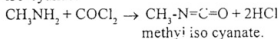


(REVISED COURSE)**Q.P. Code : 1049****(2 Hours)****[Total Marks : 60****N.B. : (1) Question No. 1 is Compulsory.****(2) Attempt any three from remaining fix questions****(3) All questions carry equal marks.****(4) Figures to the right indicate full marks.****(5) Atomic weights : H=1, C=12, S=32, N=14, O=16, Cl=35.5, Ba=137.3, Na=23, Mg=24.****1. Answer any five from the following :-****15****(a) What are propellants ? State important characteristics of good propellant.****(b) Compare Galvanizing and Tinning.****(c) Give composition, properties and uses of Wood's Metal.****(d) Write a note on 'Green Reagent'.****(e) Define terms :-****(i) Composite material (ii) Matrix phase (iii) Dispersed phase.****(f) List three main constituents of Varnish & give functions of each.****(g) A coal sample was subjected to ultimate analysis :****1.6 gm of coal on combustion in a Bomb calorimeter gave 0.47 gm of BaSO₄
Calculate % of sulphur in the coal sample.****2. (a) What is dry corrosion ? Explain with example how nature of oxidised product affect the rate of corrosion. 6****(b) What is cracking ? Explain fixed bed catalytic cracking with diagram. 5****(c) Calculate percentage atom economy for the following reaction w.r. to methyl iso-cyanate 4****3. (a) A gaseous fuel has the following composition by volume. 6****CH₄ = 35% , C₂H₆ = 5% , CO = 15% , H₂ = 40% N₂ = 1 water vapour = 4%****Calculate volume & weight of air required for complete combustion of 1m³ of fuel
[mol.wt of air = 28.94]****(b) Explain conventional & green synthesis of adipic acid. Mention the green chemistry principle involved. 5****(c) How the rate of corrosion influenced by following factors. 4****(i) pH of medium****(ii) Over voltage.****4. (a) What is powder Metallurgy ? How are metal powders prepared using. 6****(i) Atomization****(ii) Chemical reduction****(b) What is cathodic protection ? Explain Impressed current method of corrosion control. 5****TURN OVER**

- (c) Write a note on 'Sandwich panel' type layered composites. 4
5. (a) What is Bio-diesel ? Explain the trans esterification method for its synthesis. 6
Mention advantages of biodiesel as fuel.
- (b) What are alloys ? Explain any four purposes of making alloys with suitable example. 5
- (c) Discuss the physical factors influencing adhesive action. 4
6. (a) Write a note on differential aeration corrosion. 5
- (b) 2.5 gm of air dried coal sample was taken in a silica crucible , after heating it in an electric oven at 110°C for 1hr the residue was weighed 2.41 gm. The residue was heated in Silica crucible covered with vented lid at a temperature $925 \pm 25^{\circ}\text{C}$ for exactly 7 minutes. After cooling the weight of residue was found to contain 1.98 gm. The residue was then ignited to a constant weight of 0.246 gm. Report the results of above analysis. 5
- (c) Explain the effects of following elements on alloying :- 5
- (i) Nickel
 - (ii) Chromium
 - (iii) Cobalt
 - (iv) Molybdenum
 - (v) Carbon.
-

(REVISED COURSE)
(2 Hours)

QP Code : 1062

[Total Marks : 40]

N.B. (1) Question no.1 is Compulsory.

(2) Attempt any three out of the remaining FIVE questions

(3) Figures to the right indicate full marks

(4) Answers to all the sub questions should be attempted and grouped together

Q.1a. Answer any TWO of the following:

(3 x 2 = 06M)

- What steps should be taken to ensure good listening?
- How is clarity achieved in business correspondence?
- Write short note on medium with an example.
- Draw the layout of semi block form .State the punctuation applied in it.

1b. Identify the sender, message, medium and receiver in the following situations:

(04M)

- Presenting budget in the Parliament
- Announcement of man of the match after a cricket match

Q2. i. Explain semantic barriers

(02 M)

ii. Write short note on Body Language

(04 M)

iii. Complaints are blessings to the business man. Discuss.

(02 M)

iv. Define the terms: Barometer ; Laptop

(02 M)

Q3a. Maruti Merchants, Mumbai had ordered 70 bags of rice and 50 bags of Wheat from Motiwala Bros, Nasik. Write a letter of complaint for the shortage in 40 rice bags and 10 wheat bags. Give full details of the shortage and claim compensation. (Use complete block form)

(05 M)

3b. Do as directed:

- You should first open the valve of the pipe. (Convert into an imperative sentence) (01 M)
- Mention the colours in which each of these is mentioned: (02 M)
 - Caution
 - Warning
 - Danger
 - Note

3c. Write short note on signature block with an example.

