L-2/T-1/IPE **Date : 07/08/2016**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-1 B. Sc. Engineering Examinations 2015-2016

Sub : **EEE 271** (Electrical Machines and Electronics)

Full Marks: 210 Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

All the symbols and notations have their usual meanings.

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) What are the components of the excitation current of a transformer? Explain the wave shapes of these currents. How are they modeled in the equivalent circuit? **(15)**

(b) A 20-kVA, 8000/480-V distribution transformer has the following resistances and reactances: **(20)**

$R_p = 32\ \Omega$, $R_s = 0.05\ \Omega$, $X_p = 45\ \Omega$, $X_s = 0.06\ \Omega$, $R_c = 250\ k\Omega$, $X_M = 30\ k\Omega$

The excitation branch impedances are given referred to the high-voltage side of the transformer.

(i) Find the equivalent circuit of this transformer referred to the high voltage side.

(ii) Assume that this transformer is supplying rated load at 480 V and 0.8 pF lagging. What are its voltage regulation and efficiency?

2. (a) Why does the power factor of a load affect the voltage regulation of a transformer? Explain with phasor diagrams for lagging, leading and unity pF by neglecting the effect of exciting current. **(20)**

(b) Using the formula $\vec{\tau}_{ind} = k\vec{B}_R \times \vec{B}_{Net}$, graphically develop an induction motor torque speed characteristics. **(15)**

3. (a) A 460-V, 25 hp, 60 Hz, four-pole, Y-connected wound-rotor induction motor has the following impedances per-phase referred to the stator circuit: **(20)**

$R_1 = 0.641\ \Omega$, $R_2 = 0.332\ \Omega$, $X_1 = 1.106\ \Omega$, $X_2 = 0.464\ \Omega$, $X_M = 26.3\ \Omega$

(i) What is the maximum torque of this motor? At what speed and slip will it occur?

(ii) When the rotor resistance is doubled, what is the speed at which the maximum torque now occurs? What is the new starting torque of the motor?

(b) Describe any two methods of speed control of three phase induction motors with appropriate circuit diagram(s). **(15)**

Contd P/2

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4. (a) A 208-V, 45 kVA, 0.8-pF-leading, Δ-connected, 60 Hz synchronous machine has a synchronous reactance of 2.5 Ω and a negligible armature resistance. Its friction and windage losses are 1.5 kW, and its core losses are 1.0 kW. This motor is supplying a 15-hp load with an initial power factor of 0.85 pF lagging. **(20)**

   (i) Sketch the initial phasor diagram of this motor and find I_A and E_A.

   (ii) If the motor's flux is increased by 25%, sketch the new phasor diagram of the motor. What are E_A, I_A, and the power factor of the motor now?

   (b) Explain why cannot synchronous motor start by itself with appropriate diagram. Briefly describe any one technique of starting a synchronous motor. **(15)**

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) Briefly describe various methods to solve commutation problems in a DC machine. **(15)**

   (b) Derive the expression of induced torque in the simplest DC machine. Also explain two different methods of changing the direction and magnitude of the induced torque. **(12)**

   (c) Briefly describe various type of losses that occur in a DC machine and show them in the power flow diagram. **(8)**

6. (a) What are the limiting speed of armature voltage and field control method of a DC shunt motor? Draw and explain briefly the torque-speed and power-speed curves. **(15)**

   (b) A 7.5 hp, 120 V series DC motor has an armature resistance of 0.2 Ω and a series field resistance of 0.16 Ω. At full load, the current input is 58 A and the rated speed is 1050 rpm. Its magnetization curve is given in Fig. 6(b). Core losses are 200 W and mechanical losses are 240 W. Assume that the mechanical losses vary as the cube of the speed of the motor and core losses are constant. **(20)**

   (i) What is the efficiency of the motor at full load?

   (ii) What are the speed and efficiency of the motor if it is operating at an armature current of 35 A?

