20|11|17

FE- Sem -II -CBSGS -AM-II

Q. P. Code : 22297

Duration – 3 Hours   **Total Marks : 80**

(1) N.B.:- Question no 1 is compulsory.
(2) Attempt any THREE questions out of remaining FIVE questions.

Q.1) a)   Solve $\dfrac{dy}{dx} = \dfrac{a^2 - 2xy - y^2}{(x+y)^2}$ (4)

b)   Solve $(D^3 - 3D^2 + 4)y = 0$ (3)

c)   Evaluate $\displaystyle\int_{0}^{\infty} e^{-\left(x^2/4\right)} dx$ (3)

d)   Express the following integral in polar co-ordinate   **(4)**

$$\int_{0}^{2a} \int_{0}^{\sqrt{2ax - x^2}} f(x, y)\, dx\, dy$$

e)   Prove that $E = 1 + \Delta = e^{hD}$ (3)

f)   Evaluate $\displaystyle I = \int_{0}^{\pi/2} \int_{\pi/2}^{\pi} \cos(x + y)\, dy\, dx$ **(3)**

Q.2 a)   Solve $\dfrac{dz}{dx} + \dfrac{z}{x}\log z = \dfrac{z}{x^2}(\log z)^2$ (6)

b)   Change the order of integration and evaluate $I = \displaystyle\int_{0}^{1} \int_{x^2}^{2-x} \dfrac{x}{y}\, dy\, dx$ (6)

c)   Show that $\displaystyle\int_{0}^{\infty} \dfrac{\tan^{-1} ax - \tan^{-1} bx}{x}\, dx = \dfrac{\pi}{2}\log\left(\dfrac{a}{b}\right)$ **(8)**

Q.3 a)   Evaluate $I = \displaystyle\int_{0}^{2} \int_{0}^{y} \int_{x-y}^{x+y} (x + y + z)\, dx\, dy\, dz$ (6)

b)   Find the mass of a plate in the form of a cardiode $r = a(1 - \cos\theta)$ (6)
    if the density at any point of the plate varies as its distance from the
    plate.

c)   Solve $(2x+1)^2 \dfrac{d^2 y}{dx^2} - 2(2x+1)\dfrac{dy}{dx} - 12y = x^2$ **(8)**

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T0122 / T0377 APPLIED MATHEMATICS II

Q. 4 a) Show that the length of the curve $x = a e^{\theta} \sin \theta$ $y = a e^{\theta} \cos \theta$ from (6)

$\theta = 0$ to $\theta = \pi/2$

b) Solve $\dfrac{d^2 y}{dx^2} - y = \cos x \cosh x + a^x$ (6)

c) Using fourth order Runge-Kutta method, solve numerically, the **(8)** differential equation $\dfrac{dy}{dx} = x^2 + y^2$ with the given condition $x = 1$, $y = 1.5$ in the interval (1, 1.2) with $h = 0.1$

Q. 5 a) Use method of variation of parameters to solve (6)

$\dfrac{d^2 y}{dx^2} + y = 3 x - 8 \cot x$.

b) Using Taylor's series method, obtain the solution of (6) $\dfrac{dy}{dx} = y - xy$. $y(0) = 2$. Find the value of y for $x = 0.1$ correct to four decimal places

c) Evaluate $\displaystyle\int_{-1}^{1} \dfrac{dx}{1 + x^2}$ by using (i) Trapezoidal Rule, (ii) Simpson's **(8)** $(1/3)^{rd}$ Rule and (iii) Simpson's $(3/8)^{th}$ Rule. Compare the result with exact solution.

Q. 6 a) In a circuit of resistance R, self inductance L, the current i is given (6) by by $L \dfrac{di}{dt} + R i = E \cos pt$ where E and p are constants. Find the current i at time 't'

b) Find the area bounded by the parabola $y = 4 x - x^2$ and the line (6) $y = x$

c) Find the volume of the paraboloid $x^2 + y^2 = 4 z$ cut off by the **(8)** plane $z = 4$.

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FE-sem-II - CBSGS - A.P-II   24/11/17

Q. P. Code: 11964

Duration: 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.