(02 M)

4a. Match the following:

(02 M)

- | | |
|----------------------------|------------------------|
| i. Can cause burns | A) Semi block form |
| ii. Open punctuation | B) Warning |
| iii. Can lead to data loss | C) Complete Block form |
| iv. Indented Para | D) Caution |

4b. State whether the following statements are True or False

(02M)

- i. The quality of communication is a source of motivation and can improve human relations.
- ii. There could be no semantic barriers if all people spoke the same language.
- iii. The eyes have one language everywhere.
- iv. Socio psychological barriers can be overcome only by one's own efforts.

4c. Your housing society has 100 flats. In the General Body Meeting it has been decided to colour the buildings. As the Secretary of the society write a letter of enquiry and ask for quotation from a local consultant.

(Use Semi block form)

(05M)

5a. you are supposed to appear for a viva. Highlight three aspects of oral communication that you will bear in mind while answering.

(03 M)

5b. Write short note on vertical communication.

(03 M)

5c. Dr. Bose booked a flight ticket to attend a conference. On the day of departure he went on time to the airport as was mentioned in the ticket. , once he reached the counter he was told that the flight was rescheduled one hour early, and the passengers were informed through SMS which he did not receive because of poor network service.

- a. Identify the barriers in the given situation.

(02 M)

- b. How can such situation be avoided.

(02 M)

6a. Read the following passage and answer the question: given below:

Alaska pipeline starts at the frozen edge of the Arctic Ocean. It stretches southward across the largest and northernmost state in the United States, ending at a remote ice-free seaport village nearly 800 miles from where it begins. It is massive in size and extremely complicated to operate. The steel pipe crosses windswept plains and endless miles of delicate tundra that tops the frozen ground. It weaves through crooked canyons, climbs sheer mountains, plunges over rocky crags, makes its way through thick forests, and passes over or under hundreds of rivers and streams. The pipe is 4 feet in diameter, and up to 2 million barrels (or 84 million gallons) of crude oil can be pumped through it daily. Resting on H-shaped steel racks called "bents," long sections of the pipeline follow a zigzag course high above the frozen earth. Other long sections drop out of sight beneath spongy or rocky ground and return to the surface later on. The pattern of the pipeline's up-and-down route is determined by the often harsh demands of the arctic and subarctic climate, the tortuous lay of the land, and the varied compositions of soil, rock, or permafrost (permanently frozen ground). A little more than half of the pipeline is elevated above the

ground. The remainder is buried anywhere from 3 to 12 feet, depending largely upon the type of terrain and the properties of the soil. One of the largest in the world, the pipeline cost approximately \$8 billion and is by far the biggest and most expensive construction project ever undertaken by private industry. In fact, no single business could raise that much money, so 8 major oil companies formed a consortium in order to share the costs. Each company controlled oil rights and paid into the pipeline-construction fund according to the size of its holdings. Today, despite enormous problems of climate, supply shortages, equipment breakdowns, labor disagreements, treacherous terrain, a certain amount of mismanagement, and even theft, the Alaska pipeline has been completed and is operating.

1. The passage primarily discusses the pipeline's (01M)
 1. operating costs
 2. employees
 3. consumers
 4. construction
2. The word "it" in line 3 refers to (01M)
 1. pipeline
 2. ocean
 3. state
 4. village
3. According to the passage, 84 million gallons of oil can travel through the pipeline each (01M)
 1. day
 2. week
 3. month
 4. year
4. The author mentions all of the following as important in determining the pipeline's route EXCEPT the (01M)
 1. climate
 2. lay of the land itself
 3. local vegetation
 4. kind of soil and rock

[TURN OVER]

5. The word "undertaken" is closest in meaning to

(01M)

1. removed
2. selected
3. transported
4. attempted

6. Which of the following determined what percentage of the construction costs each member of the consortium would pay?

(01M)

1. How much oil field land each company owned
2. How long each company had owned land in the oil fields
3. How many people worked for each company
4. How many oil wells were located on the company's land

6 b. Distinguish between oral and written communication.

