in steps of 0.1 correct to 4 decimal places, using Euler's method.
- Use fixed point iteration method to find a real root of the equation $4x^3 + 2x^2 - 5 = 0$, correct to 4D places.
- Fit a straight line to the following data by the Least Squares Method:

X:	1	2	3	4	5	6
Y:	1200	900	600	200	110	50

SECTION C

(15 x 3 = 45)

Attempt any 3 questions.

- Q. 3. a.** Use 4D precision and apply Gauss Jordan method with partial pivoting to solve the following system of equations:

$$2x + 14y - 2z = -44$$

$$6x - 2y + z = 35$$

$$3x + 4y + 7z = 35$$

- b.** Prove that $E = e^{hD}$, where D is a differential operator.

- Q. 4. a.** Make the given system of equations,

$$5x + 28y + 9z = 71$$

$$2x + 7y - 22z = 67$$

$$29x - 2y + 6z = 11$$

Diagonally dominant and apply Gauss-Seidel method to solve them by using 4D precision.

- b.** Following are the marks obtained by 492 candidates in certain examination

Marks	0-40	40-45	45-50	50-55	55-60	60-65
No. of Candidates	210	43	54	74	32	79

Find out the number of candidates who secured more than 48 but not more than 50 marks?

- Q. 5. a.** Apply Runge Kutta 4th Order method to evaluate $y(0.8)$ correct to 5 decimal places, given that

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}, \quad y(0) = 1 \text{ and } h = 0.2$$

- b.** Use Lagrange's interpolation method to compute the value of $f(x)$ for $x = 15$ from the following table

x :	10	12	14	16	18	20
$f(x)$:	2420	1942	1497	1109	790	540

- Q. 6. a.** Find the curve of best fit of the type $y = ax^b$ to the following data by the method of Least Squares.

x :	1	2	3	4	5	6
y :	2.98	4.26	5.21	6.1	6.8	7.5

- b.** The population of a town in the decennial census was as given below. Apply suitable interpolation formula to estimate the population for the year 1995

Year	1961	1971	1981	1991	2001
Population(in thousand)	46	66	81	93	101

- Q. 7. a.** Apply Milne's Predictor-Corrector method to evaluate $y(0.4)$ and $y(0.5)$ correct to 5D places. Given

that $\frac{dy}{dx} = 4y$, with $y(0) = 1, y(0.1) = 1.492, y(0.2) = 2.226, y(0.3) = 3.320$ and $h = 0.1$

- b.** Evaluate $\int_0^6 \frac{1}{1+x^2} dx$, using

(i) Simpson's 1/3 rule

(ii) Simpson's 3/8 rule, with $n=6$ correct up to four decimal places.

Hence obtain the approximated value of π .

Enrol. No. S R H U

Regn. No. D D

END SEMESTER EXAMINATION, JANUARY-2018
PROGRAM : B.TECH.(CSE) SEVENTH SEMESTER

COURSE CODE : ECS513

COURSE TITLE : OPERATIONAL RESEARCH

[Time allotted: 03 Hrs]

[Max. Marks: 100]

Note: Attempt all Sections. Only non-programmable calculators are allowed.**Section (A)****Q. 1.** Attempt **all** parts of this question.**(2×10 = 20)**

- a. In Graphical solution to LPP, If the feasible region is then one or more decision variables will increases indefinitely in the feasible region without ever reaching optimal solution.
- b. Whenever a problem has more than one optimal BF solution, then at least of the non-basic variables has a coefficient zero in the zeroth row of final solution table.
- c. By applying Big M or two-phase method for solution of LPP, if in the final solution, there exists at least one variable greater than zero, then the solution is infeasible.
- d. In Game theory when Minimax and Maximin criteria matches, then there exist a game.....
- e. When the principle of dominance is applicable to the payoff matrix of the given game then
 - (i) Least of the row $\geq$ highest of another row
 - (ii) Least of the row $\leq$ highest of another row
 - (iii) Every element of a row $\geq$ corresponding element of another row
 - (iv) Every element of the row $\leq$ corresponding element of another row
- f. For a simple queue (M/M/1), $\rho = \lambda / \mu$ is known as:
 - (i) Poisson busy period, (ii) Random factor (iii) Traffic intensity, (iv) Exponential service factor.
- g. In Northwest corner method the allocations are made starting from the
- h. In an Assignment problem given matrix is always amatrix.
- i. The following is the assumption made in the processing of 'n' jobs on 2 machines:
 - (i) The processing time of jobs is exactly known and is independent of order of processing,
 - (ii) The processing times are known and they depend on the order of processing the job,
 - (iii) The processing time of a job is unknown and it is to be worked out after finding thesequence,
 - (iv) The sequence of doing jobs and processing times is inversely proportional.
- j. One of the important basic objectives of Inventory management is:
 - (i) To calculate EOQ for all materials in the organization,
 - (ii) To go in person to the market and purchase the materials,
 - (iii) To employ the available capital efficiently so as to yield maximum results,
 - (iv) Once materials are issued to the departments, personally check how they are used.

