Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

END SEMESTER EXAMINATION SEPTEMBER 2022

F.Y. B.Tech C (CME) Sem II

Program: First Year Engineering (C-M-E) **Duration: 3 Hours**

Course Code: BS-BT201 **Maximum Points: 100**

Course Name: Integral Calculus and Differential Equations **Semester: II**

19/22

Note:

1. **Attempt Any Five Questions**
2. **Answers to the sub questions should be grouped together**

		Questions	Points	CO	BL	PI
1	a	Prove that $\int_0^a \frac{1}{\left(a^n - x^n\right)^{1/n}} dx = \frac{\pi}{n} \operatorname{cosec}\left(\frac{\pi}{n}\right)$	6	CO2	BL3	1.1.2
	b	Evaluate $\int_0^2 \int_0^{\sqrt{2x-x^2}} x^2 y \, dx dy$	6	CO4	BL5	1.1.1
	c	Evaluate $\iiint_V \frac{1}{\sqrt{4-x^2-y^2-z^2}} dx dy dz$ over the volume of the sphere $x^2 + y^2 + z^2 = 4$	8	CO2	BL4	1.2.1
2	a	Solve $\left(D^2 + 2D + 5\right) y = e^{-2x} \cosh x$	6	CO1	BL3	1.1.1
	b	Change the order of double integral $\int_2^5 \int_{1-x}^{x-1} f(x, y) \, dx dy$	6	CO4	BL1	1.1.1
	c	Using Method of Variation of Parameters, Solve $(D^2 + a^2) y = \sec ax$	8	CO1	BL2	1.1.2

END SEMESTER EXAMINATION SEPTEMBER 2022

3	a	Evaluate $\int_0^\infty \frac{e^{-x^3}}{\sqrt{x}}dx \cdot \int_0^\infty y^4 e^{-y^6}dy$	6	CO3	BL5	1.1.1
	b	Solve $(2x\log x - xy)dy + 2ydx = 0$	6	CO1	BL5	1.1.1
	c	Evaluate $\iint_R \frac{1}{\sqrt{1-x^2-y^2}}dxdy$, where R is the region of ellipse $x^2+2y^2=1$ in the first quadrant.	8	CO4	BL2	1.1.3
4	a	Solve $(D^2-7D+6)y = e^{3x}x^2$	6	CO1	BL4	1.1.1
	b	Find the length of the arc of the cardioid $r = a(1-\cos\theta)$ which lies outside the circle $r = a\cos\theta$.	6	CO3	BL4	1.1.1
	c	Change the order of integration and evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \frac{y}{(y^2+1)\sqrt{1-x^2-y^2}}dxdy$	8	CO4	BL3	1.1.2
5	a	Solve $(y^2e^{xy^2}+4x^3)dx + (2xye^{xy^2}-3y^2)dy = 0$	6	CO1	BL5	1.1.3
	b	Find the length of the arc of the parabola $x^2 = 12y$ cut off by its latus rectum	6	CO3	BL3	1.1.1
	c	Evaluate $\iiint_V (xy^2z)dxdydz$ where V is the volume of the tetrahedron bounded by the planes $x=0$, $y=0$, $z=0$ and $x+y+z=1$	8	CO4	BL4	1.1.1
6	a	Evaluate $\int_0 \sqrt{1-\sqrt{1-\sqrt{x}}}\,dx$	6	CO2	BL5	1.1.1

END SEMESTER EXAMINATION SEPTEMBER 2022

	b	Evaluate $\int_{-\infty}^{\infty}\int_{-\infty}^{\infty}\frac{1}{\left(a^2+x^2+y^2\right)^{3/2}}dxdy$ by changing to polar coordinates	6	CO4	BL3	1.1.2
	c	Solve $\frac{dy}{dx}=1-x(y-x)-x^3(y-x)^2$	8	CO1	BL4	1.1.3
7	a	Evaluate $\int_0^{\log 2}\int_0^{x}\int_0^{x+\log y} e^{x+y+z}dxdydz$	6	CO4	BL4	1.2.1
	b	Solve $\left(D^4-8D\right)y=x^2-3x+2$	6	CO1	BL1	1.3.2
	c	Solve $(3x+2)^2\frac{d^2y}{dx^2}+3(3x+2)\frac{dy}{dx}-36y=x^2+x+1$	8	CO1	BL2	1.1.3

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai – 400058.