(02M)

6 c. Write one word for:

(02M)

- i. One who collects postage stamps; ii. A person in charge of a museum
- iii. An instrument for detecting earthquakes; iv. A number of disorderly people

Duration: 03 Hours

Max. Marks: 60

N.B.

1. Question No.1 is compulsory. Solve any three out of remaining five questions.
2. Use your own judgment for any unspecified dimension.
3. Use first angle method only.
4. Retain all construction lines.
5. Figures to the right indicate full marks.

Q.1.a)

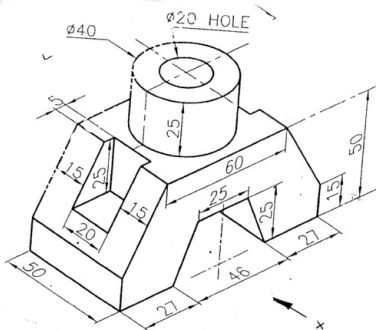
A circle of 60mm diameter rolls on a straight line without slipping. Draw the locus of a point 'P' for complete revolution of the circle. The point 'P' is 38mm above the straight line and towards the right of vertical center line of the circle.

06

Q.1. b)

Figure 1 shows pictorial view of an object. Draw

- | | |
|--------------------------|----|
| i) Front view | 04 |
| ii) Top view | 04 |
| iii) Dimension the views | 01 |



All dimensions are in mm

Figure no. 1

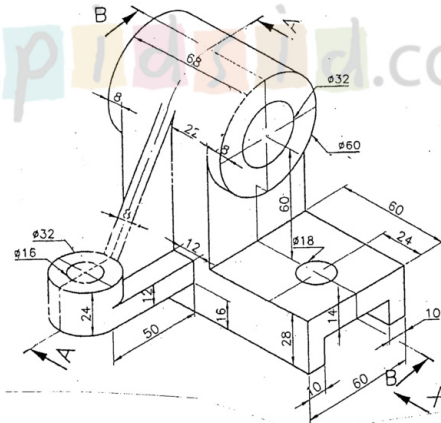
Q.2.

A pentagonal prism of 28mm. edge of base and 60 mm length of axis has a 28mm. edge on the H.P. The axis is inclined at 35° to H.P. and 45° to V.P. Draw the projections.

15

Q.3. Figure 2 shows pictorial view of an object. Draw

- | | | |
|------|--|---|
| i) | Sectional Front View along A-A. | 5 |
| ii) | Sectional Left hand side view along B-B. | 5 |
| iii) | Top View | 4 |
| | Dimension the views (any four) | 1 |



All dimensions are in mm
Figure 2

Q.4. a)

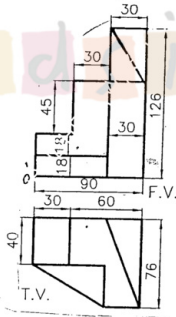
The distance between the end projectors of a line AB is 60mm. The end A is 25mm above H.P. and 45mm in front of V.P., while the other end B is 60mm above H.P. and 15mm in front of V.P. Draw projections and find the true length and also inclination of the line with H.P. and V.P.

09

Q.4 b).

Figure 3 shows two views of an object. Draw isometric view of the object.

06



All dimensions are in mm.

Figure 3

Q.No.5

A square pyramid of base side 25mm and altitude 50mm rests on its base on the HP with two sides of the base parallel to VP. It is cut by a plane bisecting the axis and inclined at 30° to the base. Draw front view, sectional top view and true shape of the section. Also draw the development of the lower part of the pyramid.

15

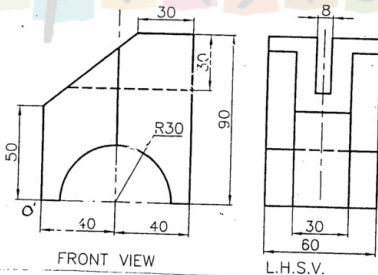
Q.No.6 a)

A cylinder with 50mm diameter of its base and axis measuring 70mm has its axis inclined to 30° to VP. Draw the projections of the cylinder when the solid is resting on one of the points of the circumference of the base on VP.

6

Q.No.6 b).

Draw isometric projection using natural scale. Refer Figure No.4. 9



All dimensions are in mm

Figure no.4

(REVISED COURSE)

QP Code : 1037

(3 Hours)

[Total Marks : 80]

N.B. (1) Question no. 1 is compulsory.

(2) Solve any three questions from the remaining six questions

(3) Each questions carry equal marks.

