13/5/19 Lab

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

9:30

End Semester Examinations- May 2019

Program: Civil/ Mechanical/ Electrical

Course Code: BS-BT201

Course Name: Engineering Mathematics II

Duration: 3 hours

Maximum Points: 100

Semester: II

Instructions:

1. Question No 1 is compulsory.
2. Attempt any four questions out of remaining six questions.

Q.No.	Questions	Points	CO	BL	PI
1(a)	Find the area of the region that lies inside the circle $r = a\sin\theta$ but outside the cardioide $r = a(1+\cos\theta)$	6	4	ii, iii	1.1.1
(b)	Prove that $\int_0^\infty xe^{-ax}\sin(bx)dx = \frac{2ab}{(a^2+b^2)^2}$	6	3	iv, v	2.4.1
(c)	Solve $(D^3-7D-6)y = \cosh x \cdot \sin 2x$	8	2	ii, v	2.4.1
2(a)	Evaluate $\int_0^1 \int_0^{1-y^2} [(x-1)^2+y^2]dxdy$	6	4	i, ii	2.4.1
(b)	Solve $\left[\frac{y^2}{(y-x)^2} - \frac{1}{x}\right]dx + \left[\frac{1}{y} - \frac{x^2}{(x-y)^2}\right]dy = 0$	6	1	ii, iii	1.1.1
(c)	Prove that $\lceil m \cdot \lceil m+\frac{1}{2} = \frac{\sqrt{\pi}}{2^{2m-1}} \cdot \lceil 2m$	8	3	ii, iii	1.1.1
3(a)	Solve $(D^2-9D+18)y = e^{e^{-3x}}$	6	2	i, ii	2.4.1
(b)	Prove that $\int_0^{\pi/2} \tan^n x\,dx = \frac{\pi}{2}\sec\left(\frac{\pi n}{2}\right)$	6	3	ii, iii	2.4.1

(c)	Evaluate $\iint_R xy(x-1)dxdy$, where R is the region bounded by the curves $xy=5$, $y=0$, $x=1$ & $x=5$.	8	4	iv, v	1.1 .1
4(a)	Solve $\frac{dy}{dx}-xy=y^2e^{-x^2/2}\log x$	6	1	i, ii	1.1 .1
(b)	Evaluate $\iiint_V \frac{z^2}{x^2+y^2+z^2}\,dxdydz$ over the volume of the sphere $x^2+y^2+z^2=a^2$	6	4	iv, v	2.4 .1
(c)	Evaluate $\int_0^a\int_0^y \frac{x}{\sqrt{(a^2-x^2)(a-y)(y-x)}}dxdy$ by changing the order of integration.	8	4	ii, iii	2.4 .1
5(a)	Find the length of the loop of the curve $9ay^2=(x-2a)(x-5a)^2$.	6	3	i, ii	2.4 .1
(b)	Evaluate $\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} \frac{1}{(a^2+x^2+y^2)^{3/2}}dxdy$	6	4	ii, iii	2.4 .1
(c)	Prove that $\int_0^{\pi/2} \frac{\cos^{2m-1}\theta.\sin^{2n-1}\theta}{(a^2\cos^2\theta+b^2\sin^2\theta)^{m+n}}d\theta=\frac{\beta(m,n)}{2\cdot a^{2m}.b^{2n}}$	8	3	iv, v	1.1 .1
6(a)	Solve $\frac{dy}{dx}=\frac{\tan y-3x^4}{x\sec^2 y-x^2\cos y}$	6	1	ii, v	1.1 .1
(b)	Solve by the method of variation of parameters, $\frac{d^2y}{dx^2}+y=\frac{1}{1+\sin x}$	6	2	iv, v	2.4 .1
(c)	Evaluate $\int_1^e\int_1^{\log y}\int_1^{e^x}\log z\,dxdydz$	8	4	i, ii	1.1 .1

7(a)	Find the length of the arc of the cardioide $r = a(1-\cos\theta)$ which lies outside the circle $r = a\cos\theta$.	6	3	i, ii	1.1 .1
(b)	Find the mass of the lemniscate $r^2 = a^2\cos 2\theta$, if the density at any point is proportional to the square of the distance from the pole.	6	4	ii, iii	2.4 .1
(c)	Solve $(2x+1)^2\frac{d^2y}{dx^2} - 2(2x+1)\frac{dy}{dx} - 12y = x^2 - 6x + 1$	8	2	ii, v	1.1 .1

Lab

15/5/19 9:30

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SARDAR PATEL COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to University of Mumbai)

End Semester Examination for F.Y.B Tech (Civil/Mechanical/Electrical)

2018-19

15/05/2019

Total Marks: **100** Duration: **3 Hrs**

CLASS/SEM : **F.Y.B Tech (C/M/E) Sem.-II**

COURSE NAME : **APPLIED PHYSICS-II**

COURSE CODE: **BSBT205**

- **Question No 1 is compulsory.**
- **Answer any FOUR out of remaining SIX questions.**
- **Diagrams have to be drawn wherever necessary.**
- **Assume suitable data (if necessary) and state your assumption/s clearly!**

Good luck!

		Mark	Module	CO	BL	PI
Q1.	**Answer any five from (a) to (f)**					
a.	Find gradient of magnitude of position vector and comment on the result.	4	1	1	1	1.2.1 1.1.1
b.	Check if the following function is an impossible magnetic field! $\vec{B} = k[y^2\hat{x} + (2xy + z^2)\hat{y} + 2yz\hat{z}]$ Here, k is a constant with appropriate units.	4	2	1	1	1.2.1 1.1.1
c.	Derive continuity equation from 4th Maxwell's equation.	4	3	2	2	1.2.1 1.1.1
d.	A slit of width 'a' is illuminated by white light. For what value of 'a' will the first minimum of light of wavelength 650nm appear at θ=15°? What is the wavelength λ' of the light whose first side diffraction maximum is at 15°, thus coinciding with the first minimum for the red light?	4	4	3	3	2.1.3
e.	Explain how population inversion in a necessary condition for laser action to take place.	4	5	4	2	1.2.1
f.	Fill in the blanks: (Fill in giving proper reasons else zero mark will be given) (i) Monochromaticity in lasers is given by the formula_____. (ii) The velocity of electromagnetic waves in free space is given by the formula_____.	 2 2	 5 3	 4 2	 1 1	1.2.1
Q2.						
a.	Derive Gauss' law in integral and differential form and hence explain significance of the same.	10	1	1	2	1.1.1 1.2.1
b.	Explain why the wedge shaped fringes are straight and parallel and equidistant. Hence, derive an expression for the fringewidth between the fringes.	6	4	3	2	1.2.1
c.	Calculate the areal spread and intensity of the image when output beam from a 0.1W Ruby laser with an aperture of 5mm, is focused with a lens having focal length 0.1m.	4	5	4	3	2.1.3

Q3.						
a.	Give expressions for divergence and curl of magnetostatic field and explain significance of the divergence of the field. If $\overline{B}$ is uniform, and $\overline{A(r)} = -\frac{1}{2}(\overline{r} \times \overline{B})$. Find: divergence and curl of A.	10	2	1	1,3	1.1.1 1.2.1
b.	Write down the (real) electric and magnetic fields for a monochromatic plane wave of amplitude E_0, frequency ω and phase angle zero that is traveling in the negative x-direction and polarized in the z-direction (i.e. motion of electric field is along the z-direction). Also, sketch the wave, and give the explicit Cartesian components of k and n.	6	3	2	4	1.2.1 2.1.3
c.	For proper resolution, 491 lines are required. Calculate the minimum number of lines in a grating which will just resolve the sodium light with wavelengths 5890A° and 5896A° in the first order spectrum.	4	4	3	3	1.2.1
Q4.						
a.	Derive and explain Poynting's theorem.	10	3	2	2	1.2.1
b.	Explain working of a four level pumping scheme in lasers. Also explain why a two level pumping scheme is inefficient.	6	5	4	2	1.2.1
c.	Check the divergence theorem for the following function: $\overline{v_1} = r^2\hat{r}$	4	1	1	1	1.1.1 1.2.1
Q5.						
a.	State the expression for the intensity distribution through a diffraction grating and derive the conditions for maxima, minima and subsidiary maxima. Also plot diffraction curve for the value of N=4, b=2a (up to scale).	10	4	3	1,2	1.2.1
b.	Suppose the electric field in some region is found to be $\overline{E} = kr^3\hat{r}$, in spherical coordinates, (k is some constant), a. Find the charge density ρ. b. Find the total charge contained in the sphere of radius R, centered at the origin.	6	1	1	3	1.1.1 2.1.3
c.	A laser beam has wavelength of 7200A° and aperture 5mm. The laser beam is sent to moon at a distance $4x10^8$m from earth. Determine (a) angular spread and (b) Areal spread when it reaches the moon.	4	5	4	3	1.2.1 2.1.3
Q6.						
a.	Explain construction and working of a He-Ne laser and hence explain why a specific proportion of He:Ne gases is used.	10	5	4	2	1.2.1
b.	State and explain fundamental theorem of gradients and further check the theorem for the function $T=xy^2$, by taking point a to be origin and b (2,1,0).	6	1	1	1,2	1.1.1 1.2.1
c.	When current flows down a wire, work is done, which shows up as Joule heating of the wire. Using Poynting's theorem, find the energy per unit time delivered to the wire assuming the electric field to be uniform.	4	3	2	4	1.2.1 2.1.3
Q7.						
a.	Describe Biot-Savart's law. Calculate the magnetic field at a distance s from a long straight wire carrying a current I.	10	2	1	2	1.2.1
b.	A monochromatic light with a frequency of $7.5x10^{14}$ Hz is travelling through the air and is incident on a thin film coating on top of a piece of glass (R.I 1.5). Evaluate the minimum thickness of the film which will make the film act as an antireflection coating.	6	4	3	3	1.2.1
c.	Show how Maxwell corrected Ampere's law.	4	3	2	3	1.2.1

Lab
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Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.