Q.1   Attempt any five of the following.   15
     a   How will you test the optical flatness of surface by interference?
     b   What is dispersive power? Write the formula for dispersive power of diffraction grating
     c   Calculate the refractive indices of core and cladding material of a fiber from following data,   NA=
         0.22 $\Delta = 0.012$
     d   Explain the terms: i) Metastable states. ii) Pumping iii) Population inversion
     e   How do you measure phase difference between two A.C. signals by CRO?
     f   Why is the wave nature of De-Broglie wave not apparent to daily life?
     g   How can Maglev train have very high speed?

Q.2 a   Show that diameter of Newton's nth dark ring is proportional to the square root of natural   4+4
         number. In Newton's ring experiment the diameter of 5th dark ring is 0.336cm and that of 15th dark
         ring is 0.590 cm. Calculate the radius of curvature of Plano convex lens if wavelength of light used is
         $5890A^0$
     b   What are the advantages of optical fiber? Explain the use of optical fiber in communication system.   7

Q.3 a   What is Holography? Explain the construction and reconstruction of Hologram with neat diagram   8
     b   Explain the interference in thin film of constant thickness and derive the conditions of maxima and   7
         minima for interference.

Q.4 a   Calculate the maximum order of diffraction maxima seen from plane transmission grating having   5
         2500 lines per inch if light of wavelength $6900A^0$ falls normally on it
     b   Derive Schrodinger's time independent equation   5
     c   Explain the phenomena of superconductivity? Show that in superconducting state the material is   5
         perfectly diamagnetic.

Q.5 a   A grating has 6000 lines per cm. Find the angular separation between two yellow lines of mercury of   5
         wavelengths $5770A^0$ and $5791A^0$ in the second order.
     b   Show that the energy of an electron in a box varies with square of natural number.   5
     c   Explain the construction and working of Atomic Force Microscope.   5

Q.6 a   With single slit electron diffraction experiment prove Heisenberg's uncertainty principle   5
     b   Explain the magnetostatic focusing system and calculate the pitch of helix   5
     c   What is top down and bottom up approach of preparing nanomaterials. Explain one of the methods   5
         on detail.

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FE-Sem-II-CBSGS- A-C-II   30/11/17

[Time: 2 Hours]   [Marks:60]

Please check whether you have got the right question paper.

N.B: 1. Question no. 1 is compulsory.
      2. Attempt any three from remaining five questions.
      3. Atomic weights: - H=1, C=12, N=14, O=16, S=32, Cl=35.5, Ba=137.5, mg=24, Na=23, Ca=40.

Q.1 Answer Any **Five** from the following:-   15
a) What is metal cladding? How is 'Alclad' obtained.
b) Define fuels. Classify them with examples.
c) Give the composition, properties and uses of wood's metal.
d) What are composites? What are their advantageous characteristics?
e) What are green solvents? Give two Industrial applications of green solvents.
f) By kjeldahl's method 1.5 gm of coal sample was analysed. The ammonia evolved was absorbed in 50 ml of 0.1 N H_2SO_4. After absorption, the excess H_2SO_4 required 34ml of 0.1N NaOH for neutralization. Calculate the percentage of Nitrogen.

Q.2 a) How do the following factors affect the rate of corrosion?   06
i) Purity of metal.
ii) Over voltage.
iii) Relative areas of anodic and cathodic parts.
b) What is cracking? Explain fixed bed catalytic cracking with neat labelled diagram.   05
c) Calculate the % Atom economy for the following reaction with respect to methyl-isocyanate.   04
$CH_3 NH_2 + COCl_2 \rightarrow CH_3N=C=O + 2HCl$
Methylamine   methyl-isocyanate

Q.3 a) The composition of gas was found to be H_2=10%, C_2H_6=16%, CH_4=20%, CO=18%, CO_2=22%, O_2=8%, N_2=6%.   06
Calculate the volume of air required for complete combustion of $1m^3$ of this gas.
b) Explain conventional and greener route for synthesis of Adipic Acid. Highlights the green chemistry principle   05
involved.
c) What are metallic coatings? Distinguish between Galvanizing and Tinning.   04

Q.4 a) What are the effect of following alloying elements on steel?   06
i) Ni ii) Cr III) Co iv) Mn v) Mo vi) W
b) Explain differential aeration corrosion with the help of a suitable example.   05
C) What is green chemistry? List the 12 principles of green chemistry.   04

Q.5 a) What is petroleum? Describe the refining of petroleum with the help of a diagram   06
b) What are structural composites? Give their types and applications.   05
c) Distinguish between Brass and Bronze   04

Q.6 a) Define an Alloy What is the purpose of making alloys?   05
b) Define paints. Mention any four constituents of paints and state functions of each constituents.   05
c) A coal sample contains C=65%, H=13%, O=6%, S=4%, N=12%, calculate the minimum amount of air needed   05
for Complete combustion of 2kg of coal.