September, End Examination 2022

Max. Marks: 100 Duration: 03 Hours

Class: F.Y.B. Tech (CME) **Semester: II**

Name of the Course: Communication Skills Course Code : HSM BT 208

7/9/22

Instruction: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is for their use.

- **Question Number 1 is compulsory.**
- **Out of remaining 6 questions attempt any 4**
- **In all total 5 questions to be attempted**
- **All questions carry equal marks**
- **Draw diagrams wherever necessary**
- **Answer to each new question to be started on a fresh page.**

Q.No	Answer the following Questions	Grade point	Co	BL	PI
Q.1. A	Define Communication and describe the process of communication with the help of a diagram. Explain the types and importance of feedback. (400 Words)	08	2,3,4,5	2,3	10.1.2
Q.1. B	Write Short Notes on any Two: (150 Words) a. Techniques to improve Conversations b. Chronemics as a form of Non-verbal Communication c. Principles of Effective writing	08	02,01	03,4	10.1.1
Q.1. C	Describe the difference between Formal and informal channel of communication of communication. (100 Words)	03	05	4,5	12.1.2
Q.2. A.	You are the Chairperson, Organizing Committee SPICON the 1st International Conference of Sardar Patel College of Engineering. Make an Enquiry with the Taj Group of Hotels, Mumbai to be our venue for the three days conference from September 15 to 17, 2022. Please request for their quotation for 100 participants stay, food, conference kits, transportation, and the banquet hall. Invent Necessary details. Write the letter in Modified block Format.	12	04	3,4	10.4.2
Q.2. B	Identify and explain any five cultural barrier to communication	08	02	2	10.4.2
Q.3. A	In anticipation of the Diwali season. PSR and Sons Pvt. Ltd., Princess	12	04	4,5	12.1.2

	Street Delhi, 100023, placed an order for gift items with Anurag Mills Pvt. Ltd, Charkop Char rasta, Kandivali West, Mumbai 400011, for delivery on 21 October, 2022. However, the good reached the store on 29 October, 2022 and most of the gift articles were damaged. As the Proprietor of the store, Write a letter of complaint seeking justified compensation for the delay and the loss that you had to incur. Use the Complete Block Form. (Invent Necessary Details).				
Q.3. B	Write Short Notes on any two kinds of non-verbal Communication in 100 words: a. Proxemics b. Kinesics c. Paralinguistic	08	02	02,05	9.4.2
Q.4. A.	"Downward channel of communication may be one of the most commonly used, but it is also the one most inadequate and unsatisfactory". Do you Agree? Explain the main objectives, importance, advantages and limitations of Downward communication.	12	03,4	4,5	12.3.2
Q.4. B.	Which of the following statements about channels of communication are True? a. Communication from the chief executive officer of a company to the personal manager of the company is an example of Upward communication b. Formal communication channels are based on social relationships in which employees talk about work during formal social gatherings. c. The main objective of diagonal communication is developing teamwork and promoting group coordination d. Informal channels transmit news of official importance through rumors e. A business proposal from the branch manager of a company to the managing director of the company is an example of horizontal communication. f. Diagonal channels of communication flow in all directions. g. Grapevine communication helps the employees to vent out their emotions h. Communication received from external parties is known as external communication	08	03,04	01,02	12.1.1.
Q.5. A	Your friend has to deliver a speech in front of a large audience for 10 minutes. He has come to take your help in writing and delivering the speech. Explain in detail the Talk Power Program for writing the speech and give him public speaking techniques for effective performance.	12	05	05	10.2.1
Q.5. B	Write a short note on You-attitude in a business letter	04	05	05	10.2.1

