

Enrol. No.

S R H U

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D D

END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : DIPLOMA FIRST SEMESTER

COURSE CODE : DELT107

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.

(2 x 10 = 20)

a) Write an opposite for the following:-

i. deep

ii. destruction

iii. sad

iv. famous

b) Complete the following sentences:-

i. We will go.....

ii. Swimming is.....

iii. Why are you.....

iv. If they

c) Fill in the blanks with Prepositions:-

i. Please meet me _____ ten _____ the Bus stop.

ii. I like to sit _____ my friend _____ class.

d) Choose the correct word and fill in the blanks :-

i. _____ friends will return after an _____. (hour, our)

ii. _____ bags have been kept _____ by the teacher. (their, there)

e) Give one synonym for each of the following words :-

i. beautiful

ii. tough

iii. concise

iv. affection

f) Fill in the blanks with suitable words :-

i. I have worked _____ during this Semester.

ii. _____ your friends reaching Delhi today?

g) Rearrange to form a sentence : of bring a please glass for me water

h) Punctuate the following : will you come with me said fred

i) Use the given Idiom in a sentence : 'in the long run'

j) Fill in the blanks :-

i. We scored as many runs as _____. (they/them)

ii. He is known to my brother and _____. (I/me)

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

iv. Let _____ help him. (us/we)

Section (B)

Attempt any 4 questions.

(4 x 5 = 20)

Q.2. a) Change as directed :-

i. The Examinations began on Thursday. (To Future Continuous)

ii. Hard work gave him promotion. (To Future Tense)

iii. Nothing is better than a busy life. (To Interrogative Sentence)

iv. The manager completed the work. (To Past Continuous)

v. As soon as the teacher entered the class, it became quiet. (To Negative Sentence)

b) 1. Choose the correct word from the brackets :-

i. The student (raised, rose) his hand in class.

ii. Fred has (sat, set) the table for dinner.

iii. We (eat, has eat) lunch at two.

iv. The boy (runs, running) fast.

v. If you are tired, you should (take, took) some rest.

vi. My teacher gave a wonderful (compliment, complement) to me.

2. Insert Articles where required :

i. I met boy from Kanpur yesterday.

ii. I had apple and banana for breakfast.

c) 1. Name the kinds of sentences and give a reason for your answer:-

i. How well he speaks!

ii. What is your name?

iii. The room is very untidy.

iv. Please give me a pen.

2. Fill in the blanks with the 'am/is/are/has/have' :-

(3)

- i. A woman and her child _____ waiting to meet the doctor.
- ii. Each of the students _____ a notebook.
- iii. The cost of mangoes _____ risen this season.
- iv. The children _____ on leave today.
- v. I _____ seen many movies.
- vi. None of the members _____ decided the matter.

d) Make sentences to show the difference in meaning of:-

- i. floor, flour ii. aloud, allowed iii. hole, whole iv. piece, peace v. right, write

e) Choose the correct Modals and fill in the blanks :-

- i. _____ you please listen to me ? (will, can)
- ii. _____ I do this for you? (might, shall)
- iii. We _____ obey our parents. (should, could)
- iv. When he was young, he _____ swim for six hours. (will, would)
- v. We _____ surely win the match. (will, shall)
- vi. _____ I enter the room? (may, will)
- vii. We _____ go for a party tomorrow. (might, could)
- viii. _____ you please lend me a Calculator. (would, should)
- ix. My friend _____ come tomorrow. (will, should)
- x. The new machine _____ work well and _____ not give any problems. (will, would)

f) Use the following idioms in sentences of your own :-

- i. to keep an eye on
- ii. in the long run
- iii. by hook or by crook
- iv. a feather in the cap
- v. bag and baggage

Section (C)

Attempt **any 2** questions.

(10 x 2 = 20)

Q. 3. Write a letter to the Dean of your College requesting him for a leave of 5 days as you have to go to Delhi for some important work.

(10)

Q. 4. Read the passage carefully and answer the questions that follow :-

(10)

If you had to have an operation in the eighteenth century, your chance of surviving it would have been very poor. Many operations which today are quite straightforward and from which patients recover quickly, such as removing an appendix, would not have been attempted at all, or if attempted the victim would probably have died without anyone really knowing why. One of the reasons for this was that doctors knew very little about anatomy- the way the body is built up, and even less about physiology – the way the different parts of the body work. It was left to John Hunter, son of a poor Scot farmer to show the value of knowledge of anatomy and surgery. John Hunter had three advantages. He had a brother who was a doctor and he was thus able to learn about diseases and their effects. His natural curiosity led him to observe and study the lives of wild animals in the countryside and he had strong and skilful hands so essential to a surgeon. In fact he became so famous in a short time that he was asked to lecture but John preferred the practical work of the surgeon. Soon after becoming a surgeon, Hunter joined the army. He learnt a great deal from his experience of dealing with soldiers' wounds. In particular, he studied how to prevent a wounded man from bleeding too much, learning thereby how the nerve system functioned in the bodies of humans and animals. But there were many things he did not know about and which could only be learnt by dissection.

- a. Suggest a suitable title for the passage. (1)
- b. Why were the chances of surviving on operation in the eighteenth century poor? (2)
- c. Write any two advantages that John Hunter had. (2)
- d. What did Hunter do after he joined the army? (2)
- e. What do the following words mean in the passage – (3)
 - i. straightforward ii. wounds iii. Anatomy

Q5 Write on any one of the given topics:-

- a. The Importance of Education b. Pollution c. Social Media

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END SEMESTER EXAMINATIONS, JANUARY 2018
PROGRAM : POLYTECHNIC FIRST SEMESTER

COURSE CODE : DMAT103**COURSE TITLE : MATHEMATICS I****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**Section (A)****Q. 1.** Attempt all questions.**(2 × 10 = 20)**

- If three numbers are in A.P. such that their sum is 27 and product is 504, find the numbers.
- Define a diagonal matrix with an example.
- Find the sum of the first 12 terms of the series $0.5 + 1 + 2 + \dots$
- Find the number of combinations for selecting 98 articles out of 100.
- Prove that $c_1 + c_2 + c_3 + \dots + c_n = 2^n - 1$, where c_r is the representation of n_{C_r} .
- State Lagrange's mean value theorem.
- What do you mean by one-one-onto function?
- Write the value of $\lim_{x \rightarrow 0} \frac{\sin x}{x}$.
- Find the centre and radius of the circle $2x^2 - 2y^2 + 10x - 6y - 1 = 0$.
- Find the equation of parabola whose vertex is origin and focal point is $(0, 2a)$.

