F.E. Sem II (All Br.) May-2010
Applied maths (II) (Revised) Dt. 28.5.2010

VT-April-10-7(I)

Con. 2646–10. **(REVISED COURSE)** AN–9835

(3 Hours) [Total Marks : 100

N.B. (1) Question No 1 is **compulsory**
(2) Attempt any **four** questions from the remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.

1.

a) Change the order of the integration of $\int_0^{2a}\int_{\sqrt{2ax-x^2}}^{\sqrt{2ax}} f(x,y)\,dxdy$ 5

b) Solve $\left[\frac{\log(\log y)}{x}+\frac{2}{3}xy^3\right]dx+\left[\frac{\log x}{y\log y}+x^2y^2\right]dy=0$ 5

c) Find the area of the hypocycloid $x=a\cos^3\theta, y=b\sin^3\theta$ 5

d) Evaluate $\int_0^{\infty} x^n e^{-\sqrt{ax}}\,dx$ 5

2.

a) Solve $\left[3x^2y^4+2xy\right]dx+\left[2x^3y^3-x^2\right]dy=0$ 6

b) Evaluate $\iint_R xy\,dxdy$ over the region R given by $x^2+y^2-2x=0$, $y^2=2x$, $y=x$. 7

c) Evaluate $\int_0^{\frac{\pi}{2}} \frac{dx}{a^2\sin^2 x+b^2\cos^2 x}$ and show that

$$\int_0^{\frac{\pi}{2}} \frac{dx}{\left(a^2\sin^2 x+b^2\cos^2 x\right)^2}=\frac{\pi}{4ab}\left(\frac{1}{a^2}+\frac{1}{b^2}\right)$$ 7

3.

a) Solve $(x^2-1)\sin x\frac{dy}{dx}+\left[2x\sin x+(x^2-1)\cos x\right]y=(x^2-1)\cos x$ 6

b) By changing into polar coordinates evaluate $\iint \frac{4xy}{x^2+y^2}e^{-x^2-y^2}\,dxdy$ over the region bounded by the circle $x^2+y^2-x=0$ in the first quadrant. 7

c) Prove that $\int_0^{\frac{\pi}{2}} \frac{d\theta}{\sqrt{1-\frac{1}{2}\sin^2\theta}}=\frac{\left(\Gamma\frac{1}{4}\right)^2}{4\sqrt{\pi}}$ 7

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4.

a) Evaluate $\int_1^e \int_1^{\log y} \int_1^{e^x} \log z \, dxdydz$ 6

b) Solve $(D-1)^2(D^2+1)y = e^x + \sin^2\frac{x}{2}$ 7

c) Solve the differential equation $\frac{dy}{dx} = \frac{1}{x+y}$, $x_0=0, y_0=1$ for the interval (0,1) choosing h=0.5 by Runga Kutta Method of Fourth Order. 7

5.

a) Solve $\frac{dy}{dx} = 1+y^2$ with initial conditions $x_0=0, y_0=0$ by Taylor's method. Obtain y as a series in powers of x. Hence find the approximate values of y for x=0.2 , 0.4 . 6

b) By using method of variation of parameters solve $(D^2-2D+4)y = e^{2x}\sec^2 x$ 7

c) Evaluate $\iiint dxdydz$ over the volume of the tetrahedron bounded by x=0, y=0, z=0 and $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$ 7

6.

a) Find the length of arc of r=a(1-cosθ) lying outside the circle r=acosθ. 7

b) Solve $(D^2-D-2)y = 2\log x + \frac{1}{x} + \frac{1}{x^2}$ 7

c) Evaluate $\iint r^2 \sin\theta dr d\theta$ over the cardioid $r = a(1+\cos\theta)$ above the initial line. 7

7.

a) Solve $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + 4y = \cos\log x + x\sin\log x$ 6

b) Find the mass of the lamina over the area bounded by the curves $16y^2 = x^3$ and the line 2y=x, if density at any point varies as the distance of the point from x axis. 7

c) Solve $\frac{di}{dt} + \frac{R}{L}i = \frac{E}{L}$ for the case in which the circuit has initial current i_0 at time t=0 and the emf impressed is given by $E = E_0 e^{-kt}$ 7

(Library) F.E. Sem II / Rev / All Branches

Engg Drawing.