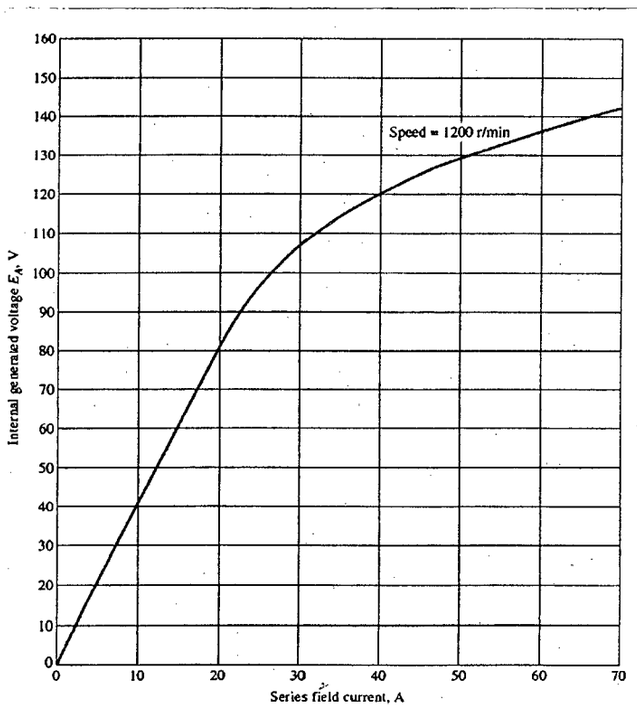


Fig. 6 (b)

Contd P/3

EEE 271 (IPE)

7. (a) For the following circuit, find the expression of output voltage in terms of V_1, V_2 and V_3. If $V_2 = -2V$ and $V = 3V$ and V_1 is a triangular wave as shown in Fig. 7(a). Sketch the current through the R_L. **(20)**

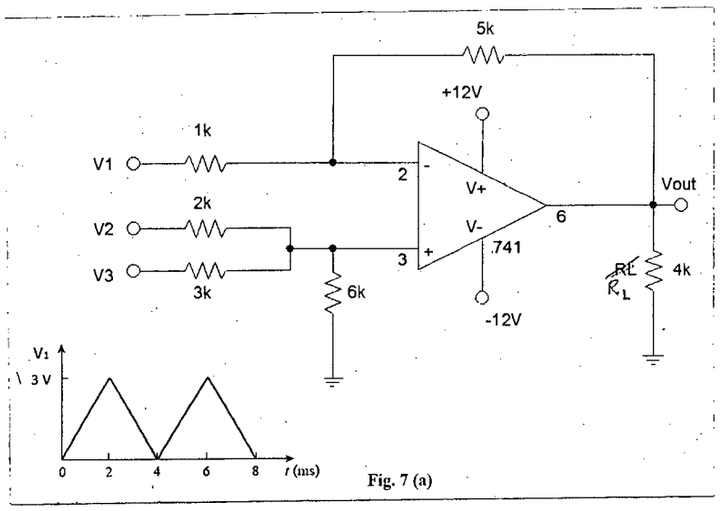


Fig. 7 (a)

(b) Design a circuit using OP-Amp that will implement the following function: **(15)**

$$v_{out}(t) = 3\frac{d^2 v_1}{dt^2} - 2\frac{dv_2}{dt}$$

8. (a) Derive the expression of input power factor for a single phase full wave controlled rectifier with appropriate sketch. Also determine the input power factor for a firing angle, $\alpha = 60^\circ$. **(20)**

(b) Briefly explain the SCR turn on process using two transistor model. Also define the holding current and latching current of a SCR. **(15)**

L-2/T-1/IPE **Date : 17/07/2016**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-1 B. Sc. Engineering Examinations 2015-2016

Sub : **ME 245** (Engineering Mechanics and Theory of Machines)

Full Marks: 280 Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

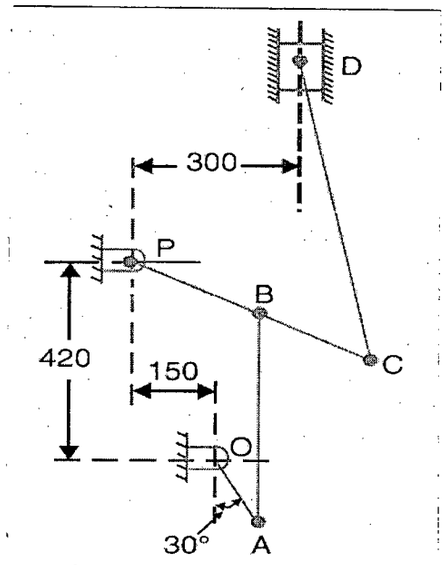
The figures in the margin indicate full marks.