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

- If $A = \begin{bmatrix} a & b \\ 0 & 1 \end{bmatrix}$, where $a \neq 0$, show that for all $n \geq 0$, $A^n = \begin{bmatrix} a^n & \frac{b(a^n-1)}{a-1} \\ 0 & 1 \end{bmatrix}$.
- Find the coefficient of x^{-1} in the expansion of $\left(x - \frac{1}{x^2}\right)^8$.
- If $z^2 - 2z \cos \theta + 1 = 0$, show that $z^2 + z^{-2} = 2 \cos 2\theta$.
- Find the Adjoint of the matrix $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$.
- Show that $\left(\frac{1+\sin \phi + i \cos \phi}{1+\sin \phi - i \cos \phi}\right)^n = \cos\left(\frac{n\pi}{2} - n\phi\right) + i \sin\left(\frac{n\pi}{2} - n\phi\right)$.
- Find the equation of the circle inscribed within the triangle having vertices $(3, 1)$, $(14, -1)$ and $(11, 5)$.
- Verify the truth of the Rolle's Theorem for the function $f(x) = x^3 + 5x^2 - 6x$ on the interval $(0, 1)$.

Section (C)

Attempt **any 3** questions.

(15 × 3 = 45)

Q. 3. a. If $x_r = \cos \frac{\pi}{2^r} + i \sin \frac{\pi}{2^r}$, prove that $x_1 \cdot x_2 \cdot x_3 \cdot x_4 \dots$ upto $\infty = \cos \pi$. (7.5)

b. Evaluate $\lim_{n \rightarrow 0} \frac{5^{n+1} + 7^{n+1}}{5^n - 7^n}$. (7.5)

Q. 4. a. Find the inverse of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 2 & 4 & 2 \\ 3 & 2 & 7 \end{bmatrix}$. (7.5)

b. Prove that the line $x + y = 3$ is the normal of the parabola $y^2 = 4x$. (7.5)

Q. 5. a. Find equations of the tangents of an ellipse which makes equal intercepts on the axes. (7.5)

b. Find the partial fraction of the term $\frac{x}{x^2 - 3x + 2}$. (7.5)

Q. 6. a. If the m_{th} term of an A.P. is $1/n$ and its n_{th} term of an A.P. is $1/m$ then show that its $(mn)_{th}$ term is 1. (7.5)

b. Find the value of n , if $2n + 1_{P_{n-1}} : 2n - 1_{P_n} = 3 : 5$. (7.5)

Q. 7. a. Prove that $(1 + i)^n + (1 - i)^n = 2^{\left(\frac{n}{2} + 1\right)} \cos \left(\frac{n\pi}{4}\right)$. (7.5)

b. Show that if $\begin{vmatrix} a & a^2 & 1 + a^3 \\ b & b^2 & 1 + b^3 \\ c & c^2 & 1 + c^3 \end{vmatrix} = 0$ then $1 + abc = 0$. (7.5)

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END SEMESTER EXAMINATIONS, JANUARY-2018

PROGRAM : DIPLOMA FIRST SEMESTER

COURSE CODE : DCHT102

COURSE TITLE : CHEMISTRY-I

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

Section (A)

Q.1. Attempt all questions:

(2 X 10 = 20)

- Define electrovalent bond
- Write electronic configuration of Zn (atomic number 30).
- Define normality
- Define crystal lattice
- What is flux?
- Define buffer solution.
- Write de-Broglie equation.
- Find out the azimuthal and magnetic quantum number when the principal quantum number is 2.
- What are molecular solids?
- Explain Aufbau's principle.

Section (B)

Q.2. Attempt any 5 questions

(7 X 5 = 35)

- What is hydrogen bonding? Explain types of hydrogen bonding.
- Explain formation of O_2 molecule on basis of MOT.
- Explain depression in freezing point of solution on addition of non-volatile solute.
- The boiling point of benzene is 353.23 K. When 1.80 g of a non-volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11 K. Calculate the molar mass of the solute. K_b for benzene is $2.53 \text{ K Kg mol}^{-1}$.
- Calculate wavelength of body of mass 5.37×10^{-27} moving with velocity 4500 ms^{-1} .
- How will you prepare propanoic acid and propanal from propan-1-ol?
- Calculate packing efficiency in face centered cubic cell.

Section (C)

Attempt any 3 questions.

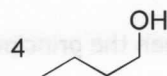
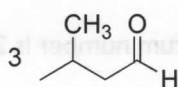
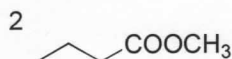
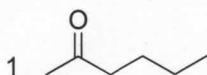
(15 x 3 = 45)

- Calculate the density of metal which crystallizes in face centred cubic form. The distance between nearest metal atoms is 287 pm. (molar mass of metal = 107.87 gmol^{-1} , $N_A = 6.022 \times 10^{23}$) 7.5
 - Calculate number of atoms per unit cell in body centered cubic cell. ii) The length of the unit cell edge of a body centered metal crystal is 350 pm. Calculate the radius of an atom of a metal. 7.5
- Explain osmosis and derive equation for osmotic pressure. 7.5
 - Explain term roasting and calcination in metallurgy. 7.5
- Give symbol and electronic configuration of any three S-block elements. 7.5
 - Discuss trend of electropositive character or metallic character and electronegativity for group I A & II A elements. 7.5
- On basis of band theory, explain conductors, semiconductors and insulators. 7.5
 - The boiling point of benzene is 353.23 K. When 2.60 g of a non-volatile solute was dissolved in 100 g of benzene, the boiling point is raised to 358.11 K. Calculate the molar mass of the solute. K_b for benzene is $2.53 \text{ K Kg mol}^{-1}$ 7.5

Q.7. a. Draw structure of following compounds:

- i. 3-Methylhexane
- ii. 2-Methylbut-2-ene
- iii. Hexan-3-one
- iv. 3-methylbutanoic acid

b. Write IUPAC name of following compounds:



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END SEMESTER EXAMINATIONS, JANUARY-2018
PROGRAM: DIPLOMA FIRST SEMESTER

COURSE CODE : DPHT101**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)**

- a. Define vectors and scalar quantities with examples.
- b. Derive dimensions of Power and work.
- c. Define kinetic and potential energy.
- d. What do you understand by dot and cross product for vectors?
- e. Write formula of Hooke's law for elasticity.
- f. Determine time period of a simple pendulum of length 4cm.
- g. Write the displacement equation for simple harmonic motion.
- h. What are different scales to measure temperature?
- i. Plot liquid surface with concave and convex meniscus.
- j. Find the value of 100 Celsius on Fahrenheit scale.

Section (B)

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

- a. Verify the dimensional correction of the formula given below:

$$T = 2\pi\sqrt{l/g}$$

- b. Describe any one law of vector addition.
- c. A mass (20 kg) is moving with a velocity of 10 m/s. It hits a stationary object of mass (40 kg). After collision the 20kg mass moves with a velocity of 5 m/s. find the velocity of the other mass.
- d. Describe all the Newton's law of motion with examples.
- e. Describe the concept of Heat and temperature.
- f. Explain centripetal and centrifugal forces with examples?
- g. Explain linear, superficial and cubical expansions in solid and their coefficients.