1. (a) Evaluate $\int_0^{\infty} \frac{x^4}{4^x} dx$ 3
- (b) Find P.I. of $(D^2 - 4D + 4)y = e^{2x} \cos 2x$ 3
- (c) Show that $\nabla = 1 - E^{-1}$ 3
- (d) Evaluate $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dy dx}{1+x^2+y^2}$ 3
- (e) Solve $\left(1 + e^{\frac{x}{y}}\right) dx + e^{\frac{x}{y}} \left(1 - \frac{x}{y}\right) dy = 0$ 4
- (f) Evaluate $\int_0^{\infty} \int_0^{\infty} e^{-(x^2+y^2)} dx dy$ by changing to polar co-ordinates 4
2. (a) Solve $y^4 dx = (x^{-\frac{3}{4}} - y^3 x) dy$ 6
- (b) Change the order of integration and evaluate $\int_0^1 \int_x^{\frac{1}{2}} \frac{y}{(1+xy)^2(1+y^2)} dy dx$ 6
- (c) (1) P.T. $\int_0^{\infty} \frac{x^{m-1}}{(a+bx)^{m+n}} dx = \frac{1}{a^n b^n} \beta(m, n)$ 4
- (2) P.T. $\int_0^{\infty} \frac{\log(i+ax^2)}{x^2} dx = \pi\sqrt{a}$, where $a > 0$ 4
3. (a) Evaluate $\int_0^{\log 2} \int_0^x \int_0^{x-\log y} e^{x+y+z} dz dy dx$ 6
- (b) Find the area bounded between the parabola $x^2 = 4ay$ and $x^2 = -4a(y-2a)$ 6

[TURN OVER]

- (c) Solve by the method of variation of parameters

8

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

4. (a) Find the length of the cardioid
- $r = a(1 - \cos \theta)$
- lying outside the circle
- $r = a \cos \theta$

6

$$(b) \text{ Solve } \frac{d^2y}{dx^2} - 4 \frac{dy}{dx} + 3y = 2xe^{3x} + 3e^x \cos 2x$$

6

- (c) Using R.K. Method of fourth order, solve.

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2} \text{ given } y(0) = 1 \text{ at } x = 0.2, 0.4$$

8

5. (a) Solve
- $x \sin x \, dy + (xycos x - y \sin x - 2)dx = 0$

$$(b) \text{ Solve } \frac{dy}{dx} = 2 + \sqrt{xy} \text{ with } x_0 = 1.2, y_0 = 1.6403 \text{ by modified Euler's method, for } x = 1.4 \text{ correct to 4-decimal places, (taking } h = 0.2)$$

6

6

- (c) Evaluate
- $\int_0^6 x f(x) dx$
- by

(a) Trapezoidal rule

(b) Simpson's $1/3^{rd}$ rule

using the following table

8

x	0	1	2	3	4	5	6
f(x)	0.146	0.161	0.176	0.190	0.204	0.217	0.230

6. (a) The charge Q on the plate of a condenser of Capacity C charged through a resistance R by a steady voltage V satisfies the differential equation

6

$$R \frac{dQ}{dt} + \frac{Q}{C} = V, \text{ If } Q = 0 \text{ at } t = 0, \text{ show that } i = \frac{V}{R} e^{-\frac{t}{RC}} \therefore i = \frac{dQ}{dt}$$

- (b) Evaluate
- $\iint_A x^2 dx dy$
- where A is the region in the first quadrant bounded by the hyperbola
- $xy = 16$
- and the lines
- $y = x, y = 0$
- and
- $x = 8$
- .

6

- (c) Find the volume of the tetrahedron bounded by the planes,
- $x = 0, y = 0, z = 0$
- and
- $x + y + z = a$

8

Q.P. Code : 1044

(REVISED COURSE)

(2 Hours)

[Total Marks : 60]

N.B.: (1) Question No.1 is compulsory.

(2) Attempt any three questions from Q.2 to Q.6.

(3) Use suitable data wherever required.

(4) Figures to the right indicate full marks.

1. Attempt any five of the following :-

15

- (a) Comment on colours in a soap film in sunlight.
- (b) What is Rayleigh's criterion of resolution ? Define resolving power of a grating.
- (c) Calculate V number for an optical fiber having numerical aperture 0.25 and core diameter $20\text{ }\mu\text{m}$ if it is operated at $1.55\text{ }\mu\text{m}$.
- (d) Compare light from ordinary source with laser light.
- (e) How phase difference between two signals is measured using CRO ?
- (f) What are the properties of matter waves ?
- (g) A superconductor has a critical temperature 3.7°K at zero magnetic field. At 0°K the critical magnetic field is 0.0306 Tesla . What is the critical magnetic field at temperature 2.0°K ?