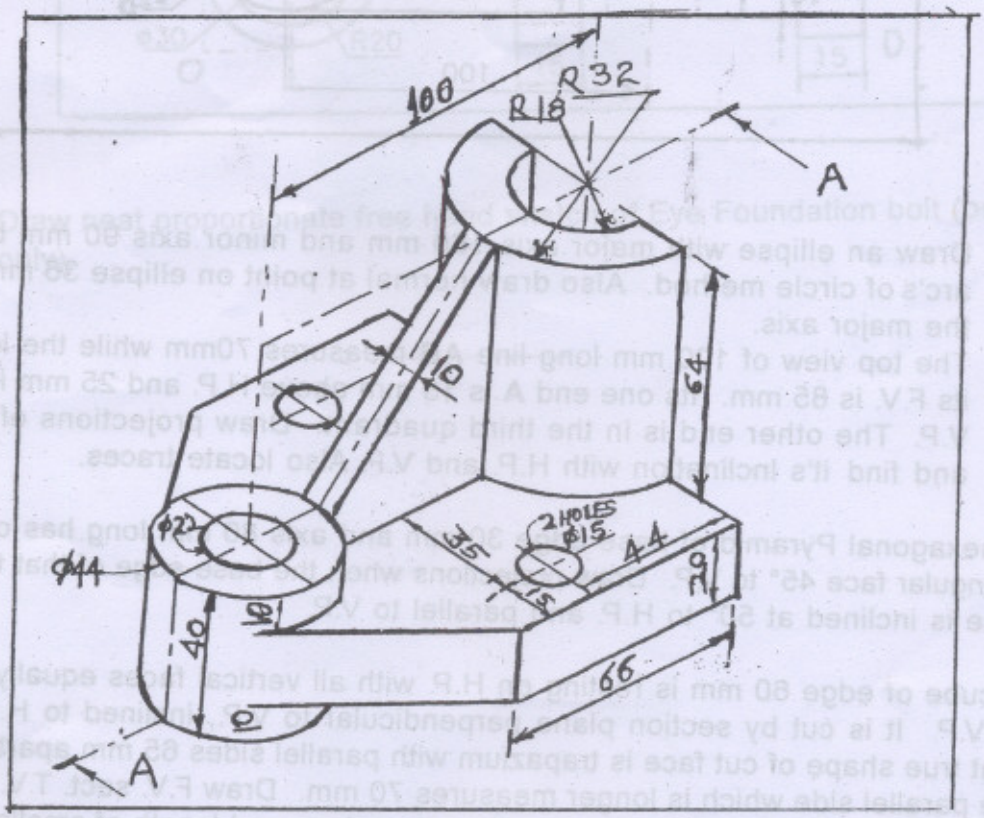
1st-half-AGJ-10 19

Con. 2641-10. **(REVISED COURSE)** **AN-9823**

(3 Hours) **[Total Marks : 75**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** quetions.
(3) Use **drawing sheets** only for **answering**.
(4) **All** dimensions in figure are in **mm**.
(5) Use your own judgement for any unspecified dimensions assuming suitable data if **necessary**.
(6) Use only **First angle method of** projection.
(7) Retain all construction lines.
(8) **Figures** to the **right** indicate **full** marks.
(9) Answers to the question should be **grouped** and written **together**.
(10) Neatness, accuracy and draftmanship will be considered while **assessing**.
(11) Use **both** the sides of the **drawing sheet**.
(12) Use scale **1:1** only.

1. **Figure** shows a pictorial view of object. Draw following views :–
   (a) Sectional F.V. along sect. A-A 4
   (b) Top View 4
   (c) Left Hand Side View.. 5
   Insert at least ten major dimensions. 2