Section (C)

Attempt any 3 questions.**(15 x 3 = 45)**

- Q. 3. a.** Describe the stress and strain for solids and also draw stress versus strain plot for an elastic material. (9)
b. A spring 60 cm long is stretched by 2 cm by the application of a load of 200gram. What will be the length when a load of 500 gram is applied? (6)
- Q. 4. a.** Describe Friction and different coefficients of friction with diagram. (9)
b. A force = $(2i-3j+5k)$ N acting on a mass produces an acceleration of 1m/s^2 . What will be the Mass of the body? (6)
- Q. 5. a.** Describe difference between conduction, convection and radiation with practical examples. (9)
b. A simple harmonic motion is represented by $X=0.71 \sin(200 t +0.74)$. Determine the amplitude, Frequency, angular frequency, Phase and the time period of SHM. (6)
- Q. 6. a.** Describe periodic, oscillatory motion and its transverse and longitudinal nature of wave with examples. (9)
b. The length of a wire at 27C is 2m. Find its length at 100C if the coefficient of linear expansion is $0.2/C$. (6)
- Q. 7. a.** Describe hydrostatic pressure and surface tension for liquids using neat diagram. (9)
b. Describe capillary action and its practical applications. (6)

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END SEMESTER EXAMINATION, JANUARY-2018**PROGRAM : DIPLOMA(ME/CE/EE/CE/ECE/BME) THIRD SEMESTER****COURSE CODE : DMAT201****COURSE TITLE : APPLIED MATHEMATICS****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**Section (A)****Q. 1.** Attempt all questions.**(2 × 10 = 20)**

- a. State Leibnitz's theorem for successive differentiation.
- b. Write the n_{th} derivative of $\sin(ax + b)$.
- c. For what value of x , the matrix $\begin{bmatrix} 1 & 1-x \\ x & -1 \end{bmatrix}$ has rank 1.
- d. Write characteristic equation for a non-singular matrix A .
- e. State Cayley-Hamilton theorem for matrices.
- f. Find the value of $\frac{1}{D^2} \sin ax$, where a is a non-zero constant.
- g. By changing independent variable, reduce the differential equation $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \sin(\log x^2)$ into a second order linear differential equation with constant coefficients.
- h. State first shifting property for Laplace Transforms.
- i. Write Euler's coefficients for Fourier series.
- j. Find Inverse Laplace Transform of s^{-4} .

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

- a. Obtain the Fourier series for $f(x) = e^{-x}$ in the interval $0 < x < 2\pi$.
- b. Find the Laplace transform of the function $\int_0^t \frac{(1-e^{-2x})}{x} dx$.
- c. Use Convolution theorem to find $L^{-1} \left\{ \frac{s}{(s^2+a^2)^2} \right\}$.
- d. Solve the differential equation $(D^2 + 4D + 3)y = e^{-x} \sin x + xe^{3x}$.
- e. Investigate the values of λ and μ so that equations:
 $2x + 3y + 5z = 9$; $7x + 3y - 2z = 8$; $2x + 3y + \lambda z = \mu$, have:
i) no-solution, ii) a unique-solution and iii) an infinite no. of solutions.
- f. If $y = a \cos(\log x) + b \sin(\log x)$, show that $x^2 y_2 + xy_1 + y = 0$ and
 $x^2 y_{n+2} + (2n+1)xy_{n+1} + (n^2+1)y_n = 0$.
- g. Change the order of the integration $\int_0^1 \int_{x^2}^x (x^2 + y^2)^{-1/2} dy dx$. Hence evaluate the integral.

Section (C)

Attempt any 3 questions.

(15 × 3 = 45)**Q. 3.** a. Evaluate $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y} dx dy$.**(7.5)**b. If $y = \sin(m \sin^{-1} x)$, show that $(1-x^2)y_{n+2} - (2n+1)xy_{n+1} + (m^2-n^2)y_n = 0$.**(7.5)**

- Q. 4. a. Find the rank of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{bmatrix}$. (7.5)
- b. Find the Laplace Transform of the function $t^2 \sin 3t$. (7.5)
- Q. 5. a. Verify Cayley Hamilton Theorem for the matrix $\begin{bmatrix} 0 & 1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & 2 \end{bmatrix}$. (7.5)
- b. Solve the following differential equation by method of variation of parameters: (7.5)
- $$\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 9y = e^{3x}/x^2.$$
- Q. 6. a. If $L^{-1}\{F(s)\} = f(t)$, show that $L^{-1}\{F(s-a)\} = e^{at}f(t)$. (7.5)
- b. Evaluate $\int \int \int (x+y+z) dx dy dz$ over the region $R: 0 \leq x \leq 1, 0 \leq y \leq x^2, 0 \leq z \leq x+y$. (7.5)
- Q. 7. a. Evaluate $\int_0^a \int_0^{bx/a} x dy dx$. (7.5)
- b. Using elementary row transformation method find the inverse of the matrix $\begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$. (7.5)

Section (B)

Section (C)

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END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : POLYTECHNIC **FIRST SEMESTER**

COURSE CODE : DPHT101**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)**

- a. What are fundamental units?
- b. Derive dimensions of kinetic energy.
- c. Define kinetic and potential energy.
- d. Define dot product of vectors.
- e. Describe Hooke's law for elasticity.
- f. Find time period of a simple pendulum of length 2m.
- g. Define simple harmonic motion.
- h. What are different scales to measure temperature?
- i. Plot liquid surface with concave meniscus.
- j. Find value of 100K on Celsius scale.

SECTION B

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

- a. Describe any one law of vector addition.
- b. Explain phenomenon of conservation of linear momentum.
- c. Explain Newton's second law of motion with example.
- d. Determine the torque acting on a body by a force of 10N if the radius of circular path is 2m.
- e. What are ultrasonic waves? Give two applications.
- f. Explain difference between linear and cubical expansions.
- g. Explain simple harmonic motion of pendulum.

SECTION C

Attempt any 3 questions.**(15 x 3 = 45)**

- Q. 3.**
 - a. Draw stress versus strain plot for an elastic material and show different regions in it.
 - b. Describe different modes of heat transfer.
- Q. 4.**
 - a. Describe different coefficients of friction with a diagram.
 - b. A body of mass 10g is placed on a table. If a force of 20N is required to move it, find the coefficient of static friction.
- Q. 5.**
 - a. Describe difference between conduction, convection and radiation.
 - b. Write practical applications of heat transfer.
- Q. 6.**
 - a. Explain different coefficients of expansion that are found in solids.
 - b. The length of a wire is 2m at 27deg. C. Find its length at 100deg. C, if the coefficient of linear expansion is 0.2/deg. C.
- Q. 7.**
 - a. What are centripetal and centrifugal forces?
 - b. A body of mass 20g is moving in a circular track of 2m with a velocity of 10m/s. Find the centripetal force acting on the body.

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END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : POLYTECHNIC **FIRST SEMESTER**

COURSE CODE : DPHT101**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)**

- a. What are fundamental units?
- b. Derive dimensions of kinetic energy.
- c. Define kinetic and potential energy.
- d. Define dot product of vectors.
- e. Describe Hooke's law for elasticity.
- f. Find time period of a simple pendulum of length 2m.
- g. Define simple harmonic motion.
- h. What are different scales to measure temperature?
- i. Plot liquid surface with concave meniscus.
- j. Find value of 100K on Celsius scale.