Page 1 of 1

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FB- Sem -II - CBSGS- ED   20|12|17

QP CODE : 23523

(3 Hours)   Marks : 60

NB : (1) Question **No.1** is **compulsory**. Solve **any three** out of remaining **five** questions.
    (2) Use your **Judgement** for **any unspecified dimension**.
    (3) Use **First Angle** method of projection only.
    (4) Retain **all construction lines**.
    (5) **Figures** to the **right** indicate full **marks**.
    (6) All dimensions are in **mm**.

1. (a) A circle of 50mm diameter rolls along a straight line without slipping, draw the 6
    curve traced by a point 'P' on the circumference of the circle for one complete
    revolution.

  (b) The pictorial view of a machine part is given in Fig. Draw
      (a) Front View in the direction of 'X'   4
      (b) Top View   4
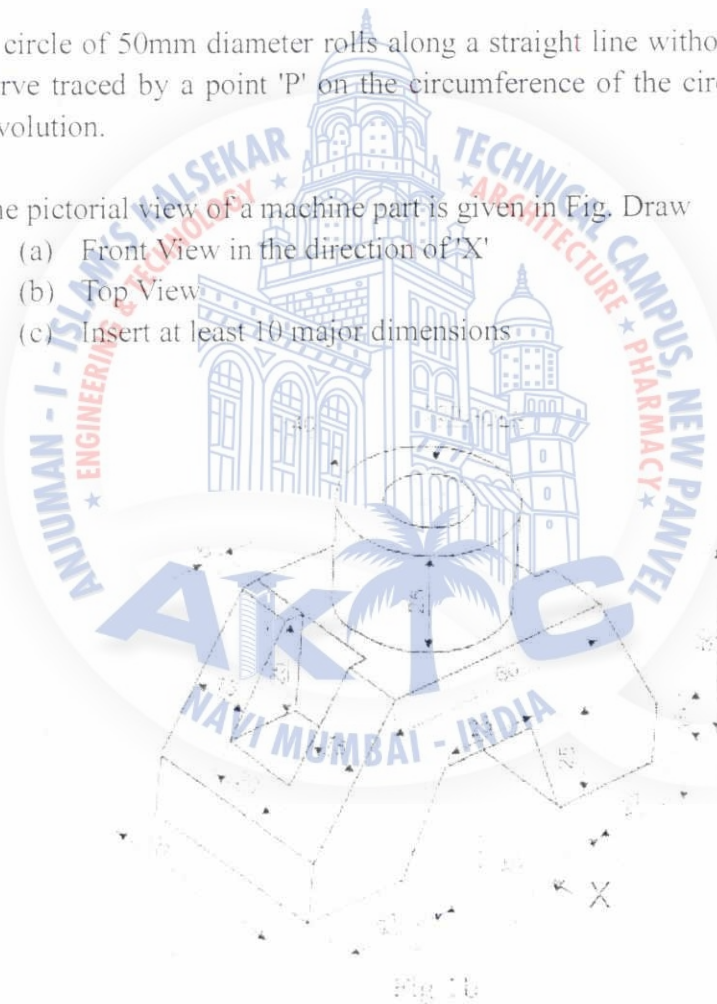   (c) Insert at least 10 major dimensions   1

Fig 1b

2. Figure shows a pictorial view of a machine part, Draw:
    (a) Sectional Front View looking along 'X' (Section A-A)   5
    (b) Top View   4
    (c) LHSV   4
   (d) Insert at least 10 major dimensions.   2

[TURN OVER

3. A pentagonal pyramid of 30mm edge of base and 65mm length of axis has a 30mm edge   15
   on the HP. The axis is inclined at 30° to HP. and 45° to VP. Draw the projections.

4. (a) A cylinder of base diameter 50 mm and height 70 mm is resting on one of the base   6
       point on H.P. with axis inclined at 45° to H.P. parellel to V.P. Draw its projections.