End-Sem-I
May- 2019

Max. Marks: **100 marks** Duration: **180 Min**
Class: F.Y B.TECH C/M/E Semester: II Program:
Name of the Course: **Applied Chemistry –II** Course Code : BS-BT-256

Instructions:

1 Question **No** (Q1) is compulsory
2 Attempt any 4 from Q2Q3 Q4 Q5Q6

Que. No	Question	Points	CO	BL	PI
Q1					
a	A Coal sample contain following composition by weight C=82%, H=3%,O=5%, S=2%,N=3% and Ash=5% calculate gross and net calorific value	**5**	3	3	3.2.1
b	Calculate the Atom Economy for following reaction C6H5CHO + CH_3CHO -------→ $C_6H_5CH=CH-CHO + H_2O$	**5**	4	3	3.2.1
c	Calculate the Atom Economy for following reaction CH_3NH_2 + COCl ---------→ $CH_3-N=C=O$ + 2HCl	**5**	4	3	3.2.1
d	3.0 g of air dried coal sample taken in silica crucible, after heating it in an electric oven at 110 ^{0}Cfor hr. the residue was weighed 2.75 g. The residue was heated in silica crucible covered with vented lid at a temperature 925 ^{0}C for exactly 7 min. after cooling the weight of residue was found to contain 2.5 .the residues was ignited to constant weight 0.346g. Find out the % moisture content, % volatile matter content, % ash content and % fix carbon content in a sample	**5**	1	1	3.2.1
Q2					
a	Explain 12 Principal of green chemistry. write short note on green solvents	**10**	4	2	2.2.3
b	Explain derivatization of chemical reaction should be avoided	**5**	2	2	2.2.3
c	Explain green solvents for chemical reaction	**5**	2	2	2.2.3

Q3					
a	Explain determination nitrogen content Ultimate analysis with its significance	**10**	3	2	2.2.3
b	Write short note on cetane value of petrol fuel	**5**	3	1	1.2.1
c	Write short note on biodiesel synthesis	**5**	3	1	1.2.1
Q4					
a	Explain dry corrosion with suitable reaction, diagram and mechanism	**10**	1	1	2.2.3
b	Write difference between wet and dry corrosion	**5**	1	1	1.2.1
c	Explain differential aeration corrosion	**5**	1	1	2.2.3
Q5					
a	Write short note crude petroleum and its composition. Explain cracking of crude petroleum and difference between thermal and catalytic cracking	**10**	3	1	2.2.3
b	Define fuel and explain ideal characteristics of fuel	**5**	3	1	1.2.1
c	What are antiknocking agents? Explain its role petrol	**5**	3	2	2.2.3
Q6					
a	Write short note on wet corrosion and Explain pitting corrosion	**10**	3	1	1.2.1
b	How Sulphur content calculated from coal sample?	**5**	3	1	1.2.2
c	A coal sample subjected to ultimate analysis. 1.5 g of coal on combustion in bomb calorimeter gave0.42g $BaSO_4$. Calculate percentage of Sulphur content in sample.	**5**	3	3	3.2.1

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Sardar Patel College of Engineering

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Munshi Nagar, Andheri (West), Mumbai – 400058.
END Semester Exam
May 2019

Max. Marks:100 Duration: 3HR
Class: F.Y.B.Tech(Mechanical) Semester:II
Program: MECHANICAL ENGINEERING
Name of the Course: **Computer Programming**
Course Code : ES-BT207

Instructions:

1. **Question No 1 is compulsory.**
2. **Attempt any four questions out of remaining six.**
3. **Draw neat diagrams**
4. **Assume suitable data if necessary**

Question No		Maximum Marks	CO	BL	PI
1	Solve the following questions. Justify your answer.	20	1,4	3	1.2.1
1.A					

```
1. #include <iostream>
2.     #include <string.h>
3.     using namespace std;
4.     int main()
5.     {
6.         struct student
7.         {
8.             int num;
9.             char name[25];
10.        };
11.        student stu;
12.        stu.num = 123;
13.        strcpy(stu.name, "John");
14.        cout << stu.num << endl;
15.        cout << stu.name << endl;
16.        return 0;
17.    }
```

a) 123
John

b) John
John

c) Compile time error
d) None of the mentioned.

1.B

```
1. #include <iostream>
2.     using namespace std;
3.     int func(int m = 10, int n)
4.     {
5.         int c;
6.         c = m + n;
7.         return c;
8.     }
9.     int main()
10.    {
11.        cout << func(5);
12.        return 0;
13.    }
```

a)15
b)10
c)Compile time error.
d)none of the mentioned.

1.C

```
1. include <iostream>
2.     using namespace std;
3.     int f(int p, int q)
4.     {
5.         if (p > q)
6.             return p;
7.         else
8.             return q;
9.     }
10.    main()
11.    {
12.        int a = 5, b = 10;
13.        int k;
14.        bool x = true;
15.        bool y = f(a, b);
16.        k =((a * b) + (x + y));
17.        cout << k;
18.    }
```

a) 55
b) 62
c) 52
d) none of the mentioned

1.D

What will happen in this code?

```
1.    int a = 100, b = 200;
```

	2. int *p = &a, *q = &b; 3. p = q; a) b is assigned to a b) p now points to b c) a is assigned to b d) q now points to a				

1.E	What is the output of this program?
	1. #include <iostream>
	2. using namespace std;
	3. void print(int i)
	4. {
	5. cout << i;
	6. }
	7. void print(double f)
	8. {
	9. cout << f;
	10. }
	11. int main(void)
	12. {
	13. print(5);
	14. print(500.263);
	15. return 0;
	16. }
	a) 5500.263
	b) 500.2635
	c) 500.263
	d) none of the mentioned				

2	A. Write an algorithm and draw a flow chart to find GCD and LCM of two numbers.	12	1,2	5	2.1.2
	B. Explain recursive functions.with example.	08	1,2	2	1.2.1
3	A. Take 10 integer inputs from user and store them in an array. Now, copy all the elements in another array but in reverse order.	10	2	3	2.1.3
	B. Write a program to find ncr where n and r are supplied by the user	10	2	3	1.2.1

4	A. Write a program to find grade scored card of SPCE Mumbai. asks user to put obtained marks. Total mark is 800.use switch statement.	10	1,2	4	2.2.1
	B. Write a C++ program to sort N names in alphabetical order.	10	1,4	3	1.3.1
5	A Calculate Standard Deviation by Passing it to Function.	10	2	4	2.1.3
	B. Write a program for multiplication of two matrices.	10	2	3,2	1.3.1
6	A. Write a program to create class "time" to read and add two times given by the user. In this program hour,minutes and seconds are private data member.	10	3	4	2.1.2
	B. Explain the following i. Constructor with example. ii. Use of static with example.	10	3,4	2	1.3.1
7	A. Write a program to store and display the name, age, salary of an employee in the company.	10	3	4	2.1.2
	C. Explain the following with example I. Nested if else statement II. Explain the given syntax with writing simple programming Condition? Expression 1: Expression 2	10	2,3	3	1.3.1

Lab
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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.

End Semester- Examination May 2019

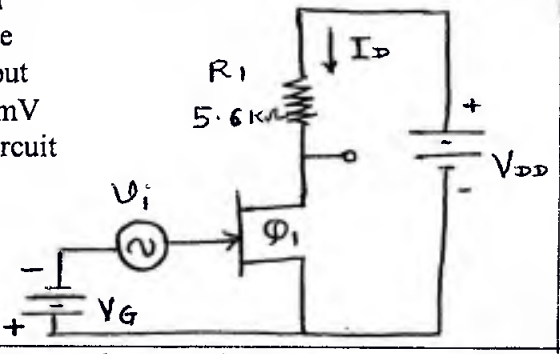
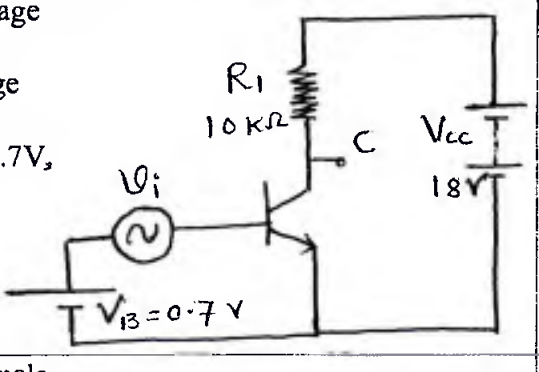
Program: B.Tech.
Course Code: ES-BT202
Course Name: Basic Electronics Engineering

Duration: Three Hours
Maximum Points: 100
Semester: II

Instructions:

- Question no.1 is compulsory
- Solve any four from remaining questions
- Answers to all sub questions should be grouped together
- **Assume suitable data if required and justify the same.**

Q. No.	Description	Pts	CO	BL	PI
Q.1 a)	Discuss the Zener diode as Voltage Regulator.	05	02		
b)	Compare BJT and JFET.	05	01		
c)	What is the forward transfer characteristics of JFET	05	01		
d)	What are the characteristics of operational amplifiers?	05	03		
Q.2 a)	A full wave centre-tapped rectifier supplies pure resistive load. Derive the expression for the average load voltage and draw the waveforms of (i)source voltage (ii) source current (iii) load voltage (iv)load current (v)voltage across diode	10	02		
Q.2 b)	In a full wave bridge rectifier the load resistance is R_L=1000 ohm. The forward resistance of diode is 10 ohm. The input voltage is **325 sin314t.** Find (i) the peak value of output current (ii) the average value of output current (iii) the rms value of output current (iv) the ripple factor of current (v) rectification efficiency	10	02		
Q.3 a)	What is the need of filter in rectifier circuit using diodes. Draw the diagram of *C-type* filter and draw the waveforms of (i) source voltage (ii) load voltage (iii) source current (iv) load current What is the limitation of C-type filter? How it is eliminated.	10	02		
Q.3 b)	How transistor as a switch is different from mechanical switch. For the efficient operation of the transistor as a switch, what are the regions of operation of transistor? Justify your answer.	10	01		