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. Find out the acceleration of the slider D and the angular acceleration of link CD for the engine mechanism shown in Fig. 1. **(46⅔)**

   The crank OA rotates uniformly at 180 r.p.m. in clockwise direction. The various lengths are: OA = 150 mm; AB = 450 mm; PB = 240 mm; BC = 210 mm; CD = 660 mm.



All dimensions in mm.

Fig. for Q. No: 1

2. (a) In a flat belt drive, the initial tension is 2000 N. The coefficient of friction between the belt and the pulley is 0.3 and the angle of lap on the smaller pulley is 150°. The smaller pulley has a radius of 200 mm and rotates at 500 r.p.m. Find the power in kW transmitted by the belt. **(20)**

   (b) An epicyclic gear consists of three gears A, B and C as shown in Fig. 2(b). The gear A has 72 internal teeth and gear C has 32 external teeth. The gear B meshes with both A and C and is carried on an arm EF which rotates about the centre of A at 18 r.p.m.. If the gear A is fixed, determine the speed of gears B and C. **(26⅔)**

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ME 245/IPE

Contd... Q. No. 2(b)

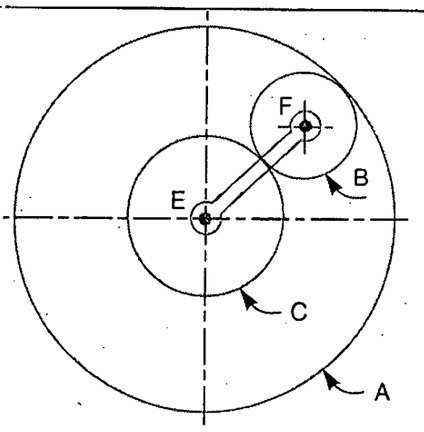

Fig. for Q. No: 2(b)

3. Construct the profile of a cam to suit the following specifications: **(46⅔)**

Cam shaft diameter = 40 mm; Least radius of cam = 25 mm; Diameter of roller = 25 mm; Angle of lift = 120°; Angle of fall = 150°; Lift of the follower = 40 mm; Number of pauses are two of equal interval between motions.

During the lift, the motion is S.H.M. During the fall, the motion is uniform acceleration and deceleration. The speed of the cam shaft is uniform. The line of stroke of the follower is off-set by 15 mm from the centre of the cam.

4. (a) The water tank shown in Fig. 4(a) is 92 m high and is made of reinforced concrete with a tubular cross section of inner diameter 2.5 m and outer diameter 3 m. The tank weighs 270 ton when filled with water. Assuming the Young's modulus of reinforced concrete as 27.5×10^9 N/m^2, determine the following: **(20)**

(i) By neglecting the mass of the support, the natural frequency of transverse vibration of the water tank.

(ii) If the support has a mass of 2 ton/m, what will be the natural frequency of transverse vibration of the water tank.

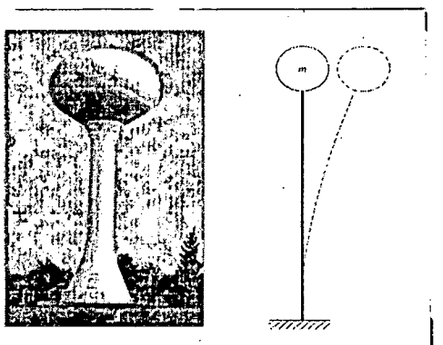

Fig. for Q. No: 4(a)

(b) A, B, C and D are four masses carried by a rotating shaft at radii 100, 125, 200 and 150 mm respectively. The planes in which the masses revolve are spaced 600 mm apart and the mass of B, C and D are 10 kg, 5 kg, and 4 kg respectively. Find the required mass A and the relative angular settings of the four masses so that the shaft shall be in complete balance. **(26⅔)**

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) One end of the boom AB is fixed at A as shown in Fig. 5(a). A steel cable is stretched from the free end B of the boom to a point C located on the vertical wall. If the tension in the cable is 2.5 kN, determine the moment about A of the force exerted by the cable at B. **(24⅔)**