SECTION B

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

- a. Describe any one law of vector addition.
- b. Explain phenomenon of conservation of linear momentum.
- c. Explain Newton's second law of motion with example.
- d. Determine the torque acting on a body by a force of 10N if the radius of circular path is 2m.
- e. What are ultrasonic waves? Give two applications.
- f. Explain difference between linear and cubical expansions.
- g. Explain simple harmonic motion of pendulum.

SECTION C

Attempt any 3 questions.**(15 x 3 = 45)**

- Q. 3.**
 - a. Draw stress versus strain plot for an elastic material and show different regions in it.
 - b. Describe different modes of heat transfer.
- Q. 4.**
 - a. Describe different coefficients of friction with a diagram.
 - b. A body of mass 10g is placed on a table. If a force of 20N is required to move it, find the coefficient of static friction.
- Q. 5.**
 - a. Describe difference between conduction, convection and radiation.
 - b. Write practical applications of heat transfer.
- Q. 6.**
 - a. Explain different coefficients of expansion that are found in solids.
 - b. The length of a wire is 2m at 27deg. C. Find its length at 100deg. C, if the coefficient of linear expansion is 0.2/deg. C.
- Q. 7.**
 - a. What are centripetal and centrifugal forces?
 - b. A body of mass 20g is moving in a circular track of 2m with a velocity of 10m/s. Find the centripetal force acting on the body.

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END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : POLYTECHNIC

FIRST SEMESTER

COURSE CODE : DMAT103

COURSE TITLE : MATHEMATICS - I

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

SECTION A

Q. 1. Attempt all parts of this question.

(2×10 = 20)

a. The cofactors of a_{22} and a_{32} of the determinant $\begin{vmatrix} 5 & 0 & 7 \\ 8 & -6 & -4 \\ 2 & 3 & 9 \end{vmatrix}$, are

b. Fourth term of the G.P. 16, -24, 36, -54 . . . is.....

c. The value of $\frac{!10}{!8 !3}$ is =....

d. The value of $(\cos \theta + i \sin \theta)^n$ is =....

e. The total numbers of ways to select 5 players out of 8 are.....

f. The simplified value of $(1 + 3i)(4 - 3i)$ is

g. $\lim_{x \rightarrow 1} \frac{|x-1|}{x-1} = \dots$

h. If $A = \begin{bmatrix} 5 & 1 \\ 2 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 2 \\ 0 & 1 \end{bmatrix}$ then $AB = \dots$

i. The slope of the line inclined at the angle 90° , is =

j. A function $f(x)$ will be continuous at the point x_0 , if

SECTION B

Q. 2. Attempt any 5 parts of this questions.

(7×5 = 35)

a. Find the 4_{th} term in the expansion of $(x^2 + \frac{1}{x^2})^7$.

b. Show that the function $f(x) = x^3 + 3x + 5$ is continuous at the point $x = 0$ and obtain its derivative at $x = 0$.

c. Find the modulus and argument of the complex number $\frac{(2+i)(2+3i)}{(3+i)(3-i)}$.

d. Resolve $\frac{1}{x^3-8}$ in to partial fractions.

e. If the m_{th} term of an A.P. is $\frac{1}{n}$ and the n_{th} term of is $\frac{1}{m}$ then show that the mn_{th} term is 1.

f. Find the sum of the series $7+77+777+7777+ \dots$

g. Resolve the partial fraction $\frac{x}{x^2-3x+2}$.

SECTION C

Attempt any 3 questions.

(15×3 = 45)

Q. 3. a. Find the equation of the line which cuts both axes such that the sum of two intercepts is 5 and the line is passing through (0, 3). (8)

b. Test the continuity as well as differentiability the function $f(x) = |x|$ at $x = 0$. (7)

Q. 4. a. Show that the maximum value of $\left(\frac{1}{x}\right)^x = e^{1/e}$. (8)

b. Show that $\begin{vmatrix} y+z & x & y \\ z+x & z & x \\ x+y & y & z \end{vmatrix} = (x+y+z)(x-z)^2$. (7)

Q. 5. a. Using matrix method, solve the following system of equation: (8)

$$5x + 3y + z = 16,$$

$$2x + y + 3z = 19,$$

$$x + 2y + 4z = 25.$$

b. Find $\frac{dy}{dx}$ of function $y = (\tan x)^{\sec x}$. (7)

Q. 6. a. Find the inverse of the matrix $\begin{bmatrix} -1 & 2 & 5 \\ 2 & -3 & 1 \\ -1 & 1 & 1 \end{bmatrix}$. (8)

b. Examine the following function for continuity: (7)

$$f(x) = \begin{cases} \frac{\sin x}{x}, & x \neq 0 \\ 1, & x = 0. \end{cases}$$

Q. 7. a. If the curves $ax^2 + by^2 = 1$ and $a'x^2 + b'y^2 = 1$ intersect orthogonally, then prove that (8)

$$\frac{1}{b} - \frac{1}{b'} = \frac{1}{a} - \frac{1}{a'}.$$

b. Prove that $(1+i)^n + (1-i)^n = 2^{\left(\frac{n}{2}+1\right)} \cos \frac{n\pi}{4}$. (7)

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END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : POLYTECHNIC FIRST SEMESTER

COURSE CODE : DELT107

COURSE TITLE : ENGLISH LANGUAGE & COMMUNICATION SKILLS - I

[Time allotted: Two hours]

[Max. Marks: 50]

Note: Attempt all Sections & Questions.

SECTION A

(1 x 10 = 10)

Q.1. Attempt all questions.

a. Arrange the sentences in proper order:

- (i) Class yesterday attend the you did?
 (ii) I my successfully have work completed.

b. Insert articles where required:

- (i) He is boy who is studying in university.
 (ii) Ravi is one of best boys in class.

c. Write an antonym for the following :

- (i) modern (ii) rough (iii) separate (iv) stiff

d. Write a synonym for the following:

- (i) blame (ii) category (iii) common (iv) zeal

e. Write the past participle (3rd form) of the following verbs:

- (i) drive (ii) put (iii) do (iv) come

f. Correct the sentences :

- (i) He is my older brother. (ii) Every news are incorrect.

g. Fill in the blanks with question words :

- (i) _____ are you late today? (iii) _____ is your best friend?
 (ii) _____ do you want to do? (iv) _____ is the next class?

h. Find the parts of speech in following sentences:-

- (i) His pronunciation is not good. (ii) He played football beautifully.

i. Choose the correct word and fill in the blanks :-

- (i) _____ bags have been kept _____ by the teacher. (there, their)
 (ii) _____ class will begin in the next one _____. (hour, our)

j. Fill in the blanks with correct verb from the bracket:-

- (i) My classmates _____ playing football yesterday. (is, was, were, are)
 (ii) They _____ going to market tomorrow. (will be, was, will, can be)

SECTION (B)Q. 2. Attempt any 4 questions.