Q.4 a)	A *2N5457 JFET* is used as an amplifier circuit. Calculate the maximum and minimum output voltage produced by a ± 100mV ac input. Also calculate the circuit voltage gain in each case. (Given: $Y_{fs(max)}$=5000μS and $Y_{fs(min)}$=1000μS) 	**10**	**01**		
Q.4 b)	Draw the circuit and explain input and output characteristics of transistor in common emitter mode. Why transistor in common emitter mode is preferred as an amplifier.	**10**	**01**		
Q.5 a)	Draw inverting configuration of operational amplifier with three inputs. (i) Prove that the configuration can be used as summing amplifier with the proper selection of input resistors and feedback resistors. (ii) Prove that the configuration can be used as averaging amplifier with the proper selection of input resistors and feedback resistors.	**10**	**03**		
Q.5 b)	Draw the circuit and explain the drain characteristics (I_D/V_{DS}) of N-channel JFET with different gate to source voltages. Mention the reason for different breakdown voltages for different values of gate to source voltages.	**10**	**01**		
Q.6 a)	What is the need of feedback in operational amplifier. Draw the circuit and derive the relation of operational amplifier as subtractor.	**10**	**03**		
Q.6 b)	Determine the dc collector voltage for the circuit for B_{dc}=B_{ac}=80. Also calculate the circuit voltage gain when vi=±50mV. (Data given: I_B=15μA for V_B=0.7V, I_b=±3μA for vi=±50mV) 	**10**	**01**		
Q.7 a)	Compare analog and digital signals.	**08**	**04**		
Q.7 b)	Simplify the following Boolean expression: (i) $\bar{A}(A+B)+(B+AA)(A+\bar{B})$ (ii) $(A+C)(AD+A\bar{D})+AC+C$	**08**	**04**		
Q.7 c)	Draw a logic circuit for: $\overline{(A+B)}\,(C+D)\bar{C}$	**04**	**04**		

Lab
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SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

End Semester Examination

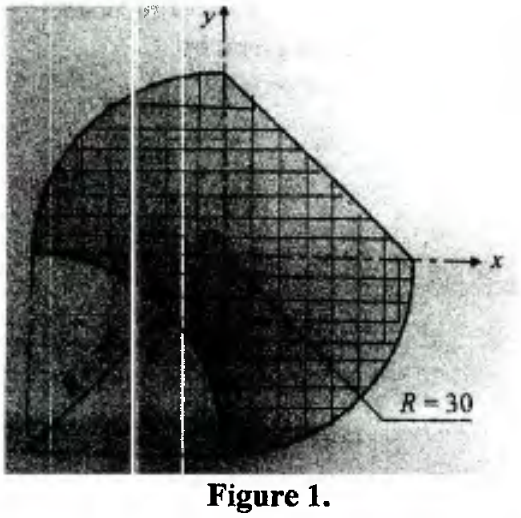
May 2019

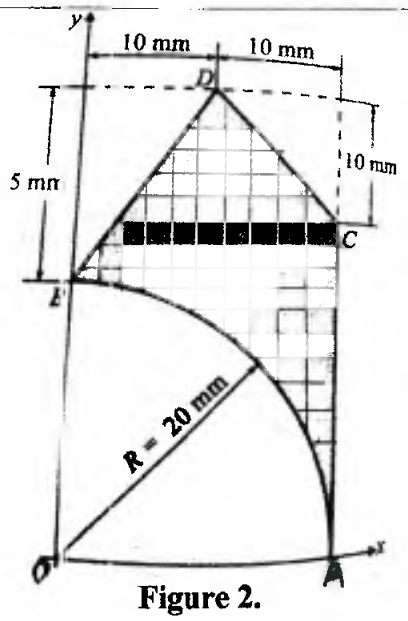
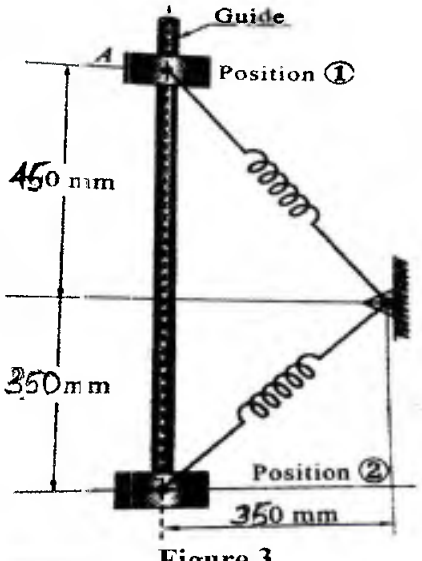
Program: F.Y. B.Tech (C/M/E) **Duration:** 03 hours

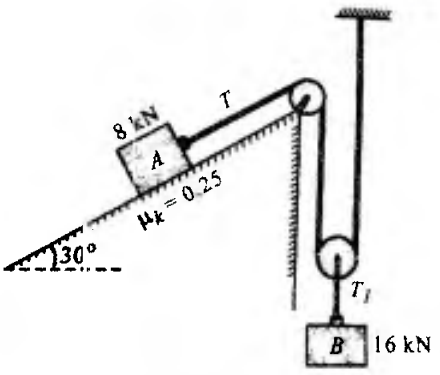
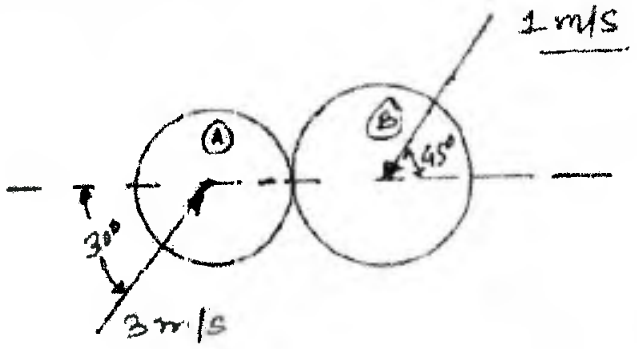
Course Code: ES-BT204 **Maximum Points:** 100 marks

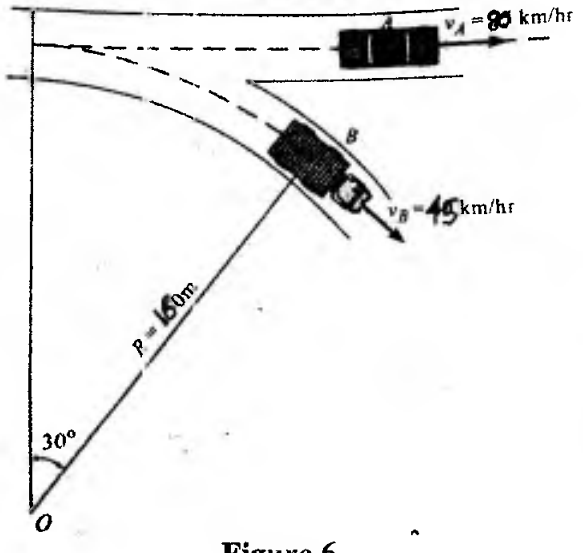
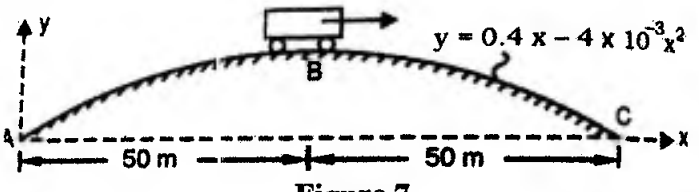
Course Name: Engineering Mechanics-II **Semester:** II

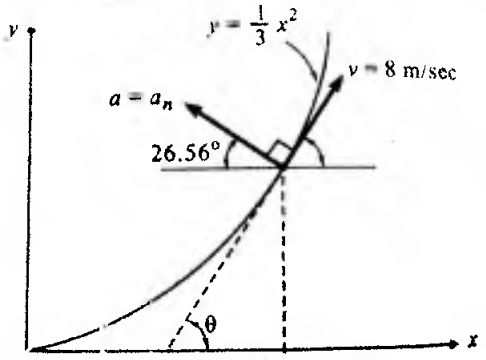
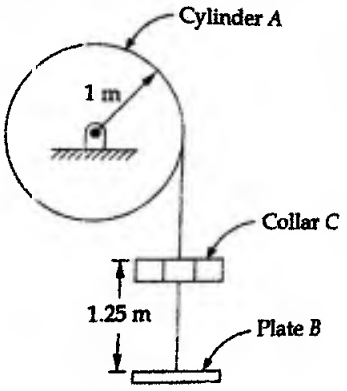
Notes: 1. Attempt **any five** questions out of seven questions.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever required and state it clearly.