   (b) Two rods are connected by a slider block as shown in Fig. 5(b). Neglecting the effect of friction, determine the couple $\mathbf{M}_A$ required to hold the system in equilibrium. **(22)**

6. (a) Determine the force in members GJ, IG and HI of the truss shown in Fig. 6(a). **(26⅔)**

   (b) A ladder AB leans against a wall as shown in Fig. 6(b). Assuming that the coefficient of static friction μ_s is zero at B, determine the smallest value of μ_s at A for which equilibrium is maintained. **(20)**

7. (a) Determine the ratio *a*/*b* for which centroidal coordinates $x_c = y_c$ for the area shown in Fig. 7(a). **(20)**

   (b) Determine the moment of inertia of the shaded area shown in Fig. 7(b) with respect to the *x*-axis. This shaded area is obtained by cutting out a half circle of radius 90 mm from a rectangle of height 120 mm and width 240 mm. **(26⅔)**

8. (a) Two blocks as shown in Fig. 8(a) are released from rest, determine the acceleration of each block and the tension in the cord. Assume that the coefficient of kinetic friction between block A and the plane is 0.25 and the pulley is frictionless and weightless. **(22)**

   (b) A uniform slender rod of length 1 m and weigh 2 kg hangs freely from a hinge at A as shown in Fig. 8(b). If a force **P** = 7 N is applied at B horizontally, determine (i) the angular acceleration of the rod and (ii) the components of the reaction at A. **(24⅔)**

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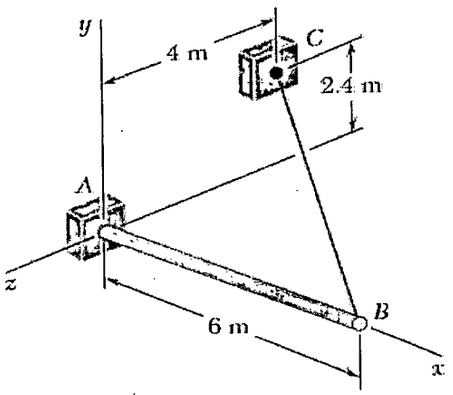


Fig. 5(a)

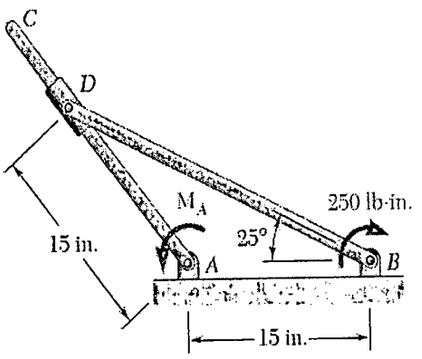


Fig. 5(b)

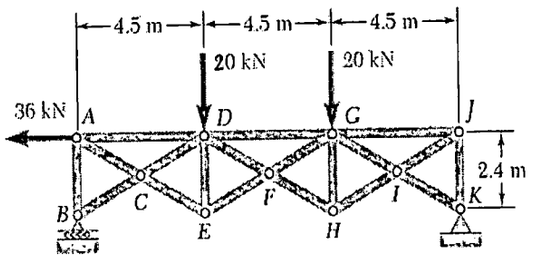


Fig. 6(a)

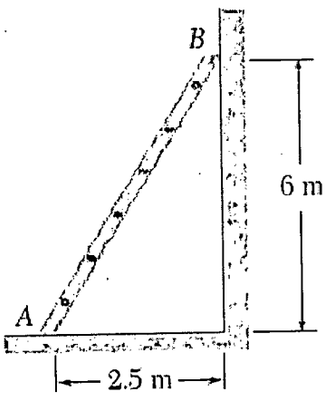


Fig. 6(b)

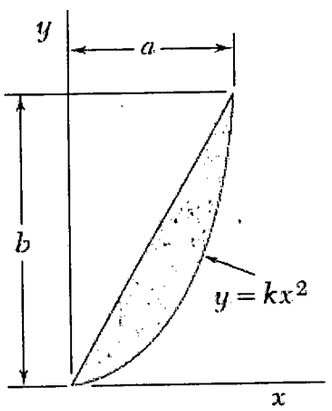


Fig. 7(a)