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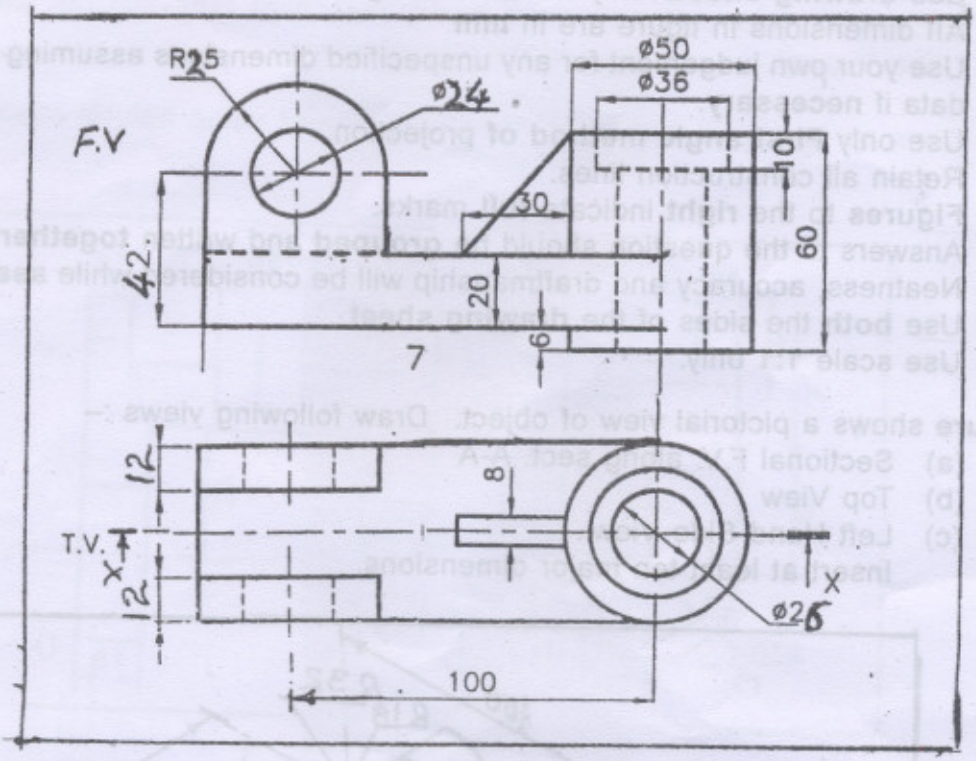
2. Figure shows the F.V. and T.V. of an object. Draw following views.
   (a) Sectinal F.V. Sect. along X-X 4
   (b) Top View 4
   (c) Missing Left Side View. 5
   Insert at least six major dimensions 2



3. (a) Draw an ellipse with major axis 160 mm and minor axis 90 mm by using arc's of circle method. Also draw normal at point on ellipse 35 mm above the major axis. 6
   (b) The top view of 100 mm long line **AB** measures 70mm while the length of its F.V. is 85 mm. Its one end **A** is 15 mm above H.P. and 25 mm infront of V.P. The other end is in the third quadrant. Draw projections of the line and find it's Inclination with H.P. and V.P. Also locate traces. 9

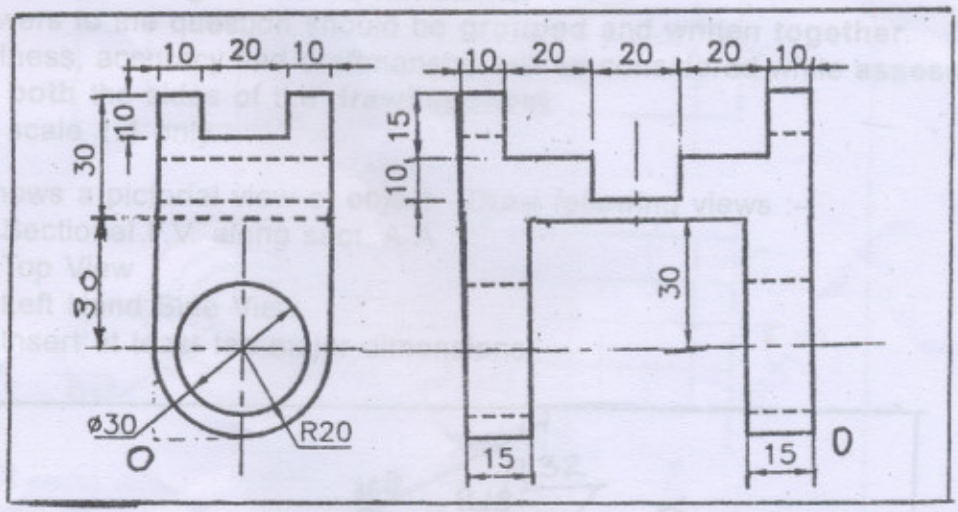
4. A hexagonal Pyramid of base edge 30 mm and axis 80 mm long has one of its triangular face 45° to V.P. Draw projections when the base edge of that triangular face is inclined at 50° to H.P. and parallel to V.P. 15