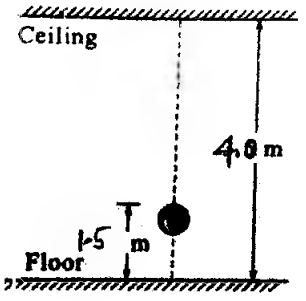
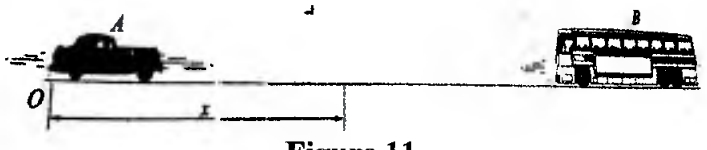
Q.No.	Questions	Points	CO	BL	PI
Q.1.					
a)	Find the centroid of the following shaded plane area about x & y- axis as shown in **figure 1.** (All dimensions are in mm)  **Figure 1.**	10	CO1	L1, L2	1.3.1 2.1.1, 2.1.2, 2.1.3, 2.2.2
b)	The motion of the particle along a straight line is governed by the relation $a = t^3-2t^2+7$ where 'a' is the acceleration in m/s^2 and 't' is the time in seconds. At time 't'= 1 sec, the velocity of the particle is 3.58 m/sec and the displacement is 9.39 m. Calculate the displacement, velocity and acceleration at time 't'= 2 sec.	10	CO2	L2	2.1.1, 2.1.2, 2.1.3, 1.3.1
Q.2.					
a)	Find the centroid of plane area shown in **figure 2.** and also find moment of inertia about centroidal axis.	12	CO1	L1, L2	1.3.1, 2.1.1,

	 Figure 2.				2.1.2, 2.1.3, 2.2.2
b)	A collar 'A' of mass 15 kg moves in vertical guide as shown in **figure 3** below. Neglecting the friction between the guide and the collar, find its velocity when it passes through position 2 after starting from rest in position 1. The spring constant is 250 N/m and the free length of the spring is 300 mm.  Figure 3.	08	CO3	L1, L2, L3, L4	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2
Q. 3.					
a)	The two blocks shown in **figure 4** below are originally at rest Neglecting the masses of the pulleys and considering the coefficient of friction between the block A and inclined plane as 0.25, determine: i) The acceleration of each block and ii) The tension in the cable (T & T1) as shown in figure.	10	CO3	L1, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2

	 **Figure 4.**				
b)	Two smooth balls collide as shown in **figure 5.** If mass of ball 'A' is 1kg and that of 'B' is 2 kg and coefficient of restitution 'e' = 0.75, find the velocities of balls after impact.  **Figure 5.**	10	CO3	L1, L2, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3
Q. 4.					
a)	A projectile is aimed at a mark on the horizontal plane through the point of projection. It falls 15 metres short when the angle of projection is 20^0, while it overshoots the mark by 28 metres when the same angle is 50^0. Find the angle of projection to hit the mark. Assume no air resistance.	10	CO2	L1, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3
b)	Determine the time required for a car to travel 1.2 km along a road if the car starts from rest, reaches a maximum speed at some intermediate point and then stops at the end of the road. The car can accelerate or decelerate at 1.8 m/s^2.	10	CO2	L1, L2	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2
Q.5.					
a)	A car 'A' is travelling along a straight highway, while truck 'B' is moving along a circular curve of radius 160 metres. The speed of car 'A' is increased at the rate of 2 m/s2 and the speed of the truck 'B' is being decreased at the rate of 1.0 m/s2. For the position shown in **figure** 5, determine:	12	CO2	L1, L2, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2

	i) The velocity of 'A' relative to 'B'& ii) The acceleration of 'A' relative to 'B'. At this instant, the speed of 'A' is 80 kmph and that of 'B' is 45 kmph.  **Figure 6.**				
b)	A vehicle of weight 8000 N travels with a constant speed of 72 kmph over a vertical parabolic curve as shown. Find the pressure exerted by the tyres on the road at the peak B. [Refer **figure 7** below].  **Figure 7.**	08	CO3	L1, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3
Q.6.					
a)	State and prove Work-Energy Principle.	05	CO3	L3, L4	1.3.1
b)	A point moves along the path $y = \frac{1}{3}x^2$ with a constant speed of 8 m/sec. What are the x and y components of velocity when x = 3 m? What is the acceleration of the point when x = 3 m? [Refer **figure 8** below]	08	CO2	L1, L4	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2

	 **Figure 8.**				
c)	An inextensible cord going around a homogeneous cylinder of mass 125 kg and radius 1 m holds a plate 'B' of negligible mass. A collar of 35 kg mass is released from rest in the position shown in **figure 9** and it drops on the plate. What will be the velocity of the collar after it has descended an additional distance of 0.5 m after striking the plate? It may be presumed that there is no rebound, i.e. the plate and the collar move downwards locked together and chord remains taut.  **Figure 9.**	07	CO3	L1, L2	1.3.1, 2.1.1, 2.1.2, 2.1.3
Q.7.					
a)	With neat sketches, define the following terms: i) Line of Impact ii) Direct Central Impact iii) Oblique Central Impact	05	CO3	L3, L4	1.3.1, 2.1.1,
b)	A ball is thrown vertically downwards with a velocity 'u' from a height of 1.5 m so that it hits the ground and just touches the ceiling after impact as shown in **figure 10.** If the ceiling is 4 m high from the ground and if the coefficient of restitution is e = 0.8, determine the velocity 'u' with which the ball is thrown.	05	CO3	L1, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3

	 **Figure 10.**				
c)	Automobile 'A' shown in **figure 11,** starts from 'O' and accelerates at the constant rate of 0.75 m/s^2. After some time, a bus 'B' passes by it which is travelling in opposite direction at a constant speed of 6 m/s. Knowing that the bus 'B' passes point 'O', 20 sec after automobile 'A' started from there, determine when and where the two vehicles passed each other.  **Figure 11.**	10	CO2	L1, L2, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2

**********GOOD LUCK**********

Lab [9:30]
24/5/19

Bharatiya Vidya Bhavan's
Sardar Patel College of Engineering
(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.

End Semester Exam

May 2019

Max. Marks: 100 Duration: 3 Hours

Class: C/M/E **Semester:** II Program: FY B. Tech

Name of the Course: Communication Skills **Course Code: HSM BT107**

Instructions:

1. **Question No 1 is compulsory.**
2. Attempt any five questions out of Seven
3. Draw neat diagrams.
4. Answers to all the sub questions should be attempted and grouped together.
5. Students are requested to follow all the instruction.

Question No		points	CO	BL	PI
Q1 (a)	"Communication is the process involving the transmission and reception of symbols eliciting meaning in the minds of the participants by making common their life experiences". Describe the communication process with the help of a diagram and explain the types of feedback.	12	01	02	10.4.1
(b)	State whether the following statements are true or false: 1) When verbal and non-verbal messages clash, receivers tend to believe the non-verbal messages. 2) Communication directs the flow of information to help people interact with each other. 3) The term jargon refers to words or expressions used by poets to express their feelings. 4) Hearing happens automatically as it is an involuntary physical act. 5) Messages are easy to understand when verbal and non-verbal messages contradict each other. 6) The intimate space zone for social interaction is reserved for colleagues 7) Vocalized pauses enhance the impact of an oral presentation 8) The discussion held between the production manager and the Head, HRD, is a perfect example of horizontal communication.	04	01,02,03,04,05	04	10.4.2
(C)	Explain the importance of Written communication in an organization. List the advantages and disadvantages of Written communication.	04	03	01	10.5.1.
Q2 (a)	You are a popular Furniture brand located in Mumbai. You have received an enquiry regarding supply of Office furniture from Sardar Patel College of Engineering, Munshi Nagar, Andheri (West), Mumbai – 400058. Draft an attractive and appropriate reply giving details of the specifications, and durability of furniture. Provide a price list in the form of quotation. Also, offer incentives to make sure you get your order. **(Use Modified--block form). Invent necessary details.**	12	04	05	10.4.2
(b)	"The living nature of language causes Semantic barriers". Describe the semantic barriers to communication with examples.	08	01	02	12.6.2
Q3 (a)	Write a letter of complaint on behalf of the Magazine Secretary of your college regarding art paper that you ordered for the magazine has	12	04	06	10.4.2

	reached you in damaged condition and the paper quality is also not as per the sample you chose. Your magazine is to be launched in the 1st week of May and your printer needs at least 3 weeks for printing and binding the 800 magazines. Express your displeasure for the above and ask them to compensate you suitably. Draft the above letter in Semi-block form. (Invent necessary details)				
(b)	Elaborate the following statements in about 150 words each: 1) For an organization to prosper, both vertically upward and vertically downward flow of communication is essential. 2) Grapevine communication can be used to the managements benefit.	08	02	04	9.5.1
Q4 (a)	Imagine that you are the chairman of a large company and wish to arrange a golden jubilee dinner for your officers. Write to the manager of a 5-star hotel, giving him date, time, number of guests, and menu and inquiring about the charges and facilities provided. (**Use Complete block form) Invent necessary details.**	12	05	06	9.5.2
(b)	Classify the aspects of non-verbal communication with a schematic diagram. Explain the importance of non-verbal communication in a business setting.	08	01	04	10.5.2
Q5 (a)	Write short Notes on (any Three) of the following terms in not more than 100 words: 1) You-attitude in a business letter 2) Role of Gesture and Posture in non-verbal communication 3) Types of Listening 4) Hints for drafting an Enquiry letter	12	03	05	9.5.1
(b)	What are the reasons for socio-psychological barriers to communication in human minds? Explain any four reasons in detail.	08	03	05	9.5.1
Q6 (a)	Read the following passage and answer the questions: The first and most important rule of legitimate or popular government, that is to say, of government whose object is the good of the people, is therefore, as I have observed, to follow in everything the general will. But to follow this will it is necessary to know it, and above all to distinguish it from the particular will, beginning with one's self: this distinction is always very difficult to make, and only the most sublime virtue can afford sufficient illumination for it. As, in order to will, it is necessary to be free, a difficulty no less great than the former arises — that of preserving at once the public liberty and the authority of government. Look into the motives which have induced men, once united by their common needs in a general society, to unite themselves still more intimately by means of civil societies: you will find no other motive than that of assuring the property, life and liberty of each member by the protection of all. But can men be forced to defend the liberty of any one among them, without trespassing on that of others? And how can they provide for the public needs, without alienating the individual property of those who are forced to contribute to them? With whatever sophistry, all this may be covered over, it is certain that if any constraint can be laid on my will, I am no longer free, and that I am no longer master of my own property, if anyone else can lay a hand on it. This difficulty, which would have seemed insurmountable, has been removed, like the first, by the most sublime of all human institutions, or rather by a divine inspiration, which teaches mankind to imitate here below the unchangeable decrees of the Deity. By what inconceivable art has a means been found of making men free by making them subject; of using in the service of the State the properties, the persons and even the lives of all its members, without constraining and without consulting them; of confining their will by their own admission; of overcoming their refusal by that consent, and forcing them to punish themselves, when they act against their own will? How can it be that all should obey, yet nobody take upon him to command, and that all should serve, and yet have no masters, but be	12	02	02	8.3.1