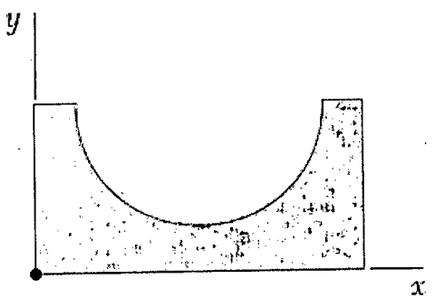


Fig. 7(b)

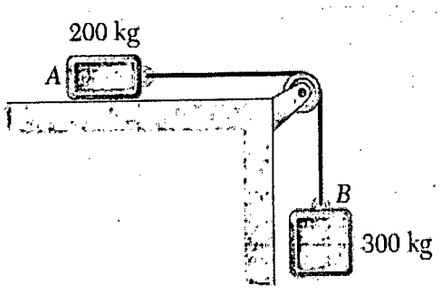


Fig. 8(a)

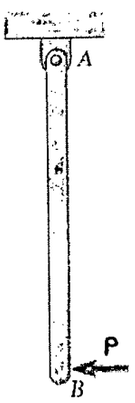


Fig. 8(b)

L-2/T-1/IPE **Date : 23/07/2016**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-1 B. Sc. Engineering Examinations 2015-2016

Sub : **MATH 291** (Differential Equations, Vector Calculus and Laplace Transforms)

Full Marks: 210 Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

Symbols used have their usual meaning.

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) Find the differential equation by eliminating arbitrary constants a and b from the equation $y = ae^{3x} + be^{-2x}$. **(10)**

   (b) Solve the following equations:

   (i) $(2x-5y+3)dx-(2x+4y-6)dy=0$ **(13)**

   (ii) $(y^4+2y)dx+(xy^3+2y^4-4x)dy=0$ **(12)**

2. (a) If the temperature of the air is 300 K and the substance cools from 380 K to 350 K in 15 minutes, using Newton's law of cooling find when the temperature will be 315 K. **(10)**

   (b) Solve: $\frac{d^3y}{dx^3}-3\frac{d^2y}{dx^2}+4\frac{dy}{dx}-2y=e^x+\cos x$. **(13)**

   (c) Solve: $x^3\frac{d^3y}{dx^3}+3x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}+y=x\ln x$. **(12)**

3. Find the series solution of the following differential equation by using the method of Fröbenius: **(35)**

$$x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}+(x^2-4)y=0$$

4. (a) Prove that: $\frac{d}{dx}\{xJ_n(x)J_{n+1}(x)\}=x\{J_n^2(x)-J_{n+1}^2(x)\}$. **(10)**

   (b) Show that: $nP_n(x)=xP_n'(x)-P_{n-1}'(x)$. **(10)**

   (c) Prove that: $P_n(x)=\frac{1}{2^n(n!)}\frac{d^n}{dx^n}(x^2-1)^n$. **(15)**

Contd P/2

MATH 291/IPE

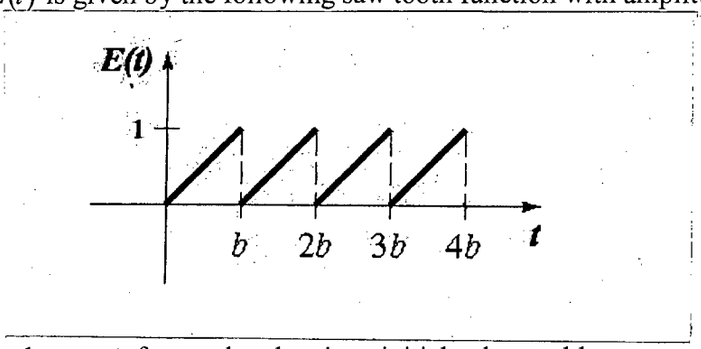
SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) By using the definition of error function $erf(t)=\frac{2}{\sqrt{\pi}}\int_0^t e^{-u^2}du$ prove that $\mathcal{L}\{erf\sqrt{t}\}=\frac{1}{s\sqrt{s+1}}$. Hence show that $\mathcal{L}\{erfc\sqrt{t}\}=\frac{1}{\sqrt{s+1}\left(\sqrt{s+1}+1\right)}$ where $erfc(t)$ is the complementary error function. **(20)**

