

F.E. Sem - II (old)
CP - II

7/12/15

QP Code : 3072

OLD COURSE

(3 Hours)

[Total Marks :100]

N.B.: (1) Question No. 1 is Compulsory
(2) Solve any Four questions out of remaining.

1. (a) What is main thread? [4]
(b) Explain the term Robustness and portability in Java. [4]
(c) Explain System.arraycopy () used in Java Programming. [4]
(d) Explain Bitwise and logical operator with example. [4]
(e) Explain the structure of java virtual machine [4]
2. (a) Explain the role of wrapper class. [5]
(b) Explain method overriding with example [5]
(c) What is vector? Explain any five methods of vector. [5]
(d) Write a program to demonstrate packages in java [5]
3. (a) Write a program to demonstrate call by value to swap two numbers. [5]
(b) WAP to find the roots of a quadratic equation [5]
(c) WAP to check whether the entered number is Armstrong or not [5]
(d) Describe multidimensional array [5]
4. (a) Write a program to display following tree. [5]
1234
123
12
1
(b) Explain multilevel inheritance with suitable example. [5]
(c) Write a program to display whether a input number is prime or not. [5]
(d) Write a program for matrix addition. [5]
5. (a) WAP in java interchange the values of two numbers using command line argument. [10]
(b) WAP in java to check whether entered character is lower case, upper case, numeric (Use if-else). [5]
(c) WAP to demonstrate parameter passing to Applet [5]
6. (a) What is exception? Explain the exception handling in java with suitable example [10]
(b) Write a program to Demonstrate method overloading & constructor overloading. [10]
7. (a) Explain interface. How to implement an interface? Explain with example. [5]
(b) Create an applet that displays "All the Best". [5]
(c) Explain what are Abstract Class and Abstract Methods. [5]
(d) WAP to count frequency of a word in a sentence [5]

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Q.P. Code : 3065

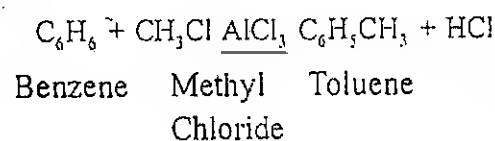
(OLD COURSE)

(2 Hours)

[Total Marks : 75]

- N.B. : (1) Question No. 1 is compulsory.
 (2) Attempt any four from remaining six questions.
 (3) Figures to the right indicate full marks.
 (4) All questions carry equal marks.
 (5) Atomic weight : H = 1, C = 12, N = 14, O = 16, Na = 23, Mg = 24, S = 32, Cl = 35.5, Ca = 40, Ba = 137.5.

1. Attempt any five from the following : 15
- (a) How volatile matters are determined from the coal sample? Write the significance of volatile matter analysis.
- (b) Write the composition, properties and uses of duralumin.
- (c) Write the classification of composite materials.
- (d) Write the difference between cathodic and anodic coating.
- (e) Define and explain activation energy.
- (f) Write a short note on "E green propellant".
2. (a) What are fibre reinforced composite materials? Write their classification. 6
- (b) A sample of coal has the following composition by weight C = 85%, H = 5%, O = 7%, S = 0.6% and remaining ash. Calculate H.C.V. and L.C.V. using Dulong's formula. 5
- (c) Write a short note on "antiknock agents." 4
3. (a) Explain traditional and green route of synthesis of indigo dye. 6
- (b) What is stress corrosion? Explain stress corrosion with the example of season cracking. 5
- (c) What are the applications of powder metallurgy. 4
4. (a) What is catalysis. Explain the adsorption theory of heterogenous catalysts. 6
- (b) Calculate the weight of air needed for complete combustion of 1kg of coal containing C = 65%, H = 7%, O = 9%, S = 1% and remaining nitrogen. 5
- (c) Calculate the percentage atom economy for the following reaction with respect to product toluene. 4



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5. (a) How these factors influence the rate of corrosion. 6
(i) pH of the medium,
(ii) Relative areas of anode and cathode,
(iii) Overvoltage. 5
(b) Write a short note on zeolite as a catalyst. 4
(c) What are laminar composites.
6. (a) What are ceramic powder? Write the manufacture of alumina. 6
(b) Write the transesterification reaction of production of bio-diesel. Explain advantages of bio-diesel. 5
(c) Explain in detail anodic protection method of corrosion control. 4
7. (a) Explain concentration cell corrosion with the help of suitable example. 6
(b) What is cracking. Explain fixed bed catalytic cracking with the help of a neat diagram. 5
(c) Explain "prevention of waste" principle of green chemistry with the help of suitable examples. 4

QP Code : 3057

(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) Use suitable data wherever required.
 (4) Figures to the right indicate full marks.
 (5) Illustrate your answer with sketches wherever necessary.