	the more free, as, in apparent subjection, each loses no part of his liberty but what might be hurtful to that of another? These wonders are the work of law. It is to law alone that men owe justice and liberty. It is this salutary organ of the will of all which establishes, in civil right, the natural equality between men. It is this celestial voice which dictates to each citizen the precepts of public reason, and teaches him to act according to the rules of his own judgment, and not to behave inconsistently with himself. It is with this voice alone that political rulers should speak when they command; for no sooner, does one man, setting aside the law, claim to subject another to his private will, then he departs from the state of civil society, and confronts him face to face in the pure state of nature, in which obedience is prescribed solely by necessity. **Q.1 The paradox is resolved according to the author when an individual** A. submits to the rule of law and thus is at liberty to do anything that does not harm another person B. behaves according to the natural rights of man and not according to imposed rules C. agrees to follow the rule of law even when it is against his best interests D. belongs to a society which guarantees individual liberty at all times E. follows the will of the majority **Q.2. The Author's attitude to Law in this passage is best conveyed as** A. respect for its inalienable authority B. extolling its importance as a human institution C. resignation to the need for its imposition on the majority D. acceptance of its restrictions E. praise for its divine origin **Q.3. The author would agree with all of the following except** A. government must maintain its authority without unduly compromising personal liberty B. individual freedom is threatened in the absence of law C. justice cannot be ensured in the absence of law political leaders should use the law as their guide to correct leadership the law recognizes that all men are capable of recognizing what is in the general interest Q.4. Write down the central message of the author from the passage.02 Q.5. Give synonyms for the word 1. Legitimate 2. Sufficient 01 Q.6. Give antonyms for the words 1. Consent 2. Preserving 01 Q.7. Write a summary of the passage in 120 words. 05				
Q.6. (b)	One word Substitution: List of words: Truant, Nepotism, Epicurean, Glutton, Eccentric,Connoisseur, Allegory, Apostate. 1) A tendency to favor one's relative 2) One who deserts one's religion 3) A student who stays away from school without telling his/her parents 4) Someone whose philosophy in life is to eat, drink, and be merry 5) One who eats indiscriminately and in large quantities 6) A person with strange and peculiar habits 7) One who understands the finer aspects of art and music 8) A story in which ideas are symbolized as characters.	08	02	04	12.5.2
Q.7. (a)	**Read the Case Study and answer the questions given below** ABC Pvt. Ltd, an FMCG (Fast moving consumer goods) company, had	12	05	06	12.4.2

been going through tough times. The Board of directors had decided to part with their loss-making division, Star Detergents, as a means to tackle the situation.

Rajan was the CEO of Star Detergents. He went for the Board meeting at Mumbai. The board said, 'We have looked at the efforts that you have made, but we feel that we should sell off the detergent division. ABC is in urgent need of funds, and selling the division will help us achieve it.'

Rajan did not have much to say against the board. He came back to office, not happy with the board's decision; a he believed that many things could have been done to revive the company and the division.

As the firm was in critical financial situation, the deal had to be signed urgently without much information circulation among the employees of the company.

Within a month Star Detergents was sold off. Rajan's secretary handed him a letter from the board that the company was sold, that he has been fired, and that he was expected to leave the office before the end of the day. 'That was a bad end to my career', he told himself. He left the office in frustration.

At the other end, it was another day at the office for John, the regional manager (south) of Star Detergents. All the four regional managers, including him, had received a copy of the communication that the company had been sold off. There were not many details in the email. The regional manager called a meeting of the sales staff and informed them. The other cities in south joined the videoconference.

With the details of the new owner of the detergent division not available, there was anxiety and frustration on the faces of the people. No one knew what to do. The motivational levels were down. People were surfing the internet and TV news channels for more information. Every person in the office was busy reading the newspaper to collect every small bit of information that may be available. John had called the Mumbai head office, and there was no information available.

People flooded one another with mail, 'guessing' what would happen next. Would they be axed? Who bought the company? There were thousands of questions that were making the rounds, and the employees had no answer. The Grapevine was strongly at work, and there were rumors on the new owners, their policies and the prospects of being fired and of a complete reorganization of the company. Although John tried his best to maintain calm by asking employees not to speculate things did not work.in the face of such uncertainty, John's advice did not make any sense to the employees.

In the absence of any clear direction from the management, the sales staff had to start their day. They packed their bags and went out for their daily sales calls. No one could believe that their company had been sold off without receiving any proper communication. Many people resigned out fear that they would be axed. Many had already starting floating their CV's around. Many employees even dropped by the competitors' office to enquire for any suitable openings, the competitors took advantage of the situation and immediately offered jobs to some of the good people.

The growth of the detergent division and ABC had deteriorated owing to a major issue. Some people who were part of the management in Mumbai and were employed in the company for over a couple of decades were creating a typical hierarchical environment. An open-door approach to solving problems was discouraged. Employees were expected to 'adhere' to the rules and protocols at all times. Seniority in position was a synonym for superiority and high- handedness, and subordinates were to communicate accordingly. In addition, the market was growing fast and technology was the in thing in the industry. The company was laidback vis-a- vis technology and did not

	even have an intranet in place even as the employee strength was increasing. This frequently led to poor flow of information, and there was virtually no contact with the top management through any medium. This had a most adverse impact on the company. Mistrust of the management was growing amongst the employees. Policies were being made and decisions were being taken without proper consultations with the employees. Even at the time of the unfortunate takeover, communication was minimal. Questions: 1. What could have been done to manage the situation better from an ABC perspective and from the perspective of the new company that bought it? (04) 2. How could have John handled the situation better? (04) 3. How can you manage such a crisis in an organization? (04)				
Q.7. (b)	Read the following case-study and answer the following questions: Mahesh is a good student and has an impressive academic record. He has appeared for many recruitment interviews on campus. However, he was not selected. A Human Resources Manager who was kind enough to give him feedback told him that his body language was negative. Mahesh took guidance from a friend who was known for his impressive personality and improved his body language. He was eventually placed in a dream company. i. Describe what the HR manager may have indicated by the term "negative body language" in terms of facial expression, posture, gestures, and eye-contact. ii. What improvements do you think Mahesh may have made to make a good impression on the interviewer?	04	04	02	10.4.1
(c)	Fill in the blanks: a. Halo and _____ effect is a kind of psychological barrier. b. Words have two types of meanings _____ and _____. c. Organizational barriers occur due to _____ chain of command. d. _____ consciousness is a very high serious barrier in face-to-face communication	02	04	01	10.4.2
(d)	Identify the communication barriers in the following situations: - a) The speaker starts stammering when he sees the huge audience. b) The music in the neighbors' house was so loud that I could hardly study. c) A successful businessman not accepting the ideas of a salesperson who comes to him with a new product. d) The Chief Guest uses technical terms in his speech which the children failed to understand.	02	04	03	12.4.1

Lab
27/05/19 [9:30]

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.
END Semester Exam
May 2019

Max. Marks:100 Duration: 3HR
Class: F.Y.B.Tech(Mechanical) Semester:II
Program: MECHANICAL ENGINEERING
Name of the Course: **Computer Programming**
Course Code : ES-BT207

Instructions:

1. **Question No 1 is compulsory.**
2. **Attempt any four questions out of remaining six.**
3. **Draw neat diagrams**
4. **Assume suitable data if necessary**

Question No		Maximum Marks	CO	BL	PI
1	Solve the following questions. Justify your answer.	20	1,4	3	1.2.1
1.A					

```
1. #include <iostream>
2.     #include <string.h>
3.     using namespace std;
4.     int main()
5.     {
6.         struct student
7.         {
8.             int num;
9.             char name[25];
10.        };
11.        student stu;
12.        stu.num = 123;
13.        strcpy(stu.name, "John");
14.        cout << stu.num << endl;
15.        cout << stu.name << endl;
16.        return 0;
17.    }
```

a) 123
John

b) John
John

c) Compile time error
d) None of the mentioned.

1.B

```
1. #include <iostream>
2.     using namespace std;
3.    int func(int m = 10, int n)
4.     {
5.         int c;
6.         c = m + n;
7.         return c;
8.     }
9.     int main()
10.     {
11.         cout << func(5);
12.         return 0;
13.     }
```

a)15
b)10
c)Compile time error.
d)none of the mentioned.