(b) sing Heaviside's expansion formula find $\mathcal{L}^{-1}\left\{\frac{s+5}{(s+1)(s^2+1)}\right\}$. **(15)**

6. (a) Solve the differential equation $L\frac{di}{dt}+Ri(t)=E(t)$ subject to $i(0)=0$ with L = 1, R = 1 and $E(t)$ is given by the following saw tooth function with amplitude 1 and b = 1. **(20)**



(b) Using Laplace transform solve the given initial value problem. **(15)**

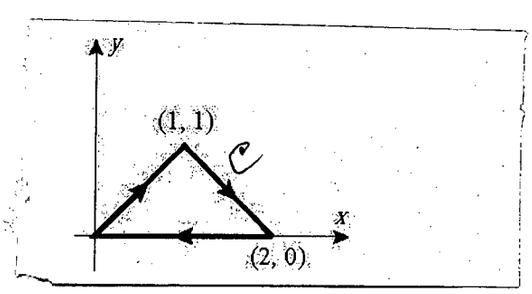
$$y''-2y'=1+\delta(t-2),\qquad y(0)=0,\qquad y'(0)=1$$

7. (a) Sketch the space curve $x=3\cos t$, $y=3\sin t$, $z=4t$ and find (i) the unit tangent **T**, (ii) the principal normal **N**, (iii) the binormal **B**, (iv) curvature κ, (v) torsion τ. **(20)**

(b) Find the values of the constants a, b, c such that the directional derivative of $\phi=axy^2+byz+cz^2x^3$ at (1, 2, −1) has a maximum magnitude 64 in the direction parallel to z-axis. **(15)**

8. (a) Prove that $\vec{F}=\left(y^2\cos x+z^3\right)\mathbf{i}+\left(2y\sin x-4\right)\mathbf{j}+\left(3xz^2+2\right)\mathbf{k}$ is a conservative force field. Find the scalar potential for $\vec{F}$. **(10)**

(b) If $\vec{F}=\left(2x+y^2\right)\mathbf{i}+\left(3y-4x\right)\mathbf{j}$, evaluate $\oint_C \vec{\mathbf{F}}.\overline{\mathbf{dr}}$ around the following triangle C. **(10)**



(c) Verify Divergence Theorem for $\vec{F}=2xy\mathbf{i}+yz^2\mathbf{j}+xz\mathbf{k}$ over the surface of the parallelepiped bounded by the plane $x=0$, $y=0$, $z=0$, $x=2$, $y=1$ and $z=3$. **(15)**

L-2/T-1/IPE **Date : 27/07/2016**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-1 B. Sc. Engineering Examinations 2015-2016

Sub : **MME 295** (Engineering Materials II)

Full Marks: 140 Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) Using figures, show that the stability of ionic compounds varies with size of the ions and hence explain the role of ionic radii ratio in determining crystal structure. **(6⅓)**

   (b) Draw the unit cell of $BaTiO_3$ and show that charge neutrality is maintained, i.e the unit cell contains one Ba^{2+}, one Ti^{4+} and three O^{2-} ions. **(5)**

   (c) Explain the effects known as ferroelectricity, pyroelectricity and piezoelectricity using the structure of $BaTiO_3$ and discuss how these effects are used in applications such as RAMs, ultrasound transducers and infrared imaging sensors. **(12)**

2. (a) Discuss the sequential steps required to produce a bone china (clay-based) flower vase beginning from raw materials to final decoration, with reasons. Include a description of the forming process suitable for this product with figures. **(12)**

   (b) Write short notes on different methods of powder manufacture. **(5)**

   (c) Schematically show liquid state sintering and solid state sintering and discuss what happens in each case briefly. **(6⅓)**

3. (a) Consider a collection of 100,000 spherical particles of a certain material with radius 5 μm and surface free energy 1 J/m^2. The grain boundary energy of the same material is 1.5 J/m^2. Show that the free energy of the system is lowered when the particles join together (sinter) and form a single mass. Assume for simplicity that after sintering there is zero porosity and that grains can be approximated as spherical with the same radius. Neglect the free surface energy of the joined single mass. [You can assume that two free surfaces get eliminated to form only one grain boundary]. **(12)**

   (b) Smaller particles can be sintered more easily. Using your analysis in part (a) can you prove that, indeed 1 μm sized particles have a larger thermodynamic driving force for sintering than 5 μm sized particles. **(5)**