Section (B)**Q. 2.** Attempt **any 5** parts of this questions.**(7×5 = 35)**

- a. Using Vogel's Approximation Method, find the initial basic feasible solution of the following transportation problem and also find its optimal solution.

	P	Q	R	T	Supply
A	5	3	6	2	19
B	4	7	9	1	37
C	3	4	7	5	34
Demand	16	18	31	25	

- b. An automobile dealer wishes to put four repairmen to four different jobs. The repairmen have different kinds of skills and they exhibit different levels of efficiency from one job to another. The dealer has estimated the number of man hours that would be required for each job-man combination. The data is given in the table below. Find the optimum assignment that will result in minimum man hours needed.

MAN JOB	A	B	C	D
JIM	5	3	2	8
JACK	7	9	2	6
TOM	6	4	5	7
HERRY	5	7	7	8

- c. Two film producers Aditya Chopra and Sanjay Leela Bhansali soon will be starting their campaigns against each other for release of their movies on Deepawali festival. Each must now select the main issue he will emphasize as the theme of her campaign. Each has advantageous issues from which to choose, but the relative effectiveness of each one would depend upon the issue chosen by the opponent. Apply the principle of dominance, find the optimal mixed strategies for both producers. Also find the value of the campaign.

		Sanjay Leela Bhansali			
		I	II	III	IV
Aditya Chopra	I	18	4	6	4
	II	6	2	13	7
	III	11	5	17	3
	IV	7	6	12	2

- d. A television manufacturing company produces its own speakers, which are used in the production of its television sets. The television sets are assembled on a continuous production line at rate of 8,000 per month. Each time a batch is produced, a set-up cost of Rs.12,000 is incurred. The cost of keeping a speaker in stock is Rs. 0.30 per month. Shortage of a speaker, (if there exists) costs Rs. 1.10 per month. Company is interested to determine: (a) Optimal lot size (b) Optimum scheduling period (c) Minimum total expected yearly cost (d) Optimal number of order. When shortage are allowed and not allowed.
- e. The local Division of Motor Vehicles (DMV) is concerned with its waiting line system. Currently, the DMV uses a single-server, single-line, single-phase system when processing license renewals. Based on historical evidence, the average number of customers arriving per hour is 9 and is described by a Poisson distribution. The service rate is 12 customers per hour with the service times following an exponential distribution. The customers are patient and come from an infinite population. The manager of the DMV would like you to calculate the operational characteristics of the waiting line system.
- What is the average system utilization?
 - What is the average number of customers in the system?
 - What is the average number of customers waiting in line?
 - What is the average time a customer spends in the system?
 - What is the average time a customer spends waiting in line?
 - What is the probability that waiting time in the system is greater than 2 hours in the system?
 - What is the probability of having more than 5 customer in the system?
- f. A book binder has a printing press, a binding machine and 06 (six) different manuscripts for books to be turned out. The time required to perform the printing and binding operation for each book are given below. Determine the order in which books should be processed, in order to minimize the total time elapsed. Evaluate idle time for printing press and binding Machine.

Books	1	2	3	4	5	6
Printing Time (in Hrs)	30	120	50	20	90	110
Binding Time (in Hrs)	80	100	90	60	30	10

Find the sequence that minimizes the total elapsed time T. Also calculate the total idle time for the machines in this period.

- g. The Lockheed Aircraft Co. is ready to begin a project to develop a new fighter airplane for the Indian Air Force. The company's contract with the Department of Defense calls for project completion within 25 months, with penalties imposed for late delivery. The project involves 12 activities and the estimates of optimistic time (t_0), most likely time (t_m) and pessimistic time (t_p) in months for different activities of a project.