   (b) Draw an isometric view of the following object using natural scale.   9
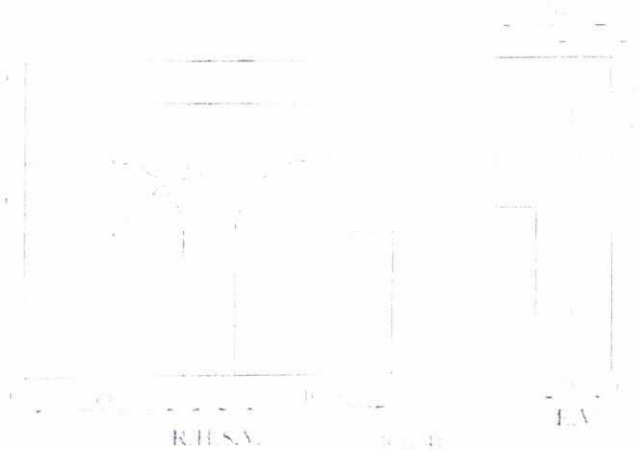
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5. A right circular cone of diameter 60 mm and length of axis 65 mm is resting on HP on its base. It is cut by a cutting plane perpendicular to VP and inclined to HP such that the true shape is a parabola of height 50mm. Draw FV, sectional TV and the true shape of section.   **15**

6. (a) A line AB 90mm long is inclined at an angle of 30^0 to HP and 45^0 to VP. Its end point 'A' is 15mm above HP and 20mm in front of VP. Draw the projections when point 'B' is in the third quadrant.   **9**

    (b) Draw an isometric view of the following object using natural scale.   **6**

Fig.6b

FE - Sem - II - CBSGS - SPA   8/12/17

Q.P. Code :18549

(Time: 3 Hours)   [Max. Marks 80]

Please check whether you have got the right question paper.

N.B
(1) Question no. 1 is compulsory.
(2) Attempt any 3 from the remaining questions.
(3) Assume suitable data if necessary.
(4) Figures to right indicate full marks.

Q1(a)	List and explain the symbols used in a drawing a flowchart.	05
Q1(b)	Compare switch control statement with if-else ladder.	05
Q.1(c)	Explain with example significance of continue, break, goto and return statements.	10
Q2(a)	WAP to cyclically rotate the elements of an array. Program should accept a choice in which direction to rotate - left or right. Depending on the choice it should perform cyclic permutation. Left rotation: i/p={1,2,3,4,5} o/p={2,3,4,5,1} Right rotation: i/p={1,2,3,4,5} o/p={5,1,2,3,4}	10
Q2(b)	Explain Recursion. WAP using recursive function 'power' to compute x^n power(x,n) = 1 if n=0 power(x,n) = x if n=1 power(x,n) = power(x , n-1) otherwise	10
Q3(a)	WAP to find trace and norm of a square matrix. Note: Trace: Sum of diagonal elements of a square matrix Norm: Square root of sum of the squares of all the elements of the matrix.	10
Q3(b)	What is FILE? What are different modes in which file can be opened? What are the different functions available to read and write to file?	10
Q4(a)	WAP for solving the following series. $S = x - x^3/3! + x^5/5! - x^7/7! + \dots\dots x^n/n!$	7
Q.4(b)	What is a pointer? Explain how the pointer variable declared and initialized and Comment on size of pointer variable.	3
Q4 (c)	What is an operator? Explain the arithmetic, relational, logical, bitwise and assignment operators in C language with examples.	10
Q5(a)	Define structure Employee with following details	10

     (i)   Employee code
     (ii)   Employee name
     (iii)   Employee salary
     (iv)   Employee date of joining (dd/mm/yyyy) (Note: Use nested structure)
Write a program to read atleast 10 records of employees and display them in ascending order of employee code.

Q5(b)	Explain storage classes with examples.	10

1

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Q6 (a) What is function? What are function parameters? Explain parameters passing techniques 10
with examples.

Q.6(b) Write user defined functions for following string operations 10
    (i)   To copy one string to another
    (ii)   To compare one string with another

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14/12/17

FE - sem - II - CBSGS - C.S

Q.P. Code :26384

[Time: 2 Hours]   [Marks:40]

Please check whether you have got the right question paper.

N.B: 1.   Question No. 1 is compulsory.
        2.   Attempt any 3 from the remaining questions.
        3.   Figures to the right indicate full marks.