   (c) Show the specific volume vs temperature curve of glass compared to a crystalline solid. Give a brief explanation for this behavior. **(6⅓)**

4. (a) Why is glass usually optically transparent? How is color produced in glasses? **(5⅓)**

   (b) How is glass toughened chemically? Explain the reason why this treatment leads to higher strength and scratch resistance. **(8)**

   (c) What do you understand by dispersion in the context of optical fibers? Discuss the mechanism of modal dispersion and argue how this can be minimized using graded index fiber. **(10)**

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SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) Mention the differences in behavior and molecular structure for thermoplastic and thermosetting polymers. **(6)**

(b) Classify the polymer materials according to their molecular structure. Draw the corresponding molecular structure for each types. **(8)**

(c) The number-average molecular weight of a polypropylene is 1,000,000 g/mol. Compute the degree of polymerization. **(4)**

(d) Why the tendency of a polymer to crystallize decreases with increasing molecular Weight? **(5⅓)**

6. (a) Discuss the influence of molecular weight and polymer crystallinity on tensile modulus of semicrystalline polymer. **(7⅓)**

(b) Describe the injection molding process for thermoplastic polymers. **(9)**

(c) What is vulcanization? How can it be achieved? Write down the effect of vulcanization on properties of polymer. **(7)**

7. (a) Write a short note on the following topics: (i) Thermoplastic elastomer, (ii) Glass fiber reinforced Polymer Composite, (iii) Copolymer, (iv) Sandwich panels. **(16)**

(b) Discuss the fracture behaviour of thermoplastic material with neat sketches. **(7⅓)**

8. (a) What is composite material? **(3)**

(b) A continuous and aligned fiber-reinforced composite is to be produced consisting of 45 vol% aramid fibers and 55 vol% of a polycarbonate matrix. Mechanical characteristics of these two materials are as follows: **(15)**

	Modulus Tensile of Elasticity (GPa)
Aramid Fiber	131
Polycarbonate	2.4

(i) For this composite, compute the longitudinal modulus of elasticity.

(ii) If the composite has a cross-sectional area of 480 mm^2 and is subjected to a longitudinal load of 53,400 N. Calculate the actual loads carried by both fiber and matrix phases.

(iii) Determine the individual strain in each phase and comment on obtained values.

(c) Explain the influence of fiber length on the properties of fiber reinforced composites. **(5⅓)**

L-2/T-1/IPE **Date : 01/08/2016**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-1 B. Sc. Engineering Examinations 2015-2016

Sub : **CSE 295** (Computer Programming Techniques)

Full Marks: 210 Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) Write a C language program to display the largest element in a 2-D matrix. **(10)**

   (b) Write a C language program to calculate the series 1/1! + 2/2! + 3/3! + ... up to n terms. **(10)**

   (c) Write a C language program which takes two strings as input and remove common character in both strings and display remaining strings. **(10)**

   (d) What is meant by NULL point and void*? **(5)**

2. (a) Write a C language program to read a string and output the frequency of each character in that string. **(10)**

   (b) What is meant by Type Casting in C? **(5)**

   (c) Write a recursive function to find square root of a number. **(12)**

   (d) What will be the output of following program? **(8)**

```
#include<stdio.h>
#include<string.h>
int main(){
    int a,b,c,d;
    char *p = ( char *)0;
    int *q = ( int *q)0;
    float *r = ( float *)0;
    double *s = 0;
    a = (int)(p+1);
    b = (int)(q+1);
    c = (int)(r+1);
    d = (int)(s+1);
    printf("%d %d %d %d",a,b,c,d);
return 0;
}
```

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CSE 295

3. (a) Write a C program using Structure to generate score card of a cricket match, which will accept name of player, number of balls played, number of runs scored, and wickets taken. Display the details of the player having highest wicket taken. **(15)**

(b) What is indirection operator? Give an example of indirection in an array of structures. **(12)**

(c) What will be the output if you will execute following code? **(8)**

```
#include<stdio.h>

struct emp{
     char *name;
     int id;
};

int main(){

     static struct emp
e1={"A",1},e2={"B",2},e3={"C",3};
     struct emp(*array[])={&e1,&e2,&e3};
     struct emp(*(*ptr)[3])=&array;

     printf("%s %d",(**(*ptr+1)).name,(*(*ptr+1))-
>id);

return 0;
}
```