5. A cube of edge 60 mm is resting on H.P. with all vertical faces equally inclined to V.P. It is cut by section plane perpendicular to V.P., inclined to H.P. Such that true shape of cut face is trapazium with parallel sides 65 mm apart. One of the parallel side which is longer measures 70 mm. Draw F.V. sect. T.V. and true shape of cut face. Find inclination of section plane and length of smaller parallel side of the trapazium. 15

6. (a) A pentagenal prism of edge 35 and axis 90 mm in resting on H.P. on one of its rectangular faces with axis perpendicular to V.P. A vertical equilateral triangular hole of side 50 mm is cut through it with axis of hole intersecting axis of prism. One of the rectangular face of hole is parallel to one of the end face of prism and 25 mm away from it. Draw development of remaining lateral portion of the prism. 12

(b) Draw neat proportionate free hand sketch of lock-nut i.e. check nut (Two Views). 3

7. (a) Draw an Isometric view of the following **object** using natural scale. 12



(b) Draw neat proportionate free hand sketch of Eye Foundation bolt (one view only). 3

(Library) Sem-II | Rev | All Branches 11/6/2010

C.P-II.

Con. 2874-10. **AN–9820**

(3 Hours) **[Total Marks : 100**

N. B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questionsfrom **2** to **7**.

1. (a) Explain the working of JVM. Also explain how java is architectural neutral. 10
   (b) Explain data types in Java. Also explain the role of wrapper class. 10

2. (a) Write a java program to find factorial of a given number. The number will be provided by user at run time. 10
   (b) Create a class employee with data members empid, empname, designation and salary. Write methods get employee ( ) – To Take user input, show Grade ( ) – to display grade of employee based on salary. Show employee ( ) to display emp details. 10

3. (a) Write a program to find out number of upper case, lower case, blank spaces, number of digits from the string. 10
   (b) Write a program to accept five integers from user and arrange in acending order. 10

4. (a) What types of Inharitance provided by java explain with proper example ? Also discuss about inability of multiple inharitance in java and the alternative way to achieve it. 10
   (b) Explain the difference between abstract class, interface and final class. Write a abstract class program to calculate area of circle, rectangle and trangle. 10

5. (a) Explain the difference between single threaded application and multithreaded application ? What is the benefit of multithreading ? Explain how java provided multithreading. 10
   (b) What is package? How it is useful demostrate with example ? 10

6. (a) Explain the exception handling feature of java with any suitable example. 10
   (b) What is java applet? Write a java applet to display "Hello java". Also write the relation between applet and HTML. 10

7. Short notes on any **four** :— 20
   (a) Difference between C++ $ Java
   (b) System.arrayCopy ( ) method
   (c) Static members
   (d) Access specifiers
   (e) Thread synchronization.

E.E. Sem II / Rev

App:. chemistry II 7-6-2010

Con. 3259–10. (REVISED COURSE) AN–9847

(2 Hours) [Total Marks : 75

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Atomic Weights : C – 12 ; H – 1 ; O – 16 ; S – 32 ; N – 14 ; Ba – 137·3 ; Cl – 35·5.

1. Solve any **five** from the following :– **15**
   (a) Explain the advantages of galvanising over tinning.
   (b) A coal sample was subjected to the ultimate analysis, 0·5 gms of coal on combustion in bomb calorimeter and the content on treatment with $Bacl_2$ solution produce 0·06 gms of $BaSo_4$. Calculate % of sulphur in coal sample.
   (c) Give the manufacturing process of silicon carbide ceramic powder.
   (d) Explain the non hazardous chemical principle of green chemistry with suitable example.
   (e) What is cracking ? Distinguish between thermal and catalytic cracking.
   (f) What are composites ? What are their advantageous characteristics.
   (g) Explain any two characteristics of catalyst with suitable examples.

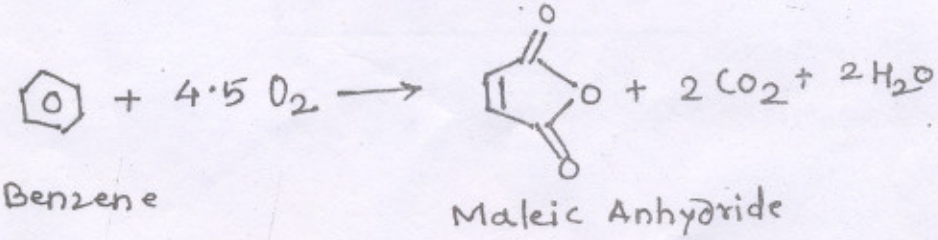
2. (a) What is petroleum ? Describe the refining of petroleum with reference to bubble tower diagram. **6**
   (b) Define corrosion and explain the corrosion due to differential areation with neat sketch. **5**
   (c) Define and explain activation energy. **4**