Q.1 a) Explain importance of communication in business.   2
     b) Identify the sender, message, receiver, medium /channel in the following situation: 2
         The doctor informed the members of family about the demise of patient and they all
         started crying.
     c) Mention any four barriers in the process of listening?   2
     d) Fill in the blanks: 4
         i.   An enquiry letter in response to an advertisement_____
         ii.   Greetings to receiver of a letter_____
         iii. Active voice and imperative style is related to_____
         iv.   The process of joining two metals by using heat is known as _____

Q.2 a) Explain the importance of sign language over spoken language   2
     b) Mention at least three points to overcome Semantic barrier   2
     c) Your firm of event management received an enquiry letter from a college for organizing   6
         their annual event. Draft a quotation letter to be sent to the Principal of the collge. (Use
         modified form)

Q.3 a) "Communication is the backbone of the organization" Discuss in detail the formal flow of   3
         communication
     b) What do the following non-verbal cues communicate: 1
         i)   Relaxed posture   ii) open palms

     c) A majority of the books that you had ordered for your Institution have been received in a   6
         damaged condition. Draft a suitable complaint cum claim letter asking for appropriate
         compensation from the supplier. (Use complete block form)

Q.4 a) Identify the barrier: 2
     i)   A signboard "fine for parking".
     ii) The rural people did not understand her speech on cleanliness
     b) 'Silence is more eloquent than words' Explain.   4

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Q.P. Code :26384

c) Match the following

a)	Caution	(i)	Instrument to see minute objects clearly
b)	Warning	(ii)	Instrument used for increasing voice volume
c)	Microphone	(iii)	Wear slippers while changing a fuse wire
d)	Microscope	(iv)	Do not overload machine beyond a prescribed capacity

Q.5 a) Write short notes on i) Haptics   ii) conciseness   4
   b) Differentiate between hearing and listening   2
   c) Give a diagrammatic representation of a letter in complete block form   2
   d) Make sentence with the following pair of words so as to differentiate between their meanings:
      i) access- excess   ii) sail –cell   2

Q.6 a) **Read the following passage and answer the questions that follow:**   5
   It is reported that the government is close to finalizing a system of dual pricing for the public procurement of food grains. There would be two basic elements to this system: A fixed Minimum Support Price (MSP) covering the cost of cultivation, as at present, recommended by the Commission on Agricultural Costs and Prices (CACP), and variable procurement prices, at the discretion of the department of food , depending on market For example, according to a working group of the Planning Commission, over the five year period ending 2001-02 when there was a steep rise in procurement price resulting in accumulation of embarrassing large stock of food grains of over 60 million tones with the government, consumption of food grains in the country was reduced, on this account, by at least five million tons per annum. The new system by assigning a greater role for private trade can improve the efficiency in the distribution of foodgrains and substantially cut down subsidies, which can help to step up much needed public investment in agriculture. The proposed dual pricing system is a better alternative than total marketisation of foodgrains trade by disbanding altogether public procurement at MSP.
   Such a dismantling could lead to a crash in market prices of foodgrains in years of food harvest. Even though this may take exports competitive and raise domestic consumption of food grains in the short run, it may undermine food security by sapping producer incentives. The experience of green revolution underlines the importance of assured MSP including the farmers to step up their own investment and effort and derive full benefit from available infrastructure.
   For the dual pricing system to yield desired results, it needs to be backed by several other policy measures. Since the impetus for crop diversification would be greater in the infrastructurally developed regions like the north-west , this can slow down the growth of foodgrains output in the country and, in particular, the surpluses procured, unless

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immediate measures are taken to strengthen public support for irrigation, technology, extension and credit in the rest of the company, especially in the central and eastern regions where there is a large potentials the growth of food grains output has barely kept pace with population growth since the mid-90s. This also calls for more effective public procurement of food grains at MSP in these regions, as farmers have to often sell their produce immediately after the harvest at prices that are lower than MSP. Therefore, dual pricing system can be sustained only through non-price interventions such as infrastructural support for regional dispersal of growth in foodgrains output.

The new system requires better market intelligence forecasts as well as concurrent analyses on prices and sales in markets in India and abroad

Questions.

(a)   What are the two elements of dual pricing system for procuring foodgrains?

(b)   How will the above proposed system benefit the nation?

(c)   What is the result of ecological degradation in the north-western region of India ?

(d)   In order to boost the dual system what urgent measures are needed to be taken?

(e)   How we can sustain the dual pricing system?

b)   Describe any ONE of the following objects giving definition, diagram, components &   3
       working. Electronic Voting Machine, Digital camera

c)   Use one word for the following statements.   2
       1. Words which have the same meaning,
       2. A person with a positive approach

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