4. (a) Writ a file handling program in C to count and display the number of spaces, lines, special symbols, vowels, numbers and words in an input file. **(15)**

(b) What is header file in C? **(5)**

(c) Write a C program which concatenates two files and write it in a third file. **(10)**

(d) What is the function of EOF in C? **(5)**

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) What are the tasks of Compiler, Standard Library and Integrated Development Environment (IDE)? What is the importance of operator precedence? **(9+5=14)**

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Contd... Q. No. 5

(b) Write short note on each of the followings: **(12)**

(i) Keyword

(ii) Variable

(iii) Data type

(c) What is the difference between a postfix and a prefix increment operator? Explain with example code fragments. **(9)**

6. (a) Write a C program that will take a "BUET student id" as in integer input (DO NOT use array), and separately print bath id, department id and roll number. **(14)**

Sample Input:

1405120

Sample Output:

Batch ID: 14

Department ID: 5

Roll Number: 120

(b) Using conditional expressions (DO NOT use array), write a C program that will take three integer numbers as input and print the second maximum of these three numbers. **(12)**

(c) What is the output of the following code fragment? **(9)**

```
#include<stdio.h>

int main()
{
    int i,j,k;

    for(i=0;i<2;i++)
    {
        for(j=3;j>i-1;j--)
        {
            k=1;
            do
            {
                printf("%d, %d, %d\n",i,j,k);
                k++;
            }while(k<j);
        }
    }

    return 0;
}
```

Figure: Code fragment for Q. 6(c)

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7. (a) (i) Briefly discuss about the arrangement of 2-D array in memory. **(3+11=14)**

(ii) In C programming, use a 2-D (two dimensional) array to represent a matrix. If we want to write a code to add two matrices (of same size), at first we take inputs into two 2-D arrays, then add and store the added result of the arrays (matrices) into a separate 2-D array, and finally print the content of the resultant array. Consider the following C code snippet:

```
#include<stdio.h>

int main()
{
    int r,c,i,j;
    int A1[100][100], A2[100][100];
    int result[100][100];

    //The row and column numbers are same for both arrays "A1" and "A2".
    //The value of r means the row number (r<100).
    //The value of c means the column number (c<100).

    scanf("%d%d",&r,&c);

    //Point 1: write the code fragment to scan the inputs into the arrays
    //"A1" and "A2"


    //Point 2: write the code fragment to add the arrays "A1" and "A2"
    //and store the result into the "result" array


    //Point 3: write the code fragment to print the "result" array


    return 0;
}
```

Figure: Code snippet for Q. 7(a)

Write only the code fragments necessary for the Points 1, 2 and 3. (You need NOT rewrite the whole program from top to bottom)

Contd P/5

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Contd... Q. No. 7

(b) Why "do-while" loop is different from "while" and "for" loops? Write down the output of the following code fragment: **(5+7=12)**

```
#include<stdio.h>

int main()
{
    int i=3;

    while(i>=0)
    {
        switch(i)
        {
        case 3:
            printf("Three\n");
        case 2:
            printf("Two\n");
        case 1:
            printf("One\n");
        default:
            printf("Other\n");
        }
        i--;
    }

    return 0;
}
```

Figure: Code fragment for Q. 7(b)

(c) Using any type of loop, write a C program that will take two integer numbers as input and print the GCD (Greatest Common Divisor) of these two numbers. **(9)**

8. (a) In C, we often use a library function named pow() which takes two double numbers, for example, x and y, and determines the value of x^y. If the value of x is 5.0 and the value of y is 2.0, then it will return 25.0. Now, we don't want to use pow() library function any more; rather we are interested in writing our own function `powerGenerator()` which will be almost similar to pow() function, but will handle only the integer numbers. The definition of this function is as follows: **(14)**

```
int powerGenerator(int x, int y)
```

Write down the full body of this function using any type of loop (not recursion) assuming that both the values of x and y can be positive, zero or negative.

(b) In case of a function, what is the difference between "call by value" and "call by reference"? Explain with example code fragments. **(12)**

(c) Write the code fragment to sort a 1-D array of integers using BUBBLE sort in ascending order. **(9)**