3. (a) Explain laminar composites and sandwich panel with suitable example. **6**
   (b) Write short note on paint ingredients and their functions. **5**
   (c) Give composition, properties and uses of High-Phosphorous bronze. **4**

4. (a) Explain in detail Fibre-reinforced composites. **6**
   (b) A coal sample was found to contain the following constituents : C – 81%, O – 8%, S – 1%, H – 5%, N – 1%, Ash – 4%. Calculate the minimum amount of air required for complete combustion of 2 kg of coal. **5**
   (c) What is powder metallurgy ? Explain cold powder extrusion moulding. **4**

5. (a) What is bio-diesel ? Explain the method to obtain bio-diesel from vegetable oil and expedite why biodiesel. **6**
   (b) What are zeolite catalyst ? Give the types of zeolites and explain the structure of sodalite as building block zeolites. **5**
   (c) What are the important applications of composites. **4**

6. (a) State the principle and explain the electroplating process with neat sketch. **6**
   (b) Calculate the Gross and Net calorific value of coal sample having the following composition : C – 85%, H – 7%, O – 3%, S – 3·5%, N – 2·1% and Ash – 4·4%. **5**
   (c) Calculate the atom economy for the following reaction. **4**



7. (a) Give the composition, properties and uses of – 6
   (i) Woods Metal
   (ii) Magnalumin
   (b) Explain the mechanism of adsorption theory of catalysis. 5
   (c) Explain how are the following factors influence the rate of corrosion. 4
   (i) Solubility of corrosion product
   (ii) Nature of ions present.

(Library) Sem - II / Rev / All Branches

App - phys - II

2-6-2

Con. 2649-10. AN-9805

(2 Hours) [Total Marks : 75

N.B. (1) Question No. 1 is compulsory.
(2) Attempt any four questions from Q. Nos. 2 to 7.
(3) Figures to the right indicate full marks.
(4) Use suitable data wherever necessary.

1. Solve any five from the following :– 15
(a) What is stimulated emission ? What role does it play in the operation of a laser ?
(b) What is diffraction grating. What is the advantage of increasing the number of lines in a grating ?
(c) Differenciate between diffusion and rotary pump.
(d) In Newton's ring experiment the pringes are circular with dark ring at centre. Why ?
(e) What is the difference between critical angle and angle of acceptance ?
(f) A magnetic material has magnetizing force 198 A/m and magnetization of 2300 A/m.
Find (i) Corresponding flux density
(ii) Relative permeability.
(g) What is Rayleigh's criterion of resolution ? Write expression for the resolving power of a grating.

2. (a) Obtain the expression for nth dark ring in case of Newton's rings experiment. Hence explain the suitable way to calculate refractive index of a liquid using same set up. 8
(b) Explain with diagram, the construction and working of semiconductor diode laser. What serves the resonance cavity in semiconductor diode lasers ? 7

3. (a) What is the fundamental principle of a hologram ? How is it produced and how is the image constructed from it ? 8
(b) What do you understand by antireflection coating ? Derive the condition with proper diagram. 7

4. (a) What is monomode and multimode fibre ? Explain the term V-number. 5
(b) Show that the energy of an electron in the box varied as the square of natural numbers. 5
(c) A magnetizing field of 1600 A/m produces a magnetic flux of 2.4×10^{-5} weber in an iorn bar of cross-sectional area 0.2 cm^2. Calculate permeability and succeptibility of the bar. 5

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5. (a) Explain the principle of Pirani Quage ? How does it work. 5
(b) Arrive at Heisenberg uncertainty principle with the help of single slit diffraction experiment. 5
(c) A diffraction grating used at normal incidence gives a line 5400 A° in certain order superimposed on another line 4050 A° of the next higher order if the angle of diffraction is 30°, how many lines/cm are there on the grating ? 5

6. (a) Explain Ohm's law for magnetic circuit and hence derive a relation between magnetomotive force and magnetic field strength for magnetic circuit due to solenoid. 5
(b) A wedge shaped air film having angle of 40 second is illuminated by monochromatic light. Fringes are observed vertically through a microscope. The distance between 10 consecutive dark fringes is 0·12 cm. Find the wavelength of monocromatic light. 5
(c) An optical fibre has a numerical aperture of 0·20 and a refractive index of cladding is 1·59. Determine the acceptance angle for the fibre in water which has a refractive index of 1·33. 5