2. (a) Show that the diameter of Newton's n^{th} dark ring is proportional to square root of ring number. In Newton's rings experiment the diameter of 5^{th} dark ring was 0.336 cm and that of 15^{th} dark ring was 0.590 cm . Calculate the radius of curvature of plano-convex lens if wavelength of light used is $5890\text{ }\text{\AA}$. 8

(b) Derive an expression for numerical aperture of step index optical fiber. What are the advantages of using an optical fiber ? 7

3. (a) Explain construction and working of He-Ne laser. What are its merits ? 8

(b) Derive the condition for a thin transparent film of constant thickness to appear bright and dark when viewed in reflected light. 7

4. (a) Calculate the maximum order of diffraction maxima seen from a plane diffraction grating having 5500 lines per cm if light of wavelength $5896\text{ }\text{\AA}$ falls normally on it. 5

(b) Derive Schrodinger's time-independent wave equation. 5

(c) Define the term superconductivity. Show that in the superconducting state the material is perfectly diamagnetic. 5

5. (a) A slit of width 0.3 mm is illuminated by a light of wavelength 5890 Å. A lens whose focal length is 40 cm forms a Fraunhofer diffraction pattern. Calculate the distance between first dark and the next bright fringe from the axis. 5
- (b) An electron is accelerated through 1000 volts and is reflected from a crystal. The first order reflection occurs when glancing angle is 70° . Calculate the interplanar spacing of a crystal. 5
- (c) Explain construction and working of Atomic Force Microscope. 5
6. (a) State Heisenber's uncertainty principle. Show that electron cannot pre-exist in free state in a nucleus. 5
- (b) Draw a labelled diagram and explain construction and working of CRT. 5
- (c) Explain top down and bottom up approaches to prepare nanomaterials. 5
-

SPA Sem - II 29/05/11

(REVISED COURSE)

[Total Marks : 80

(2) Solve any **three** out of **five** questions.

1. (a) Explain following bitwise operator with example :-
 - (i) Bitwise Right shift operator
 - (ii) Bitwise X-OR operator
 - (b) Find output of the following statenal

```
int x=20, y, *ip;
ip= & x;
y=(*ip)++;
printf(“%d \n”, y);
printf(“%d \n”, *ip);

y=++0 (*ip);
printf(“%d \n”, y);
printf(“%d \n”, ip);
```
 - (c) Explain nested structure with example.
 - (d) Explain need of flowchart and draw a flowchart to check enter no is prime or not.
 - (e) Explain following statement with example.
 - (i) goto
 - (ii) continue
-
2. (a) Explain syntax of switch case? Discuss what is need of break statement in switch case? Write a program to count vowel using switch case.
 - (b) Write a program to display following pattern

(i)

A	B	C	D
	A	B	C
		A	B
			A

(ii)

				1			
				1	2	A	
			1	2	3	A	B
		1	2	3	4	A	B
	1	2	3	4	A	B	C

3. (a) (i) Explain difference between while and do-while loop. 10
(ii) Write a program to find out binary equivalent of given decimal no. 10
(b) Define a function to check whether enter square matrix is symmetric or not. Pass square matrix as a argument from main program to function. 10

[TURN OVER

JP-Con.:10622-15.

4. (a) Write a program to evaluate the value of the standard deviation and display the result. 10

$$sd = \sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 / n}$$

\bar{x} = Average of all no is array.

- (b) (i) Explain string function for following operation with example. 5
 (1) Copy n char from source string to destination.
 (2) Joining of two string.
- (ii) Write a program to find reverse of given string without using string library function. 5
5. (a) Define a structure cricket which consist following members 10
 (i) player name
 (ii) country name
 (iii) batting average
- Input 20 player information of test playing country. Write a program which will display detail information of player with given player name.
- (b) What do you mean by recursion? Write a program to find out summation of n no using recursion. 10
6. (a) (i) Explain call by value and call by reference with necessary example. 8
 (ii) Explain following storage class with example. 4
 (1) static (2) external
- (b) Write an algorithm and program to generate a factor of given no. 8