(4 x 5 = 20)

a. Change the sentences as directed:-

- (i) He will complete his work on time. (To Simple Present Tense)
 (ii) They are writing a letter to the teacher. (To Simple Past Tense)
 (iii) He has solved the question. (To Simple Future Tense)
 (iv) Ravi played very nicely. (To Present Continuous Tense)
 (v) His friend has given me this pen. (To Past Continuous Tense)
 (vi) They have been watching the movie for two hours. (To Present Perfect Tense)
 (vii) Where do you go for lunch? (To Simple Future Tense)
 (viii) Teachers will evaluate the answer sheets. (To Past Perfect Tense)
 (ix) I will come to the market in the evening. (To Past Continuous Tense)
 (x) All members attended the meeting. (To Future Continuous Tense)

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

- (i) a bone of contention (ii) once in a blue moon (iii) to keep an eye upon
(iv) at the eleventh hour (v) ups and downs

c. Change as directed:

- (i) My friend is present in the class today. (To Negative Sentence)
(ii) He participates in every game. (To Interrogative Sentence)
(iii) He is too weak to walk. (Remove too)
(iv) The bird is beautiful. (To Exclamatory Sentence)
(v) What a genius student he is! (To Assertive Sentence)
(vi) Eating is Reena lunch the. (Arrange the words to make a proper sentence)
(vii) Ram is the tallest boy in the class. (Rewrite the sentence using 'taller')
(viii) Meena is writing a book. (To Interrogative sentence)
(ix) It is a lovely day. (To Exclamatory sentence)
(x) Are dogs faithful animals? (To Assertive sentence)

d. Fill in the blanks with suitable Prepositions:

My friend lives __ Dehradun __ his two brothers. He is looking __ a job. I met him __ Monday and asked him __ his preparation. He looked __ me and said that he is planning __ visit Delhi __ the month of January. Then, he sat __ me and we talked __ the struggles of life. In his room, there was a clock __ the wall __ the bed. A small cat was sitting __ the bed. His younger brother came __ dinner. He entered __ the room and sat __ the chair. His brother is pursuing graduation __ a University. He is __ 20 years. He has been studying __ 2015. He always completes his works __ time.

e. Fill in the blanks with the correct modal verbs from the bracket:

- (i) He was in the field yesterday. He ____ participate in the game. (will, might, could, should)
(ii) This is a class. You ____ come on time. (must, can, should, could)
(iii) You ____ talk to your friends about the matter. (shall, could, should, would)
(iv) ____ I talk to you for five minutes? (can, may, must, should)
(v) ____ you like to have a cup of tea? (should, could, would, shall)
(vi) George has travelled a lot. He ____ speak four languages. (will, can, would, should)
(vii) ____ I borrow your book for today? (might, may, will, would)
(viii) The restaurant is always filled with people. It ____ be very good. (may, must, would, can)
(ix) ____ I leave the room? (can, will, may, might)
(x) ____ you help me please? (will, may, should, must)

f. Use the following homophones in the sentences of your own:-

- (i) rite, write (ii) caste, cast (iii) alter, altar (iv) site, sight (v) fair, fare

SECTION (C)

Attempt any 2 questions.

(10 x 2 = 20)

Q. 3. Write an application to the Dean of your college requesting him to issue a duplicate Mark Sheet.

Q. 4. Write an essay to **any one** the of the following (200-250 words) :-

- a. My first day in college b. English language lab c. Air pollution in cities

Q. 5. Read the following passage and answer the question below:

The New Year is the time for resolution. Mentally, at least most of us could compile formidable lists of 'do's and 'don'ts'. The same old favorites recur year in and year out with the children, do a thousand and one job about the house, be nice to people we don't like, drive carefully, and take the dog for a walk every day. Past experience has taught us that certain accomplishments are beyond attainment. If we remain deep rooted liars, it is only because we have so often experienced the frustration that results from failure. Most of us fail in our efforts at self-improvement because our schemes are too ambitious and we never have time to carry them out. We also make the fundamental error of announcing our resolution to everybody so that we look even more foolish when we slip back into our bad old ways. Aware of these pitfalls, this year I attempted to keep my resolution to myself. I limited myself to two modest ambitions, to do physical exercise every morning and to read more in the evening. An overnight party on New Year's Eve provided me with a good excuse for not carrying out either of these new resolutions on the first day of the year, but on the second, I applied myself assiduously to the task.

The daily exercise lasted only eleven minutes and I proposed to do them early in the morning before anyone had got up. The self-discipline required to drag myself out of bed eleven minutes earlier than usual was considerable. Nevertheless, I managed to creep down into the living room for two days before anyone found me out. After jumping about in the carpet and twisted the human frame into uncomfortable positions, I sat down at the breakfast table in an exhausted condition. It was this that betrayed me. The next morning the whole family trooped into watch the performance. That was really unsettling but I fended off the taunts and jibes of the family good humoredly and soon everybody got used to the idea. However, my enthusiasm reduced, the time I spent at exercises gradually diminished. Little by little the eleven minutes fell to zero. By January 10th I was back to where I had started from. I argued that if I spent less time exhausting myself at exercises in the morning, I would keep my mind fresh for reading when I got home from work. Resisting the hypnotizing effect of television, I sat in my room for a few evenings with my eyes glued to a book. One night, however, feeling cold and lonely, I went downstairs and sat in front of the television pretending to read. That proved to be my undoing, for I soon got back to the old bad habit of dozing off in front of the screen. I still haven't given up my resolution to do more reading. In fact, I have just bought a book entitled 'How to Read a Thousand Words a Minute'. Perhaps it will solve my problem, but I just have not had time to read it.

- a. Why do most of us fail in our efforts for self-improvement? (2)
- b. Why is it a basic mistake to announce our resolution to everybody? (2)
- c. Why did the writer not carry out his resolution on New Year's Day? (2)
- d. Why does the author buy a book? (2)
- e. Find out the words in the above passage which convey the similar meaning to the following: (2)
(i) overwhelming (ii) drawbacks (iii) decrease (iv) simple

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END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : POLYTECHNIC FIRST SEMESTER

COURSE CODE : DCHT102**COURSE TITLE : CHEMISTRY - 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. Define electrovalent bond.
- b. Define parts per million.
- c. Enlist few properties of solids
- d. What is slag?
- e. Define mole fraction.
- f. Write de-Broglie equation.
- g. Define functional group.
- h. Write electronic configuration of Ni (atomic number 28).
- i. Find out the azimuthal and magnetic quantum number when the principal quantum number is 4.
- j. How many sub-orbitals are present in f-orbital? How many electrons can be accommodated in them?

SECTION B

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

- a. What is hydrogen bonding? Explain effect of hydrogen bonding on properties of substances.
- b. Explain formation of O_2^+ molecule on basis of MOT.
- c. State Raoult's law and write mathematical equation for same.
- d. Define buffer and explain mechanism of action of basic buffer solution.
- e. A cricket ball weighing 100g is to be located within 0.1 Å. What is uncertainty in its velocity?
- f. How will you prepare Ethanoic acid and Ethanal from Ethanol?
- g. Calculate packing efficiency in simple cubic cell.