Activity	Optimistic Time (t_0)	Most Likely Time (t_m)	Pessimistic Time (t_p)
1-2	1	2	3
2-3	1	2	3
3-4	1	3	5
3-5	3	4	5
4-5	2	3	4
4-6	3	5	7
5-7	4	5	6
5-8	6	7	8
6-10	2	4	6
7-9	4	6	8
8-9	1	2	3
9-10	3	5	7

- (i) Construct the project network for this project. (ii) Find the Expected Duration & Variance of each activity. (iii) Identify the Critical Path and Expected Project Completion time.

Section (C)

Attempt any 3 questions.

(15×3 = 45)

- Q. 3. a. Use Two-Phase Simplex method to solve the following LPP:

(10)

$$\text{Maximization } z = 5x_1 - 4x_2 + 3x_3$$

Subject to:

$$2x_1 + x_2 - 6x_3 = 20$$

$$6x_1 + 5x_2 + 10x_3 \leq 76$$

$$8x_1 - 3x_2 + 6x_3 \leq 50$$

$$\text{and } x_1 \geq 0, x_2 \geq 0, x_3 \geq 0$$

- b. Solve the following game using saddle point to obtain the optimal strategy of for the two players A and B, also compute the value of game, given the pay-off matrix of the player A:

(5)

		Player B				
		I	II	III	IV	V
Player A	I	9	3	1	8	0
	II	6	5	4	6	7
	III	2	4	3	3	8
	IV	5	6	2	2	1

- Q. 4. a. Solve by using Big-M method, the following LPP

(10)

$$\text{Maximize } Z = 6x_1 + 4x_2$$

Subject to

$$2x_1 + 3x_2 \leq 30$$

$$3x_1 + 2x_2 \leq 24$$

$$x_1 + x_2 \geq 3$$

$$\text{and } x_1 \geq 0, x_2 \geq 0$$

- b. Define degeneracy in a transportation problem. What do you mean by optimality of transportation problem?

(5)

- Q. 5. a. Solve the following game graphically to obtain the optimal strategy of for the two players A and B, also compute the value of game, given the pay-off matrix of the player A: (10)

		I	II	III
Player A	I	-6	7	8
	II	4	-5	5
	III	-1	-2	4
	IV	-2	5	5
	V	7	-6	8

- b. What is an assignment problem? Describe Hungarian method to solve the problem. (5)

- Q. 6. a. A machine operator has to perform three operations, namely plane turning, step turning and taper turning on a number of different jobs. The time required to perform these operations in minutes for each operating for each job is given in the matrix given below. (10)

Jobs	I	II	III	IV	V	VI	VII
Plane Turning	3	8	7	4	9	8	7
Step Turning	4	3	2	5	1	4	3
Taper Turning	6	7	5	11	5	6	12

Find the optimal sequence that minimum the total elapsed time required to complete the jobs. Also calculate the total idle time for the machines in this period.

- b. Construct the dual of given LPP model (primal)

$$\text{Maximize } z = 3x_1 - 4x_2 + x_3$$

$$\text{Subject to } x_1 - 3x_2 + 4x_3 = 9$$

$$x_1 - 2x_2 + 3x_3 \leq 3$$

$$5x_1 + 2x_2 - x_3 \geq 8$$

$$\text{And } x_1 \geq 0, x_2 \geq 0, x_3 \text{ unrestricted in sign} \quad (5)$$

- Q. 7. a. SRHU has planned to start primary health care center (PHCC) in Toli village, District Pauri Garhwal, the birthplace of H.H. Dr. Swami Rama. The following list of activity has been finalized for timely completion of this project. (10)

Activity	A	B	C	D	E	F	G	H	I	J	K
Activity Description	Select administrative and medical staff.	Select site and do site survey	Select equipment	Prepare final construction plans and layout	Bring utilities to the site.	Interview applicants and fill positions in nursing support staff, maintenance, and security.	Purchase and take delivery of equipment	Construct the hospital	Develop an information system.	Install the equipment	Train nurses and support staff
Immediate Predecessors	-	-	A	B	B	A	C	D	A	E,G,H	F,I, J
Estimated Duration (weeks)	12	9	10	10	24	10	35	40	15	4	9

- Construct the project network for PHC project.
- Develop the project schedule (EST, EFT, LST, LFT).
- Find the critical path and maximum time for completion of project.
- Compute total floats and free floats for critical and non-critical activities.

- b. Define PERT and CPM for network analysis and differentiate between PERT and CPM. (5)