Q.5.C.	Draw the Semi-Block format with all the eight basic parts of a business letter.	04	05	02	10.2.1
Q.6. A	You are a young freshly passed MBA graduates, who have launched a company that markets dairy products. Design a sales letter for prospective buyers who are discerning, upmarket, middle class and class conscious. The letter should be drafted applying the AIDA principles of sales letter.	12	05	05	12.2.3
Q.6. B.	Explain the SQ3R Techniques to reading	04	04	04	10.1.2
Q.6. C.	What is a claim Letter? State the points to be kept in mind while drafting a claim letter.				
Q.7. A	Read the passage and answer the questions: The immune system is equal in complexity to the combined intricacies of the brain and nervous system. The success of the immune system in defending the body relies on a dynamic regulatory communications network consisting of millions and millions of cells. Organized into sets and subsets, these cells pass information back and forth like clouds of bees swarming around a hive. The result is a sensitive system of checks and balances that produces an immune response that is prompt, appropriate, effective, and self-limiting. (2) At the heart of the immune system is the ability to distinguish between self and non-self. When immune defenders encounter cells or organisms carrying foreign or non-self-molecules, the immune troops move quickly to eliminate the intruders. Virtually every body cell carries distinctive molecules that identify it as self. The body's immune defenses do not normally attack tissues that carry a self-marker. Rather, immune cells and other body cells coexist peaceably in a state known as *self-tolerance*. When a normally functioning immune system attacks a non-self-molecule, the system has the ability to remember the specifics of the foreign body. Upon subsequent encounters with the same species of molecules, the immune system reacts accordingly. With the possible exception of antibodies passed during lactation, this so-called immune system memory is not inherited. Despite the occurrence of a virus in your family, your immune system must learn from experience with the many millions of distinctive non-self-molecules in the sea of microbes in which we live. Learning entails producing the appropriate molecules and cells to match up with and counteract each non-self-invader. (3) Any substance capable of triggering an immune response is called an *antigen*. Antigens are not to be confused with *allergens*, which are most often harmless substances (such as ragweed pollen or cat hair) that provoke the immune system to set off the inappropriate and harmful response known as *allergy*. An antigen	14	01	01	10.1.1

can be a virus, a bacterium, a fungus, a parasite, or even a portion or product of one of these organisms. Tissues or cells from another individual (except an identical twin, whose cells carry identical self-markers) also act as antigens; because the immune system recognizes transplanted tissues as foreign, it rejects them. The body will even reject nourishing proteins unless they are first broken down by the digestive system into their primary, non-antigenic building blocks. An antigen announces its foreignness by means of intricate and characteristic shapes called *epitopes*, which protrude from its surface. Most antigens, even the simplest microbes, carry several different kinds of epitopes on their surface; some may even carry several hundred. Some epitopes will be more effective than others at stimulating an immune response. Only in abnormal situations does the immune system wrongly identify self as non-self and execute a misdirected immune attack. The result can be a so-called autoimmune disease such as rheumatoid arthritis or systemic lupus erythematous. The painful side effects of these diseases are caused by a person's immune system actually attacking itself.

1. What is the analogy used to describe the communications network among the cells in the immune system? **01**

   a. the immune system's memory
   b. bees swarming around a hive
   c. a sea of microbes
   d. immune troops eliminating intruder

2. The immune cells and other cells in the body coexist peaceably in a state known as -**01**

   A. Equilibrium. B. self-tolerance. C. harmony. D. tolerance.

3. What is the specific term for the substance capable of triggering an inappropriate or harmful immune response to a harmless substance such as ragweed pollen? -**01**

   a. Antigen c. allergen
   b. autoimmune disease microbe

4. How do the cells in the immune system recognize an antigen as foreign or non-self? -**01**

   a. Through an allergic response c. through fine hairs protruding from the antigen surface
   b. through characteristic shapes on the antigen surface d. through blood type

5. After you have had the chicken pox, your immune system will be able to do all of the following EXCEPT -**01**

   a. Prevent your offspring from infection by the chicken pox virus.
   b. Distinguish between your body cells and that of the chicken pox virus.

	c. Remember previous experiences with the chicken pox virus. d. Match up and counteract non-self-molecules in the form of the chicken pox virus. 6. Which of the following best expresses the main idea of this passage? **-01** a. An antigen is any substance that triggers an immune response. b. The basic function of the immune system is to distinguish between self and non-self. c. One of the immune system's primary functions is the allergic response. d. The human body presents an opportune habitat for microbes. 7. Why would tissue transplanted from father to daughter have a greater risk of being detected as foreign as a tissue transplanted between identical twins? **-01** a. The age of the twins' tissue would be the same and, therefore, less likely to be rejected. b. The identical twin's tissue would carry the same self-markers and would, therefore, be less likely to be rejected. c. The difference in the sex of the father and daughter would cause the tissue to be rejected by the daughter's immune system. d. The twins' immune systems would remember the same encounters with childhood illnesses. 8. What is the meaning of the underlined word *intricacies* as it is used in the first sentence of the passage? **-01** a. elaborate interconnections b. confusion of pathways c. inherent perplexity d. comprehensive coverage 9. Write a summary of the passage in 150 Words **-05**				
Q.7. B.	In the following questions, out of the four alternatives, choose the one which can be substituted for the given sentence. 1. One who accepts pleasure and pain equally (A) Stoic (B) Humanitarian (C) Thespian (D) Sadist **2. An apartment building in which each apartment is owned separately by the people living in it, but also containing shared areas.** (A) duplex (B) caravan (C) condominium (D) multiplex	04	01	01	10.1.1