SECTION C

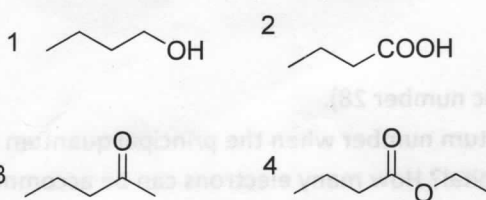
Attempt any 3 questions.

(15 x 3 = 45)

- Q. 3.**
 - a. What are point defects? Explain vacancy and interstitial defects
 - b. i) Calculate number of atoms per unit cell in face centered cubic cell.
ii) The length of the unit cell edge of a body centered metal crystal is 375 pm. Calculate the radius of an atom of a metal.
- Q. 4.**
 - a. Explain vapour pressure curve for ideal and non-ideal solutions.
 - b. Explain various processes in concentration of ores.
- Q. 5.**
 - a. Discuss trend of density and oxidation state for group I A & II A elements.
 - b. Discuss the trend of ionic conductance, lattice and hydration energy for group I A elements.

- Q. 6.** a. What is doping? What are various types of semi-conductors?
 b. i) Calculate the amount of benzoic acid (molecular weight 122) required to prepare 2.5 litre, 0.15 M solution in Methanol.
 ii) Calculate molality of 2.5g Ethanoic acid (molecular weight 60) in 75g of Benzene.

- Q. 7.** a. Draw structure of following compounds
 i. 2-Methylhexane
 ii. 2-Methylhex-2-ene
 iii. Hexanal
 iv. Butanoic acid
 b. Write IUPAC name of following compounds



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END SEMESTER EXAMINATIONS, JUNE-2018

PROGRAM : POLYTECHNIC

SECOND SEMESTER

COURSE CODE : DMAT113

COURSE TITLE : MATHEMATICS - II

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections and Questions.

SECTION A

Q.1. Attempt all questions.

10 × 2 = 20

- a. $\int \sec x \tan x \, dx = \dots\dots\dots$
- b. Value of $\int \frac{1}{\sqrt{x}} \sin \sqrt{x} \, dx = \dots\dots\dots$
- c. Value of $(\hat{i} + 2\hat{j} + 3\hat{k}) \times (2\hat{i} + \hat{j} - \hat{k}) = \dots\dots\dots$
- d. The value of $\vec{a} \times (\vec{b} \times \vec{c}) + \vec{b} \times (\vec{c} \times \vec{a}) + \vec{c} \times (\vec{a} \times \vec{b}) = \dots\dots\dots$
- e. If $|\vec{a} \times \vec{b}| = \vec{a} \cdot \vec{b}$, then the angle between vectors $\vec{a}$ and $\vec{b}$ is $\dots\dots\dots$
- f. If $f(x, y)$ be a homogeneous function of degree n , then Euler's theorem states that $\dots\dots\dots$
- g. If $\theta = t^n e^{-\frac{r^2}{4t}}$, then $\frac{\partial \theta}{\partial r} = \dots\dots\dots$
- h. The order and degree of the differential equation $\frac{d^2 y}{dx^2} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$ are $\dots\dots\dots$
- i. A differential equation $M \, dx + N \, dy = 0$, will be exact if $\dots\dots\dots$
- j. The integrating factor of the differential equation $x \frac{dy}{dx} + P(x) y = Q(x)$ is $\dots\dots\dots$

SECTION B

Q.2. Attempt any 5 questions.

5 × 7 = 35

- a. Evaluate $\int \frac{x \sin^{-1} x^2}{\sqrt{1-x^4}} \, dx$.
- b. Find the value of the integral $\int \sqrt{1 + \sin 2x} \, dx$.
- c. Find the value of $\int \frac{\sin \log x \, dx}{x}$.
- d. Discuss the maxima and minima of $f(x, y) = x^2 + y^2 + 6x + 12$.
- e. Determine the value of λ such that $\vec{a} = (\hat{i} + \hat{j} + \hat{k})$, $\vec{b} = (2\hat{i} - 4\hat{k})$ and $\vec{c} = (\hat{i} + \lambda\hat{j} + 3\hat{k})$ are coplanar.
- f. If $u = \sin^{-1}\left(\frac{x}{y}\right) + \tan^{-1}\left(\frac{y}{x}\right)$ then prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$.
- g. Expand $e^x \cos y$ about the point $\left(1, \frac{\pi}{4}\right)$ by Taylor theorem.

SECTION C

Attempt **any 3** questions.

3 × 15 = 45

- Q.3.** a. Solve the differential equation $x dy - y dx = \sqrt{x^2 - y^2}$. (8)
- b. A particle acted on by constant forces $2\hat{i} + \hat{j} - \hat{k}$, $\hat{i} - 2\hat{j} + 3\hat{k}$ and $3\hat{i} + \hat{j} + 5\hat{k}$, is displaced from the point $\hat{i} + 2\hat{j} + 3\hat{k}$ to the point $6\hat{i} + 3\hat{j} + \hat{k}$. Find work done. (7)
- Q.4.** a. If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, show that $\left(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z}\right)^2 u = -\frac{9}{(x+y+z)^2}$. (8)
- b. Find the value of the integral $\int_0^{\frac{\pi}{2}} \log \cos x \, dx$. (7)
- Q.5.** a. Prove that $[\vec{a} + \vec{b}, \vec{b} + \vec{c}, \vec{c} + \vec{a}] = 2\vec{a} \cdot \vec{b} \times \vec{c}$. (7)
- b. Expand $f(x, y) = e^{xy}$ about the point $(1, 1)$. Hence compute $f(1.1, 0.9)$. (7)
- Q.6.** a. Examine $f(x, y) = x^3 + y^3 - 3xy$ for maxima and minima. (8)
- b. Expand $f(x, y) = \tan^{-1}\left(\frac{y}{x}\right)$ in powers of $(x - 1, y - 1)$. Hence compute $f(1.1, 0.9)$. (7)
- Q.7.** a. Solve $\int \sec^3 x \, dx$. (8)
- b. Solve the differential equation $x \frac{dy}{dx} - y = (x - 1)e^x$. (7)

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END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: POLYTECHNIC

SECOND SEMESTER

COURSE CODE : DPHT111

COURSE TITLE : PHYSICS-II

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections & Questions.

SECTION AQ. 1. Attempt all questions.

(2 x 10 = 20)

- Draw convex, plano-convex and double-convex lenses.
- Calculate focal length of a convex lens with a power of 2 Dioptre.
- Draw ray diagram for image formation by a convex lens when object is at infinity.
- Write formula for electric potential produced by a point charge Q at a distance r from it.
- Give practical applications of lenses.
- Briefly describe Kirchhoff's voltage current law.
- Draw band structures for insulators and semiconductors.
- What instrument is used to measure voltage in circuits?
- Draw diagram for spontaneous emission
- What are common applications of LASER?