1.C

```
1. include <iostream>
2.     using namespace std;
3.     int f(int p, int q)
4.     {
5.         if (p > q)
6.             return p;
7.         else
8.             return q;
9.     }
10.     main()
11.     {
12.         int a = 5, b = 10;
13.         int k;
14.         bool x = true;
15.         bool y = f(a, b);
16.         k =((a * b) + (x + y));
17.         cout << k;
18.     }
```

a) 55
b) 62
c) 52
d) none of the mentioned

1.D

What will happen in this code?

```
1.    int a = 100, b = 200;
```

	2. int *p = &a, *q = &b; 3. p = q; a) b is assigned to a b) p now points to b c) a is assigned to b d) q now points to a				

1.E	What is the output of this program?
	1. #include <iostream>
	2. using namespace std;
	3. void print(int i)
	4. {
	5. cout << i;
	6. }
	7. void print(double f)
	8. {
	9. cout << f;
	10. }
	11. int main(void)
	12. {
	13. print(5);
	14. print(500.263);
	15. return 0;
	16. }
	a) 5500.263
	b) 500.2635
	c) 500.263
	d) none of the mentioned				

2	A. Write an algorithm and draw a flow chart to find GCD and LCM of two numbers.	12	1,2	5	2.1.2
	B. Explain recursive functions.with example.	08	1,2	2	1.2.1
3	A. Take 10 integer inputs from user and store them in an array. Now, copy all the elements in another array but in reverse order.	10	2	3	2.1.3
	B. Write a program to find ncr where n and r are supplied by the user	10	2	3	1.2.1

4	A. Write a program to find grade scored card of SPCE Mumbai. asks user to put obtained marks. Total mark is 800.use switch statement.	10	1,2	4	2.2.1
	B. Write a C++ program to sort N names in alphabetical order.	10	1,4	3	1.3.1
5	A. Calculate Standard Deviation by Passing it to Function.	10	2	4	2.1.3
	B. Write a program for multiplication of two matrices.	10	2	3,2	1.3.1
6	A. Write a program to create class "time" to read and add two times given by the user. In this program hour,minutes and seconds are private data member.	10	3	4	2.1.2
	B. Explain the following i. Constructor with example. ii. Use of static with example.	10	3,4	2	1.3.1
7	A. Write a program to store and display the name, age, salary of an employee in the company.	10	3	4	2.1.2
	C. Explain the following with example I. Nested if else statement II. Explain the given syntax with writing simple programming Condition? Expression 1: Expression 2	10	2,3	3	1.3.1

Lab
29/05/19

[1:30]

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Munshi Nagar, Andheri (W) Mumbai – 400058

END-SEMESTER EXAMINATIONS - MAY 2019

Program: F.Y.B.Tech (C/M/E) | **Duration: 3 Hrs**

Course Code: HSM-BT107 | **Maximum Points: 100**

Course Name: Constitution Of India | **Semester: II**

Instructions:

- **Attempt any five questions.**
- **Label the suitable constitutional Articles to justify the answers.**
- **Answers to all sub-questions should be grouped to together.**

Q.No.	Questions	Points	CO	BL	PI
1 A	Choose the correct alternatives from the following: 1) The constitution of India was imposed on - a)15th august 1947 b)22nd July 1947 c)26th jan.1950 d)26th nov.1949. 2) Article 21A relates with right to- a) information b) education c) equality d) employment 3) provisions of emergency are adapted from constitution of- a) England b) Ireland c) USA d) Germany 4) fundamental duties are inserted in article – a) 51A b)32 c) 14-18 d)39A 5) money bill is initiated in Loksabha on the recommendation of – a) speaker b) Niti aayog c) finance minister d) president.	10	3	5	6.1.1
B	Attempt the following: 1) Define the term secular and republic. 2) Justify the concept judicial review. 3) What is a rule of law?	10	2	4	6.2.1

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

END-SEMESTER EXAMINATIONS - MAY 2019

	4) State the term ordinance. 5) What is meant by money bill?				
2	A) Classify the powers and functions of parliament of India	10	1	4	8.2.2
	B) Discuss the emergency powers of president.	10	3	2	
3	A) Explain the philosophy enshrined in the preamble.	10	1	2	6.1.1
	B) Analyze the position of Rajya sabha.	10	4	4	
4	A) Describe the salient features of Indian constitution	10	2	2	8.2.2
	B) Compose the different writs as per article 32	10	3	6	
5	A) Illustrate the fundamental rights as per Art.12-30.	10	4	3	6.2.1
	B) Classify the directive principles of state policy.	10	3	4	
6	A) List and evaluate the fundamental duties.	10	4	1	6.1.1
	b) Discuss the concept-uniform civil code.	10	1	2	
7	Summarize the following:- A) Vishakha Vs. union of India B) Sovereignty of parliament. C) Powers and Functions of President D) An engineering college made admissions of the candidates on the basis of oral interview after a written test. High marks were allotted for oral test and candidates were interviewed only for 3 minutes. "A" get high marks in written test but low marks in oral rest. He wants to challenge- Decide and apply writ	20	3	5	8.2.2

15/07/2019
(exam/lab)
9:30 am.

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

Re-Examination

July 2019

Program: F.Y. B.Tech (C/M/E)

Course Code: ES-BT204 (New Course)

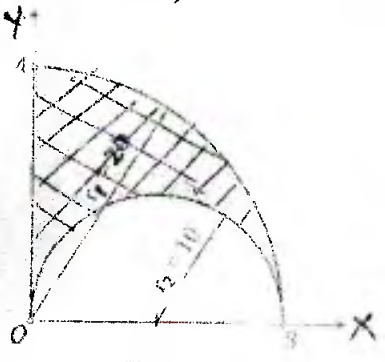
Course Name: Engineering Mechanics-II

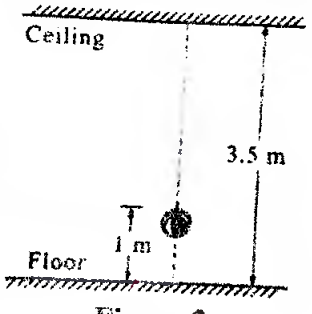
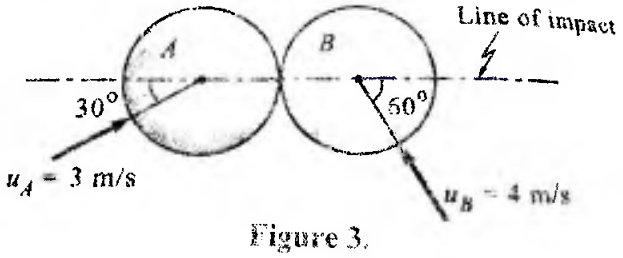
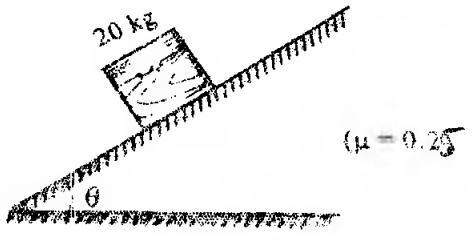
Duration: 03 hours

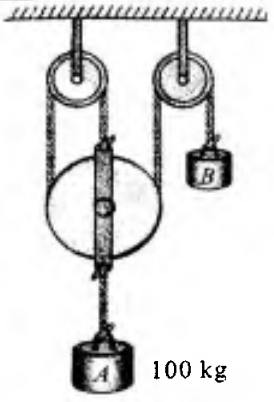
Maximum Points: 100 marks

Semester: II

Notes: 1. Attempt **any five** questions out of seven questions.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever required and state it clearly.

Q.No.	Questions	Points	CO	BL	PI
Q.1.					
a)	Find the centroid of the following shaded plane area about x & y- axis as shown in **figure 1.** (All dimensions are in cm)  **Figure 1.**	10	CO1	L1, L2	1.3.1 2.1.1, 2.1.2, 2.1.3, 2.2.2
b)	Find the moment of inertia of the shaded area shown in **figure 1.**above about OX and OY axis.	10	CO1	L1, L2	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2
Q.2.					
a)	Drops of water fall from the roof of a building 20 m high, at regular intervals of time. When the first drop strikes the ground, at the same instant fifth drop starts its fall. Find the distance between individual drops in the air, the instant first drop reaches the ground.	12	CO2	L2	2.1.1, 2.1.2, 2.1.3, 1.3.1
b)	A ball is thrown vertically downwards with a velocity 'u' from a height of 1.0 m so that it hits the ground and just touches the ceiling after impact as shown in **figure**	08	CO3	L1, L3	1.3.1, 2.1.1, 2.1.2,

	2. If the ceiling is 3.5 m high from the ground and if the coefficient of restitution is e = 0.7, determine the velocity 'u' with which the ball is thrown.  **Figure 2.**				2.1.3
Q. 3.					
a)	The magnitude and direction of the velocities of two identical frictionless balls before they strike each other is shown in **figure 3** below. Assume e = 0.9, determine the magnitude and direction of the velocity of each ball after the impact.  **Figure 3.**	10	CO3	L1, L2, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3
b)	A mass of 20 kg is projected up an inclined of 26^0 with velocity of 4 m/s as shown in **figure 4.** If μ = 0.25, i) Find maximum distance that the package will move along the plane and ii) What will be the velocity of the package when it comes back to initial position?  **Figure 4.**	10	CO3	L1, L2, L3, L4	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2
Q. 4.					
a)	In the **figure 5** given below, block 'A' of mass 100 kg is observed to move upward with an acceleration of 1.8 m/s^2. Determine: (i) Mass of block 'B' (ii) The corresponding tension in the cable.	10	CO3	L1, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2