	3. Politicians are notorious for doing undue favor to their relatives. (A) nepotism (B) dualism (C) polarism (D) pluralism **4. A person especially interested in the study of coins and medals.** (A) numismatist (B) numerist (C) medallist (D) coinist				
Q.7. C	Multiple Choice Questions: 1. Which of the following statements are true about organizational communication? a. Internal Communication is called formal when the communication happens within an organization in an unplanned way. b. Internal formal communication can happen over emails, messenger chats, blogs and phone calls c. Formal communication is mostly related to work; informal communication may or may not be about work. d. Grapevine is a formal communication channel. 2. To control speaker related barriers, you should a. Inform the speaker about expectations of the audience b. Listen to the speaker with a pinch of salt. c. Tell the speaker if he/she is too fast or slow **i. B & C ii. A& B iii. A& C iv. All of these** 3. Adaption of the writing style according to the audience is important because a. Different people may have different requirements from the message b. It is the latest management fad c. Different people will have different viewpoints of the same information d. It helps improve your writing e. All of these 4. Giving and receiving feedback in an organization should be a. Open b. Ambiguous c. Transparent d. Precise.	04	1,2,3, 4,5	1,2, 3,4, 5	10.2.1

==========END==========

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END SEMESTER EXAMINATION - SEPTEMBER 2022

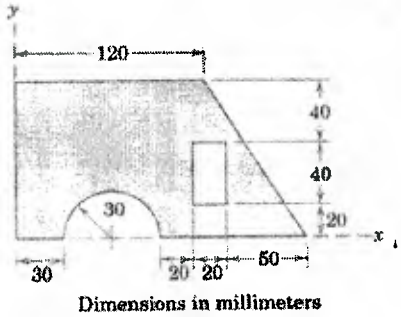
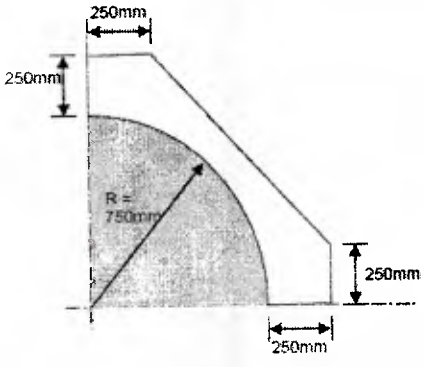
Program: B. Tech (Civil/ Mechanical/ Electrical) **Duration: 3 Hr.**

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

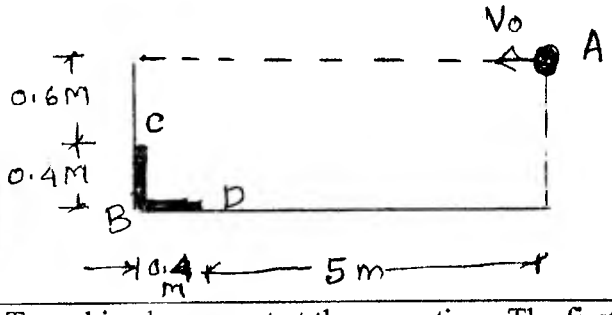
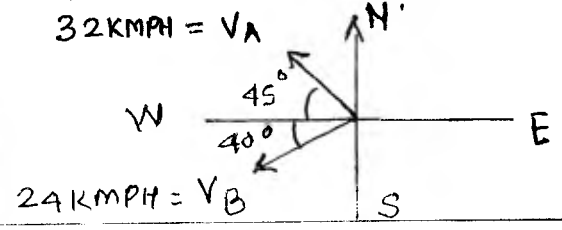
Course Name: Engineering Mechanics II **Semester: II**