SECTION BQ. 2. Attempt any 5 questions.

(7 x 5 = 35)

- Describe laws of Refraction with diagram. Also describe real and apparent depth.
- Describe total internal reflection and the necessary condition to achieve it.
- Determine the number of electrons in a charge of 20 coulomb.
- Explain KCL and KVL using circuit diagrams.
- Write a short note on n-type semiconductors.
- Explain the phenomenon of photoelectric effect.
- Find the work done by a charge of 20C when it moves from a point of 10V to another point of 20V in an electric field.

SECTION CAttempt any 3 questions.

(15 x 3 = 45)

- Two plane mirrors are inclined at 20 degree. Find the number of images formed by the arrangement. What happens when the angle is changed to 40 degree?
 - Describe main differences between the phenomenon of reflection and refraction shown by mirrors and lenses.
- Describe Biot-Savart's law to find magnetic field around a current carrying wire.
 - Describe variation of magnetic field along the axis of a current carrying loop.
- Explain Coulomb's law of interaction between electrostatic charges.
 - Three charges of 10C, 20C and -15 C are placed in a line. Find the force acting on -15C charge if it is placed in the middle position.
- Explain the phenomenon used in generating electricity in solar panels.
 - Give practical applications of LASER in medical and industrial applications.
- Explain the working principle of Wheatstone bridge.
 - Find the equivalent resistance when three resistances (3 ohm, 30 ohm, 6 ohm) are connected in series. What happens when they are connected in parallel arrangement?

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END SEMESTER EXAMINATION, JUNE - 2018
PROGRAM : POLYTECHNIC SECOND SEMESTER

COURSE CODE : DCHT112**COURSE TITLE : CHEMISTRY-II****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.

SECTION A

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

- a. Give examples of negatively charged ligands.
- b. What is the unit of rate constant for first order reaction?
- c. Write down the monomeric units of natural rubber.
- d. What can be predicted about reaction from sign of ΔG ?
- e. Write the equation for half-life of a second order reaction.
- f. Define calorific value.
- g. Give statements of Second Law of thermodynamics.
- h. What is enthalpy?
- i. Write the equation to calculate the calorific value of a fuel.
- j. Define electrolysis.

SECTION B

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

- a. Derive the equation for rate constant of the given chemical reaction.
 - i. $A \rightarrow \text{Product}$
 - ii. $(a-x) \quad x$
- b. Write down the classification of fuels.
- c. Explain effect of temperature on rate of reaction.
- d. Write about vulcanization of rubber.
- e. Explain stereo-isomerism in co-ordination compounds with help of suitable examples.
- f. Explain classification of polymers.
- g. Explain working of lead storage batteries.

SECTION C

Attempt any 3 questions**(15 X 3 = 45)****Q.3. a. Derive integrated equation for rate constant of second order reaction with two reactants.****7.5****b. Calculate the half-life of a first order reaction when the rate constant is 600 sec^{-1} .****7.5****Q.4. a. Derive relationship between C_p and C_v for gaseous reactants.****7.5****b. Explain high calorific value and low calorific value and give equation for theoretical calculations of calorific value.****7.5****Q.5. Write down the hybridization in the following coordination compounds****a. $[\text{Ni}(\text{CO})_4]$ (Ni=28)****7.5****b. $[\text{Fe}(\text{CN})_6]^{3-}$ (Fe=26)****7.5**

Q.6.

a. Give the IUPAC name of the following compounds:-

- i. $\text{Na}_2[\text{Pt}(\text{CN})\text{Cl}_5]$
- ii. $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
- iii. $[\text{Pt}(\text{NH}_3)_6]\text{Cl}_4$
- iv. $\text{K}[\text{Ag}(\text{CN})_2]$
- v. $\text{K}_3[\text{Fe}(\text{CN})_6]$

b. Calculate the gross and net calorific values of a coal sample containing 82.5 Carbon, 4.5 % Sulphur, 7% nitrogen, 5.5 % hydrogen and 6.4 % oxygen. Latent heat of steam is 587cal/g.

Q.7. a. Explain Faraday's second law of electrolysis.

b. Electric current was passed between platinum electrodes through solution of silver nitrate and copper sulphate, the solutions being placed in series. If 5gm of silver was deposited calculate amount of copper deposited (Equivalent weight of $\text{Cu}=31.5$ and $\text{Ag}=108$).

c. Explain following terms:

- i. Monomer
- ii. Degree of polymerization
- iii. Polymerization.

SECTION B

SECTION C

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END SEMESTER EXAMINATIONS, JULY-2018
PROGRAM : POLYTECHNIC **THIRD SEMESTER**

COURSE CODE : DMAT201**COURSE TITLE : APPLIED MATHEMATICS****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.

SECTION A

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

- a. If $u = u(x)$ and $v = v(x)$, then $D^n(uv) = ?$
- b. Determine the value of x , for which, the matrix $\begin{bmatrix} 1 & 1-x \\ x-1 & -1 \end{bmatrix}$ has rank 2.
- c. State Cayley-Hamilton theorem for matrices.
- d. Write the n_{th} derivative of $\cos(ax - b)$.
- e. If A be a non-singular matrix, write its characteristic equation.
- f. Find the value of $\frac{1}{D^2+a^2} \cos ax$, where a is a non-zero constant.
- g. Convert $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \sin(\log x^2)$ in to a linear differential equation with constant coefficients.
- h. Find the Laplace Transforms of $(\cos at)/t$.
- i. Write Euler's coefficients for Fourier series.
- j. Find Inverse Laplace Transform of s^{-6} .

SECTION B

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

- a. Find the n_{th} differential coefficient of $\sin 2x \sin 3x$.
- b. Obtain the Fourier series for $f(x) = \begin{cases} -\pi, & -\pi < x < 0, \\ x, & 0 < x < \pi. \end{cases}$ Hence Deduce that:
$$\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{\pi^2}{8}.$$
- c. Change the order of the integration $\int_0^1 \int_{x^2}^x (x^2 + y^2)^{-1/2} dy dx$. Hence evaluate the integral.
- d. Solve the differential equation $(D - 2)^2 y = 8(e^{2x} + \sin 2x + x^2)$.
- e. Investigate the values of λ and μ so that equations:
 $2x + 3y + 5z = 9; 7x + 3y - 2z = 8; 2x + 3y + \lambda z = \mu$, have:
 - i. no-solution
 - ii. a unique-solution
 - iii. an infinite no. of solutions.
- f. If $y = x \log(1 + x)$, prove that $y_n = [(-1)^n(n-2)! (x+n)]/(1+x)^n$.
- g. Use convolution theorem to evaluate $L^{-1} \left\{ \frac{s}{(s^2+a^2)^2} \right\}$.

SECTION C

Attempt any 3 questions.