1. Solve any five from the following:-

- (a) Explain the formation of colors with in a thin film of transparent material when illuminated by sunlight? 15
- (b) Calculate the numerical aperture of a fibre with core index 1.61 and cladding index 1.55?
- (c) Explain optical resonator used in laser source?
- (d) State and explain De' Brogli's hypothesis about matter?
- (e) Define relative permeability and susceptibility and write the relation between them?
- (f) What is magnetic circuit? Define magnetomotive force and reluctance?
- (g) What are different ranges of vacuum? Write name of various gauges used to measure vacuum?
2. (a) Explain construction and working of He-Ne laser source? Comment on its efficiency? 8
- (b) Light falls normally on a soap film of thickness 5×10^{-5} cm and refractive index 1.33. Calculate the wavelength in the visible region reflected most strongly? 7
3. (a) Derive the expression for numerical aperture and acceptance angle for step index optical fibre? Write its significance? 8
- (b) Describe the construction and working of semiconductor laser Write its importance? 7
4. (a) Show that in Newton's rings experiment diameter of n^{th} dark ring is directly proportional to square root of natural number? 5
- (b) If the de-broglie wavelength associated with the moving electron is 5000 \AA , calculate its kinetic energy in terms of electron volt? 5
 (Given $m_e = 9.108 \times 10^{-31}$ kg Planks constant = 6.625×10^{-34} J-Sec.)
- (c) Define magnetomotive force? Calculate the current required to demagnetise the magnet of coercivity 5×10^3 amp/m kept in a solenoid of length 10cm and having 50 turns. 5

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5. (a) Light incident on a grating of 0.5 cm wide with 3000 lines. Find the angular separation in Second order of two sodium lines 5893 \AA and 5896 \AA 5
(b) State and explain Heisenberg's uncertainty principle? Give its experimental illustration? 5
(c) Explain the construction and working scanning electron microscope? 5
6. (a) Calculate the minimum space required by the electron to be confined in an atom if the uncertainty in the measurement of its speed is $2 \times 10^4 \text{ m/sec}$. (Given $m_e = 9.108 \times 10^{-31} \text{ kg}$, $h = 6.63 \times 10^{-34} \text{ J-Sec}$.) 5
(b) Explain the laboratory method to determine the wavelength of light source using plane transmission grating? 5
(c) Sketch the hysteresis loop and explain the terms retentivity, coercivity, magnetization and magnetic susceptibility? 5
7. (a) Distinguish between single mode and multimode optical fibre? 5
(b) Distinguish between holography and ordinary photography? 5
(c) Distinguish between soft and hard magnetic material? 5

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(3 Hours)**QP Code : 3053****[Total Marks : 100**

1. Q 1 is compulsory.
2. Solve any four out of the remaining from Q. No. 2 to Q No 7
3. Fig on right hand side indicates full marks.

Q. 1.

- a) Using Taylors series method solve $\frac{dy}{dx} = x^2y - 1$ with $x_0 = 0, y_0 = 1$ and carry to $x = 0.2$ 3
- b) Solve $(D^3 + 1)y = 0$ 3
- c) Evaluate $\int_0^1 \int_{x^2}^x xy(x+y) dydx$ 3
- d) Evaluate $\int_0^a \int_0^{a-x} \int_0^{a-x-y} x^2 dx dy dz$ 3
- e) Evaluate $\int_0^{2a} x \sqrt{2ax - x^2} dx$ 4
- f) Using Euler's method, find the approximate value of y when $\frac{dy}{dx} = x + y$, and $y=1$ when $x=0$ at $x=1$ in five steps. 4

Q.2. a) Prove that $\int_0^a \frac{dx}{(a^n - x^n)^{\frac{1}{n}}} = \frac{\pi}{n} \operatorname{cosec} \left(\frac{\pi}{n} \right)$. 6

- b) Solve using Runge- Kutta method of fourth order $\frac{dy}{dx} = x + y^2$, with the condition $x=0$ at $y=1$, find y at $x=0.2$ with $h= 0.1$. 6
- c) Solve $\frac{dy}{dx} = e^{x-y}(e^x - e^y)$ 8

Q.3. a) Solve $[1 + \log(xy)] dx + [1 + \frac{x}{y}] dy = 0$ 6

b) Solve using method of variation of parameters, $(D^2 + 1)y = \frac{1}{(1 + \sin x)}$ 6