7. (a) What are hard and soft magnetic materials ? Give their characteristics properties and applications. 5
(b) Explain the construction of scanning Electron Microscope with proper diagram Also explain the principle on which it works. 5
(c) Find the thickness of the soap film which appear yellow (5896A°) in reflection when it is exposed by white light at an angle of 45° (μ = 1·35). 5

(Library) Sem-II/Rev/All Branches 16/6/

Comm. Skills

Con. 2638-10. **AN-9853**

(2 Hours) **[Total Marks : 75**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of the remaining **six** quetions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Answers to all **sub questions** should be **attempted** and **grouped together**.

1. (a) Comment on the statement that communication is a two way process, what role does feedback play in this process ? Illustrate your answer with the help of a diagram. 9
   (b) Explain merits and demerits of oral communication. 6

2. Write short notes on any **three** of the following :– 15
   (a) The importance of internal communication in business organisation
   (b) Advantages of video-conferencing
   (c) Characteristics of a good speaker
   (d) Role played by gesture and posture in body language
   (e) Draw Complete Block Format of letter and name the parts.

3. (a) You are the Head of the Computer Department in Pragati College of Technology, and you need some new, updated equipments for your computer laboratory. Write a letter of enquiry to Bits and Bytes Ltd., Banglore, and give full details of your requirements (use Full Block form). 8
   (b) Give definitions for. 4
   (i) Calculator (iii) Voltmeter
   (ii) Soldering gun (iv) E-mail.
   (c) Find one word substitutes for the following :– 3
   (i) Tiny organism that can be seen only under microscope which causes disease
   (ii) Branch of philosophy dealing with the nature of existence truth and knowledge
   (iii) Holding establish opinion.

4. (a) You purchased an expensive shirt manufactured by a reputed company from a retail shop. After one wear the colour faded and material shrunk. The retailer has asked you to write to the manufacturers for a replacement. Write a letter of complaint. (use semi block form). 8
   (b) Write a set of instructions to use microwave oven. 7

5. (a) As the Public Relation Officer of BEST you have received a letter from a commuter complaining about the rude behaviour of one of the bus conductor. Write a reply to this letter. 9
   (b) Use any **three** sets of words to form a single sentence. 6
   (i) Rein – Rain (iii) Mail – Male
   (ii) Tire – Tyre (iv) Urn – Earn
   (v) Affect – Effect.

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6. (a) Describe any **one** of the following objects by giving definition, diagram, description and working :– 10

(i) Computer (iii) Calculator

(ii) Electric Iron.

(b) Write the emotions the various facial expression suggest :– 5

(i) Raised Eyebrows (ii) Contracted Face

(iii) Small Headnod (iv) Smiling Face

(v) Yawning.

7. Read the following passage and answer the questions given below :–

Rock is considered as rigid solid material forming the surface of a planet. There are three types of rocks found in the earth. The first type is called as 'igenous rocks'. Igenous rocks erupt from a very hot liquid found beneath the earths surface due to volcanoes. This hot liquid is known as magma. Volcanoes are the mountains with a large opening on the top and multiple openings on its either sides, through with magma and other gases escape with great force. Basalt, granite and pumice stones are examples of Igneous rocks. The second type of rock is known as Sedimentary rock.

Sedimentary rock can be formed by deposits in water and sometimes by wind. Sand stone is common example of this type of rock. Sedimentary rocks are further subdivided into two major Categories. The first sub category is known as 'Organic Sedimentary Rock'. These rocks are formed by living plants and animals, coal and limestone are common examples of organic sedimentary rocks. Coal comes from the plants, and limestone from crores of plants and animals. The second sub category is called as chemical sedimentary rock. Chemical sedimentary rocks erupt from the various chemical processes wherein the minerals are deposited.

The third type of rock is known as metamorphic. This can be formed either of igneous or sedimentary rocks. Metamorphic rocks are formed by the intensity of high temperature pressure.

uestions :

(i) What is rock ? 1

(ii) Which are the three major types of rocks ? 1

(iii) What are the sub-types of sedimentary rocks ? 1

(iv) What are volcanoes ? 2

(v) What is magma ? 1

(vi) What are minerals ? 1

(vii) Write a summary of the above passage. 8