(15 × 3 = 45)

Q. 3. a. Evaluate $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y} dx dy$. (7.5)

b. If $y = \sin(m \sin^{-1} x)$, show that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} + (m^2 - n^2)y_n = 0$. (7.5)

Q. 4. a. Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 5 & 7 \end{bmatrix}$ by reducing to canonical (normal) form. (7.5)

b. Solve the following differential equation by method of variation of parameters: (7.5)

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

Q. 5. a. Verify Cayley Hamilton Theorem for the matrix $\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$. Hence find its inverse. (7.5)

b. Find the Laplace Transform of the function $(\cos at - \cos bt)/t$. (7.5)

Q. 6. a. If $L^{-1}\{F(s)\} = f(t)$, show that $L^{-1}\{F(s - a)\} = e^{at}f(t)$. (7.5)

b. Evaluate $\int \int \int (x + y + z) dx dy dz$ over the region $R: 0 \leq x \leq 1, 0 \leq y \leq x^2, 0 \leq z \leq x + y$. (7.5)

Q. 7. a. Using elementary row transformation method find the inverse of the matrix $\begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$. (7.5)

b. Evaluate $\int_0^a \int_0^{bx/a} x dy dx$. (7.5)

Enrol. No. S R H U

Regn. No. D D

END SEMESTER EXAMINATIONS, JUNE - 2018
PROGRAM: POLYTECHNIC FOURTH SEMESTER

COURSE CODE : DTCT207**COURSE TITLE : TECHNICAL COMMUNICATION****[Time allotted: Three hours]****[Max. Marks: 50]****Note:** Attempt all Sections & Questions.

SECTION A

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

- a. What is a Precis? What should be the length of a Precis?
- b. Define Technical Communication.
- c. What is the difference between a Resume' and Curriculum Vitae?
- d. What do you understand by the term 'Jargon'? Give two examples.
- e. Give two disadvantages of e-mails.
- f. Why do we write a Notice?
- g. Fill in the blanks :
 - (i) We scored as many runs as _____. (they/them)
 - (ii) Let _____ help him. (us/we)
- h. Make sentences with the following words : here, hair
- i. Write the opposites of :
 - (i) Trained (ii) dark (iii) multiply (iv) educated
- j. Complete the sentences :
 - (i) We should
 - (ii) Why is.....

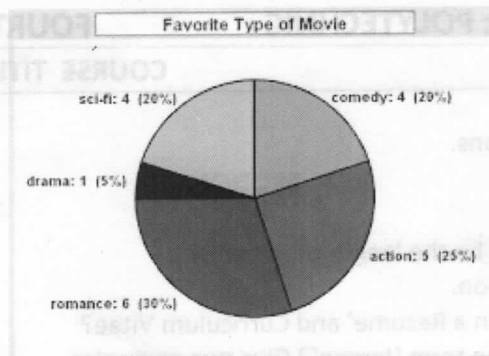
SECTION B

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

- a. **You are the Activity Coordinator of your College. Write a Notice informing all the students about a Student Trip to Nainital being organized by the HSET students. Give all the required details.**
- b. **Explain the following :**
 - i. Difference between Technical and General Communication
 - ii. Features of Technical Communication
- c. **Correct the following sentences :-**
 - i) Why you have not did your work? (vi) Can you return back my book tomorrow?
 - ii) Mumbai is more rich then any other city in India. (vii) The boy are not eat their lunch properly.
 - iii) Is this pen are yours? (viii) She is suffering with Flu.
 - iv) Ram and Shyam is write a letter. (ix) The poet and philosopher are dead.
 - v) The Arabian Nights are a good book. (x) I like to listen music.
- d. **The Manager of your Company has invited you to his son's birthday party. Write an e-mail in response to the invitation, informing him that you will not be able to attend the Program.**
- e. **Write a Cover Letter on the basis of the following advertisement in 'The Hindustan Times' dated 5th June 2018**

DPL Enterprises Ltd. invites applications from Diploma Holders in Engineering for the post of Assistant Engineers. The candidates must have good communication skills as well as in-depth subject knowledge of their branch. Freshers may also apply. Send your Resume to the HRD Manager at Plot No. 125, Sector 3, Noida 201301 by 25th June'18.

f. Write a Report based on the given Pie Chart :



Source : www.moviefever.com

SECTION C

Attempt any 2 questions.

(10 x 2 = 20)

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

- i) Popularity of Fast Food Restaurants – Merits and Demerits
- ii) Telling Lies – Causes and Effects

Q. 4. Assuming that you are a Diploma Holder in Engineering from SRHU, draft your complete Resume'.

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

Teaching is the noblest of all professions. A teacher has a sacred duty to perform. It is he on whom rests the responsibility of changing the character of young children. Apart from developing their intellect, he can inculcate in them qualities of good citizenship, remaining neat and clean, talking decently and sitting properly. These virtues are not easy to be imbibed. Only he who himself leads a life of simplicity, purity and rigid discipline can successfully cultivate these habits in his pupils.

Besides, a teacher always remains young. He may grow old in age, but not otherwise. Perpetual contact with budding youth keeps him happy and cheerful. There are moments when domestic worries weigh heavily on his mind, but the delightful company of innocent children makes him overcome his transient moods of despair.

- a. Why is Teaching called a noble profession? Give your views. (1)
- b. Name any four qualities that a teacher teaches his/her students. (2)
- c. What do the following words mean? (2)
 - (i) sacred (ii) virtues (iii) perpetual (iv) domestic
- d. Suggest a suitable Title for the passage and write a Precis of 60 words on it. (5)

Enrol. No. S R H U

Regn. No. D D

END SEMESTER EXAMINATIONS, JUNE - 2018**PROGRAM: POLYTECHNIC (All Branches) SIXTH SEMESTER****COURSE CODE : DMT307****COURSE TITLE : INDUSTRIAL MANAGEMENT & ENTREPRENEURSHIP****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt **all** questions.**(2 x 10 = 20)**

- What is management?
- What is NPD?
- Write any two differences between product and service.
- What do you understand by EDD Rule?
- Write two examples of intermittent flow system.
- What is dispatching?
- In ABC analysis C class items are _____
- What do you understand by make span time?
- Write the name of various purchase system?
- What is PPC?

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

- What are the various characteristics of management? Explain any one in detail?
- Explain the function of manager.
- Draw graph showing various cost involved in inventory? Define EOQ on the basis of figure?
- Explain the role of supervisor.
- What is Autocratic and democratic leadership style?
- Explain the objectives of management.
- Explain in brief how companies increase demand?

SECTION CAttempt **any 3** questions.**(15 x 3 = 45)**

- Explain in details continuous flow type Production system in detail with example.
 - Explain the motivation with its model.

- Explain entrepreneurial Process.
 - What do you understand by PLC ?

- Draw a Gantt chart for following data :

Job	1	2	3	4
M/C 1	3	1	4	2
M/C 2	5	3	5	7

- A company purchases 3600 units of CRT a year at Rs 65 each. Ordering costs are Rs 31 and annual carrying cost are 20% of purchase price. Compute EOQ.

- What are the various roles of a supervisor? How you will supervise an old worker?

- Explain in detail about various elements of PPC.