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c) Show that $\int_0^{\infty} \frac{\tan^{-1} ax}{x(1+x^2)} dx = \frac{\pi}{2} \log(1+a)$ 8

Q.4. a) Solve $y(x y + e^x) dx - e^x dy = 0$ 6

b) Solve, $x^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + 2y = x \log x$ 6

c) Solve $(D^2 + 2)y = x^2 e^{3x} + e^x - \cos 2x$ 8

Q.5. a) In a electric circuit containing inductance L, resistance R, and voltage $E \sin \omega t$, the current i is given by $L \frac{di}{dt} + Ri = E \sin \omega t$. Find the current i at time t, if at t=0 when i=0 and L,R,E are constants. 6

b) Change the order of integration. $\int_0^a \int_{\frac{x^2}{a}}^{2a-x} f(x,y) dx dy$ 6

c) Evaluate $\iiint xyz dx dy dz$, over the positive octant of the sphere $x^2 + y^2 + z^2 = a^2$ 8

Q.6. a) Find the length of the cardioide, $r = a(1 - \cos \theta)$ lying outside the circle $r = a \cos \theta$. 6

b) Change to polar coordinates and evaluate $\int_0^a \int_y^a x dx dy$ 6

c) Evaluate $\iint_R (x^2 + y^2) dx dy$ Over the region R of a triangle whose vertices are (0,1), (1,1) and (1,2). 8

Q.7. a) Change the order of integration and evaluate $\int_0^5 \int_{2-x}^{2+x} dx dy$. 6

b) Find by double integration the area of region bounded by the circles $r = 2a \sin \theta$, and $r = 2b \sin \theta$, ($b > a$). 6

c) Find the volume bounded by the cylinder $x^2 + y^2 = a^2$, and the planes $z = 0$ and $y + z = b$ 8

F.E Sem II (OLD)
CS 12/11/15

QP Code : 3077

(2 Hours)

[Total Marks : 75

- 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.
(4) Answer to all sub questions should be attempted and grouped together

1. (a) Fill in the blanks
- (i) Putting the message into code is _____ 2
 - (ii) _____ is the last component in the process of communication. 2
- (b) Briefly explain 'mechanical barrier' to communication. 5
- (c) Fill in the blanks
- (i) Hearing is natural but Listening needs. _____ 2
 - (ii) _____ is the process of finding out a particular piece of information while reading. 4
- d) Draw the diagrammatic representation of a letter in 'semi-block' format, indicating the compulsory parts. 1
- (e) Define 'Process of Welding'. 1
- (f) List the headings used to indicate special instructions. 1
2. (a) Define the following. 2
- (i) Decoding. 2
 - (ii) Warning as an objective of communication. 5
- (b) Write brief notes on the following in 5-6 sentences.
- (i) Merits of Downward Channel of communication. 8
 - (ii) Facial expression as a means of communication. 8
- (c) You are the Store Manager of a Medical Hospital and you have received 50 first aid kits in a damaged conditions. Draft a complaint letter to the distributor and demand an alternative replacement at his cost within five days. (Use Semi block format) 4
3. (a) Identify the barriers in the following communication situations/conversation.
- (i) construction activity near a school building.
 - (ii) The tape recorder stops working & the dancer could not continue the programme.
 - (iii) The speaker starts stammering when he sees the huge audience.
 - (iv) 'I am always perfect in my work' said Yash. 3
- (b) Fill in the blanks
- (i) _____ communication moves on the equal authority level.
 - (ii) _____ means movement of hand, head, neck to communicate messages.

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- (iii) The informal channel of communication is named as _____ 8
3. (c) You are opening a Novelty -shop, first of it's kind in your small town. Draft an enquiry letter to 'Supreme Agencies', Matunga, Murnabi asking for detailed information about variety, price-list along with incentives they can offer. (Use Full-block format.)
- 4 (a) State whether the following statements are True/False. 3
- (i) Painting is an example of a medium of communication.
 - (ii) Every successful communication situation has a feedback.
 - (iii) Communication is one way process.
- (b) Define the following. 5
- (i) Olfactics
 - (ii) Haptics
 - (iii) Upward channel of communication.
- (c) Briefly describe 'Simple Calculator' by using the points - Definition, Component parts and Working. 3
- (d) Arrange the following instructions on shaping a wooden piece into round & cylindrical object: 4
- (i) Hold the piece between two centres.
 - (ii) Stem the motor.
 - (iii) Move the tool towards the job.
 - (iv) Apply the cut.
 - (v) Take the wooden piece to be turned.
 - (vi) Hold the tool in the hand & support it.
 - (vii) Check for the final dimension.
 - (viii) When the correct dimension is obtained remove the job.
 - (ix) Stop the motor and check the dimension. Bring the tool back and adjust the next cut.
5. (a) Differentiate between the following. 3
- (i) Medium and Channel.
 - (ii) Response and Feedback.
- (b) Match the following. 3
- | | |
|------------------|----------------------|
| A | B |
| (i) Paralanguage | (a) Grapevine |
| (ii) Proxemics | (b) Vocal clues |
| (iii) Rumours | (c) Space-distancing |
- (c) Write a brief note on 'Conciseness' & 'Correctness' as the basic principles of 6