	 **Figure 5.**				
b)	The acceleration of the particle is defined by the relation $a = 25-3x^2$ m/s^2. The particle starts with no initial velocity at the position x =0, determine: (i) The velocity when x = 2.5 m, (ii) The position when the velocity is again zero and (iii) The position where the velocity is maximum and the corresponding maximum velocity.	10	CO2	L2	2.1.1, 2.1.2, 2.1.3, 1.3.1
Q.5.					
a)	A point moves along a curved path $y = 0.4 x^2$. At x = 2.5 m, its speed is 7 m/s increasing at the rate of 4 m/s^2. At this instant, find: (i) velocity components along x and y direction and (ii) its acceleration	10	CO2	L1, L4	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2
b)	In Asian games, for 150 m event, an athlete accelerates uniformly from the start to his maximum velocity in a distance of 5 m and run the remaining distance with that velocity. If the athlete finishes the race in 12 sec, determine: i) His initial acceleration and ii) His maximum velocity.	10	CO2	L1, L2	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2
Q.6.					
a)	A shuttle cock hit with a velocity 'v_0' from point 'A' just crosses the fence at the top of its trajectory at point 'B' and lands on the ground at 'C'. Find: i) Initial velocity v_0. ii) Height 'h' of the fence iii) Range 'R' to point 'C'.	12	CO2	L1, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3

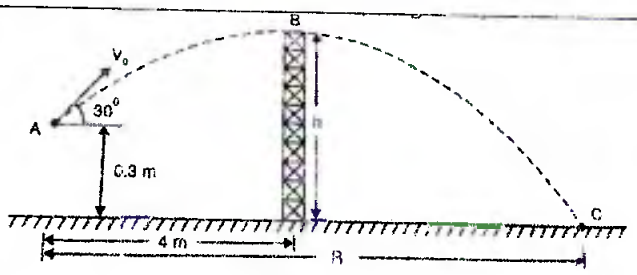


Figure 6.

b)	An inextensible cord going around a homogeneous cylinder of mass 125 kg and radius 1 m holds a plate 'B' of negligible mass. A collar of 35 kg mass is released from rest in the position shown in **figure** 7 and it drops on the plate. What will be the velocity of the collar after it has descended an additional distance of 0.5 m after striking the plate? It may be presumed that there is no rebound, i.e. the plate and the collar move downwards locked together and chord remains taut.	08	CO3	L1, L2	1.3.1, 2.1.1, 2.1.2, 2.1.3

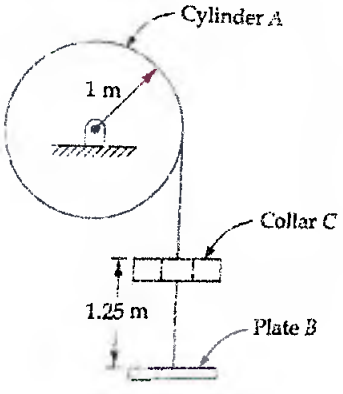


Figure 7.

Q.7.					
a)	Automobile 'A' is travelling east at the constant speed of 36 kmph. As automobile 'A' crosses the intersection shown in **figure 8** below, automobile 'B' starts from rest, 35 m North of the intersection and moves South with a constant acceleration of 1.2 m/s^2. Determine the position, velocity and acceleration of 'B' relative to 'A' 5 sec after 'A' crosses the intersection.	12	CO2	L1, L2	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2

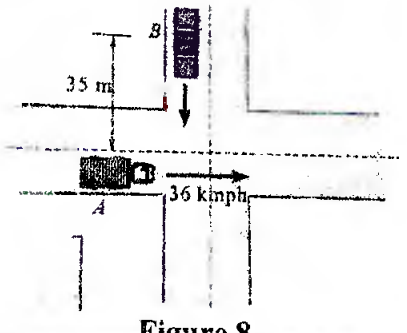


Figure 8.

b)	State and prove Work-Energy Principle. Also state the law of conservation of momentum.	08	CO3	L3, L4	1.3.1

**********GOOD LUCK**********

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

Re-Examination

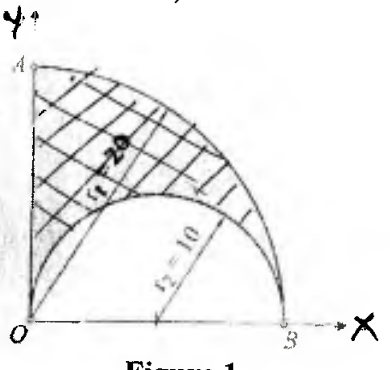
July 2019

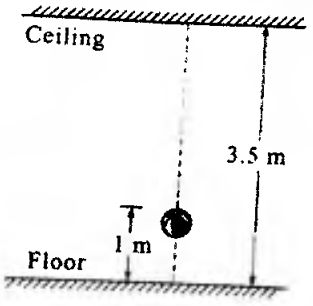
Program: F.Y. B.Tech (C/M/E) **Duration:** 03 hours

Course Code: ES-BT204 (New Course) **Maximum Points:** 100 marks

Course Name: Engineering Mechanics-II **Semester:** II

Notes: 1. Attempt **any five** questions out of seven questions.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever required and state it clearly.

Q.No.	Questions	Points	CO	BL	PI
Q.1.					
a)	Find the centroid of the following shaded plane area about x & y- axis as shown in **figure 1.** (All dimensions are in cm)  **Figure 1.**	10	CO1	L1, L2	1.3.1 2.1.1, 2.1.2, 2.1.3, 2.2.2
b)	Find the moment of inertia of the shaded area shown in **figure 1.**above about OX and OY axis.	10	CO1	L1, L2	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2
Q.2.					
a)	Drops of water fall from the roof of a building 20 m high, at regular intervals of time. When the first drop strikes the ground, at the same instant fifth drop starts its fall. Find the distance between individual drops in the air, the instant first drop reaches the ground.	12	CO2	L2	2.1.1, 2.1.2, 2.1.3, 1.3.1
b)	A ball is thrown vertically downwards with a velocity 'u' from a height of 1.0 m so that it hits the ground and just touches the ceiling after impact as shown in **figure**	08	CO3	L1, L3	1.3.1, 2.1.1, 2.1.2,

	2. If the ceiling is 3.5 m high from the ground and if the coefficient of restitution is e = 0.7, determine the velocity 'u' with which the ball is thrown.  **Figure 2.**				2.1.3
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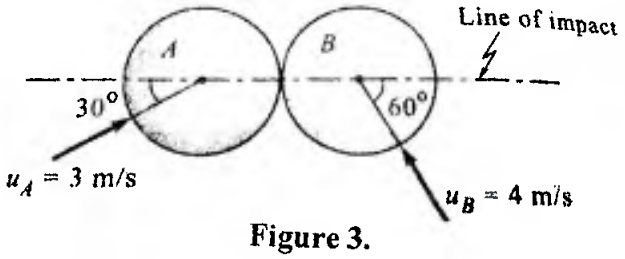
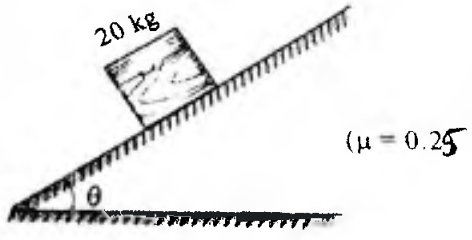
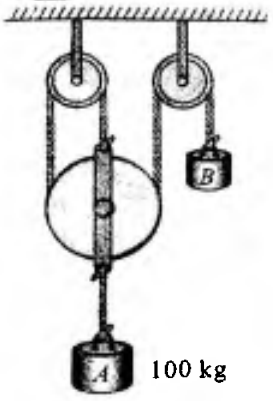
a)	The magnitude and direction of the velocities of two identical frictionless balls before they strike each other is shown in **figure 3** below. Assume e = 0.9, determine the magnitude and direction of the velocity of each ball after the impact.  **Figure 3.**	10	CO3	L1, L2, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3
b)	A mass of 20 kg is projected up an inclined of 26^0 with velocity of 4 m/s as shown in **figure 4.** If $\mu = 0.25$, i) Find maximum distance that the package will move along the plane and ii) What will be the velocity of the package when it comes back to initial position?  **Figure 4.**	10	CO3	L1, L2, L3, L4	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2
Q. 4.					
a)	In the **figure 5** given below, block 'A' of mass 100 kg is observed to move upward with an acceleration of 1.8 m/s^2. Determine: (i) Mass of block 'B' (ii) The corresponding tension in the cable.	10	CO3	L1, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2

	 **Figure 5.**				
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Q.5.					
a)	A point moves along a curved path $y = 0.4 x^2$. At x = 2.5 m, its speed is 7 m/s increasing at the rate of 4 m/s^2. At this instant, find: (i) velocity components along x and y direction and (ii) its acceleration	10	CO2	L1, L4	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2
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Q.6.					
a)	A shuttle cock hit with a velocity 'v_0' from point 'A' just crosses the fence at the top of its trajectory at point 'B' and lands on the ground at 'C'. Find: i) Initial velocity v_0. ii) Height 'h' of the fence iii) Range 'R' to point 'C'.	12	CO2	L1, L3	1.3.1, 2.1.1, 2.1.2, 2.1.3

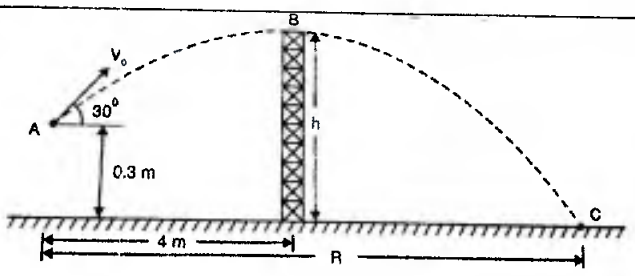


Figure 6.

b)	An inextensible cord going around a homogeneous cylinder of mass 125 kg and radius 1 m holds a plate 'B' of negligible mass. A collar of 35 kg mass is released from rest in the position shown in **figure 7** and it drops on the plate. What will be the velocity of the collar after it has descended an additional distance of 0.5 m after striking the plate? It may be presumed that there is no rebound, i.e. the plate and the collar move downwards locked together and chord remains taut.	08	CO3	L1, L2	1.3.1, 2.1.1, 2.1.2, 2.1.3

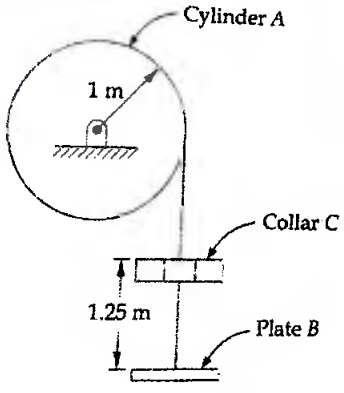


Figure 7.