- (d) Arrange the following instructions on using a manually opened lift or elevator: 3
- (i) Switch on the fan if needed.
 - (ii) Open both the doors of the lift.
 - (iii) Press the button of the floor on which you wish to go.
 - (iv) Close both the doors.
 - (v) Step out of the lift.
 - (vi) After the lift stops at your desired floor, switch off the fan.
 - (vii) Get in the lift.
 - (viii) Press the button fixed on the wall nearby the cage of the elevator to call it.
 - (ix) Close both the doors of the lift.

- 6 (a) Fill in the blanks. 2
- (i) The word communication is derived from the Latin word _____ which means sharing of information.
 - (ii) _____ is an organized and specialized form of advice. 6

- (b) Write brief notes on the following in 5-6 sentences. 2
- (i) Types of Listening
 - (ii) Critical reading method
- (c) Match the following. 2

- | | | |
|---|---|----------|
| <p>A</p> <ol style="list-style-type: none"> (i) Post-script (ii) UVW/ac (iii) Date-line (iv) Semi-block | <p>B</p> <ol style="list-style-type: none"> (a) No abbreviation. (b) indented paragraphs. (c) exhibits unplanned letter (d) Identification Mark | <p>5</p> |
|---|---|----------|

- (d) Match the following. 5
- | | |
|--|--|
| <p>A</p> <ol style="list-style-type: none"> (i) Apparatus (ii) Machine (iii) Instrument (iv) Tool (v) Appliance | <p>B</p> <ol style="list-style-type: none"> (a) Food-Processor (b) Screw-driver (c) Conical Flask (d) Voltmeter (e) Drill |
|--|--|

7. (a) Read the following passage and answer the questions below.
- Science has obviously multiplied the power of the war-markers. The weapons of the moment can kill more people more secretly and more unpleasantly than those of the past. This progress - as for want of another word I must call it - this progress has been going on for some time; and for some time it has been said of each new weapon that it is so destructive or so horrible that it will frighten people into their wits and force the nation to give up war for lack of cannon fodder. This hope has never been fulfilled, and I know no one who takes refuges in it today. The acts of men and women are not dictated by such simple compulsions and they themselves do not

stand in any simple relation to the decision of the nations which they compose. Grapeshot and TNT and gas have not helped to outlaw war; and I see no sign that the hydrogen bomb or a whiff of bacteria will be more successful in making men wise by compulsion.

Secondly, science at the same time has given the nations quite new occasions for falling out. I do not mean such simple objectives as someone else uranium mine, or a Pacific Island which happens to be knee deep in organic fertilizers. I do not mean merely another nation's factories and her sidled production. These are all parts of the surplus above our simple needs which gives our civilization its character. And war in our world batters on this surplus, This is the object of the greed of the nations and this also gives them the leisure to train and the means to arm for war. At bottom, we may remain individually too greedy to distribute our surplus, and collectively too stupid to pile it up in any more useful form than the tradition mountains of arms. Science has created the surplus. Now put this year's budget besides the budget of 1750, anywhere in the world and you will see what we are doing with it.

Questions:

- (i) Write down a word /a phrase that could take the place of the following as they occur in the original: 1
 (a) Cannon fodder (b) organic fertilizers
 (c) collectively (d) traditional.
- (ii) What argument in favor of accepting new weapons is mentioned by the author? 1
- (iii) What is his attitude to this argument? 1
- (iv) Express in your own words:
 "The acts of the men and women are not dictated by such simple compulsions" 1
- (v) Where do you learn in para 1 that people's wishes are not necessarily carried out by their government? 1
- (vi) Mention several things of which we have a 'surplus above our simple need, thanks to science,' 1
- (vii) The last words of the passage are 'you will see what we are doing with it'. What will the comparison of budget reveal, in the authors opinion? 1
- (viii) What, according to the writer, prevents us from giving away the surplus? 1
- (b) Summarize the above passage in your words. Provide a suitable title. 7