Q.7.					
a)	Automobile 'A' is travelling east at the constant speed of 36 kmph. As automobile 'A' crosses the intersection shown in **figure 8** below, automobile 'B' starts from rest, 35 m North of the intersection and moves South with a constant acceleration of 1.2 m/s^2. Determine the position, velocity and acceleration of 'B' relative to 'A' 5 sec after 'A' crosses the intersection.	12	CO2	L1, L2	1.3.1, 2.1.1, 2.1.2, 2.1.3, 2.2.2

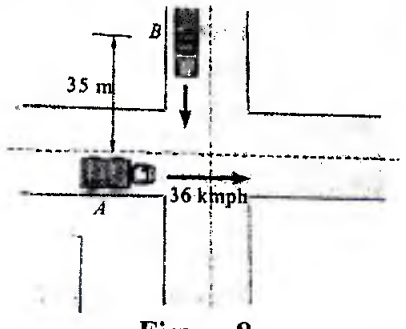


Figure 8.

b)	State and prove Work-Energy Principle. Also state the law of conservation of momentum.	08	CO3	L3, L4	1.3.1

**********GOOD LUCK**********

exam
12/07/19
[9:30]

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.

Re- Examination July 2019

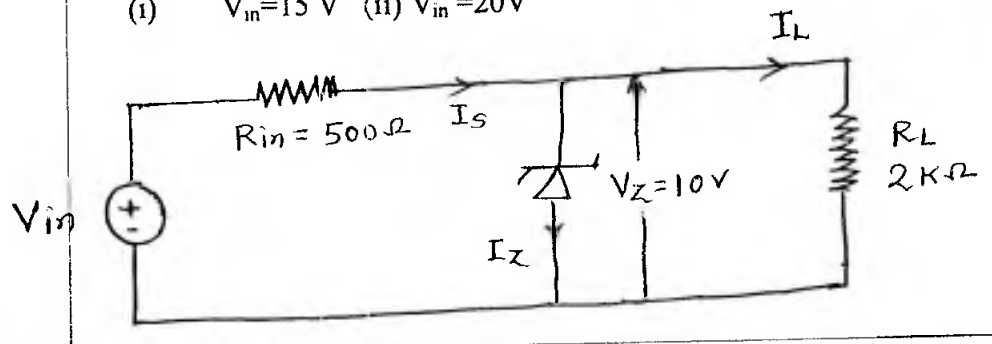
Program: B.Tech.
Course Code: ES-BT202
Course Name: Basic Electronics Engineering

Duration: Three Hours
Maximum Points: 100
Semester: II

Instructions:

- Solve any five questions from seven questions
- Answers to all sub questions should be grouped together
- **Assume suitable data if required and justify the same.**

Q. No.	Description	Pts	CO	BL	PI
Q. a)	What are the important features of JFET?	10	01		
b)	Transistor can acts as an amplifier. Justify it.	10	03		
Q.2 a)	A full wave bridge rectifier supplies pure resistive load. Derive the expression for the RMS value of the load voltage and draw the waveforms of (i) load voltage (ii)load current and (iii)voltage across diode.	10	02		
Q.2 b)	In a full wave bridge rectifier the load resistance is R_L=1000 ohm. The input voltage is **325 sin314t.** Find (i) the peak value of output voltage (ii) the average value of output voltage (iii) the rms value of output voltage (iv) the ripple factor of output voltage (v) rectification efficiency	10	02		
Q.3 a)	What is the need of filter in rectifier circuit using diodes? What are the different types of filters? Discuss any one with suitable circuit diagram.	10	02		
Q.3 b)	What are the important features of Bipolar Junction Transistor?	10	01		

Q.4 a)	Why the width of the base region of a transistor is kept very small compared to other regions? A transistor has current gain of 0.99 when used in common base (CB) configuration. How much will be the current gain of this transistor in common emitter (CE) configuration?	**10**	**01**		
Q.4 b)	The bipolar junction transistor is operating in common base mode. Draw the circuit and explain input and output characteristics of transistor in common base mode.	**10**	**01**		
Q.5 a)	For the Zener voltage regulator shown in Fig. below find the current I_s when (i) V_{in}=15 V (ii) V_{in} =20V 	**10**	**03**		
Q.5 b)	The channel of JFET provides the variable resistance to drain current. Justify it.	**10**	**01**		
Q.6 a)	Draw the circuit and explain the operational amplifier as subtractor.	**10**	**03**		
Q.6 b)	What are the different properties of operational amplifiers?	**10**	**01**		
Q.7 a)	What is digital signal? What are the different basic components of digital system?	**08**	**04**		
Q.7 b)	Define the rules used to simplify the Boolean algebraic expression.	**08**	**04**		
Q.7 c)	Draw a logic circuit for: $\bar{A}(A+B)+(B+AA)(A+\bar{B})$	**04**	**04**		

Re-exam – Lab

9/07/19 [9:30]

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai - 400058

Re-Examinations- July 2019

Program: Civil/Mechanical/Electrical

Course Code: BS-BT201

Course Name: Engineering Mathematics II

Duration: 3 hours

Maximum Points: 100

Semester: II

Instructions:

1. Question No 1 is compulsory.
2. Attempt any four questions out of remaining six questions.

Q.No	Questions	Points	CO	BL	PI
1(a)	Solve $(3xy-y^2)dx+x(x-y)dy=0$	6	1	ii, iii	1.1.1
1(b)	Express $\int_{-\pi/6}^{\pi/6}(\sin\theta+\sqrt{3}\cos\theta)^{1/6}d\theta$ as a beta function.	6	3	iv, v	2.4.1
1(c)	Evaluate $\iint_R(6x^2-40y)dxdy$, where R is the triangle having vertices $(0,3),(1,1)$ and $(5,3)$	8	4	ii, v	2.4.1
2(a)	Solve $(D^3+2D^2-5D-6)y=e^{-x}+\cosh 3x$	6	2	i, ii	2.4.1
2(b)	Evaluate $\int_0^{\pi/2}(\tan\theta)^{1/4}\cdot e^{-\sqrt{\tan\theta}}\cdot(\sec\theta)^2\,d\theta$	6	3	ii, iii	1.1.1
2(c)	Find the arc length of the parabola $x^2=4y$ which lies inside the circle $x^2+y^2=6y$.	8	4	ii, iii	1.1.1
3(a)	Solve $(3y^2e^{xy^2}-1)+(2ye^{xy^2}+3xy^2e^{xy^2})\frac{dy}{dx}=0$	6	1	i, ii	2.4.1
3(b)	Prove that $\int_0^{\infty}\frac{1}{(e^x+e^{-x})^n}dx=\frac{1}{4}\beta\left(\frac{n}{2},\frac{n}{2}\right)$	6	3	ii, iii	2.4.1
3(c)	Evaluate $\int_0^{4}\int_{\sqrt{x}}^{2}\frac{1}{1+y^3}dydx$	8	4	iv, v	1.1.1

4(a)	Prove that the length of one arc of cycloid $x=a(\theta-\sin\theta), y=a(1-\cos\theta)$ is 8a	**6**	**3**	i, ii	1.1.1
4(b)	Solve $y=\left(2y^4+2x\right)\frac{dy}{dx}$	**6**	**1**	iv, v	2.4.1
4(c)	Evaluate $\iiint_V x^2yz\,dxdydz$ where V is the volume bounded by the planes $x=0, y=0, z=0$ and $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$	**8**	**4**	ii, iii	2.4.1
5(a)	Solve $(D^3+4D)y=\sin x\cdot\cos 3x$	**6**	**2**	i, ii	2.4.1
5(b)	$x^2\frac{d^2y}{dx^2}+2x\frac{dy}{dx}-20y=(x+1)^2$	**6**	**2**	ii, iii	2.4.1
5(c)	Evaluate $\int_0^4\int_{\sqrt{4x-x^2}}^{\sqrt{16-x^2}}\frac{1}{\sqrt{16-x^2-y^2}}dxdy$ by changing to polar coordinates.	**8**	**4**	iv, v	1.1.1
6(a)	Change the order of integration $\int_0^{2a}\int_{\sqrt{2ax-x^2}}^{\sqrt{2ax}} f(x,y)dxdy,$	**6**	**4**	ii, v	1.1.1
6(b)	Solve $(D^2+D-6)y=e^{-2x}\cos 3x$	**6**	**2**	iv, v	2.4.1
6(c)	Find the volume bounded by the cylinder $y^2=x, x^2=y$ and the planes $z=0$, $x+y+z=2$	**8**	**4**	i, ii	1.1.1
7(a)	Solve $(D^2-3D+2)y=\sin(e^{-x})$	**6**	**2**	i, ii	1.1.1
7(b)	Evaluate $\int_0^3\frac{x^{\frac{3}{2}}}{\sqrt{3-x}}dx\cdot\int_0^1\frac{1}{\sqrt{1-x^{\frac{1}{4}}}}dx$	**6**	**3**	ii, iii	2.4.1
7(c)	Evaluate $\iint_R\frac{ye^{2y}}{\sqrt{(1-x)(x-y)}}dxdy$, where R is the region of the triangle whose vertices are (0, 0), (1, 0) and (1, 1).	**8**	**4**	ii, v	1.1.1