12/9/22

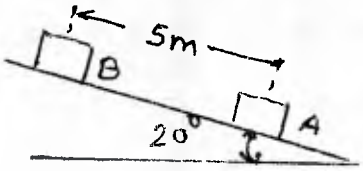
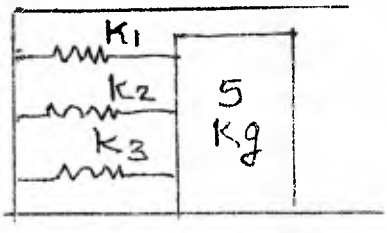
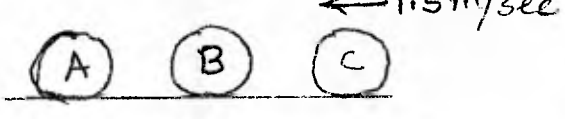
Notes: Solve any 5 questions out of 7 questions

Q.No.	Questions	Points	CO	BL	module
1 (a)	Determine centroid of shaded area shown with respect to X-X and Y-Y axis  Dimensions in millimeters	10	1	2	1
1 (b)	 Find Ixx, Iyy of unshaded area	10	1	2	2
2(a)	An object is moving along the ground. Its acceleration is $\mathbf{a}(t) = 3t + 5$, its velocity at time t =4 sec is 6 m/sec and its position at t=5 is x(5)=25 m. Find the equation for position that describes this object's motion.	8	2	3	3

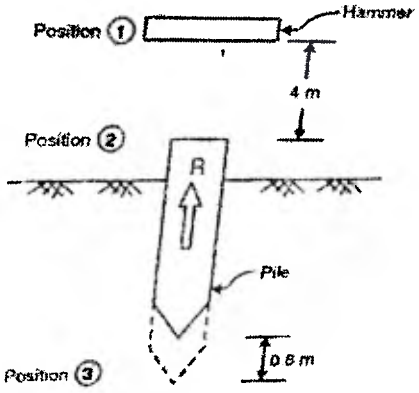
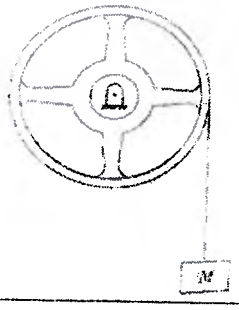
END SEMESTER EXAMINATION - SEPTEMBER 2022

2(b)	A stone is thrown up with a velocity of 25m/sec from ground. On return journey it strikes a glass placed at half the height and loses 25%of its velocity in breaking the glass. Find the velocity with which it will hit the ground	12	1	3	3
3(a)	Car A starts from rest and accelerates uniformly on a straight high way. Car B start from the same point 6 second later with initial velocity zero and accelerates uniformly at 6 m/sec^2. If car B overtake car A 500 meter after starting point, determine acceleration of car A. Also find velocity of each car at the time of overtaking.	8	1	3	3
3(b)	The equations of motion of particle are $x= 3t^2$ and $y=6t$. i) Determine the geometric nature of path ii) Determine normal and tangential components of acceleration iii) Calculate radius of curvature	12	2	3	3
4(a)	A handball player throws a ball from point A with horizontal velocity Vo. Calculate Vo for which the ball will strike corner B. Also find range of value of Vo for which the ball will strike corner region CBD 	12	2	3	3
4(b)	Two ships leave port at the same time. The first ship A moves towards North West at 32 kmph and the second ship B moves 40^0 South of West at 24 kmph Determine i) the relative velocity of ship B with respect to ship A ii) After what time will they be 160 km apart 	08	2	3	4

END SEMESTER EXAMINATION - SEPTEMBER 2022

5(a)	Two blocks A and B are held on an inclined plane 5 m apart as shown. For block A μ=0.2 and for block B μ = 0.1. If blocks begin to slide simultaneously calculate the time and distance travelled by each block before collision. 	10	2	3	4
5(b)	A ball thrown by a boy in the street is caught by another boy on a balcony 4 m above the ground and 18 m away after 2 s. Calculate the initial velocity and the angle of projection	10	2	3	4
6(a)	A block of mass 5 kg can slide without friction in a slot and is attached to 3 springs as shown. The springs are initially un stretched. When the block is pushed to the left 45 mm and released determine i) Maximum velocity of block ii) Velocity of block when it is 18 mm from initial position. K1= 1 kN/m, K2 = 2 kN/m and K3= 4 kN/m 	10	3	3	4
6(b)	Two identical balls A and B are at rest on a smooth surface. A ball C of different material but of same mass moving with velocity of 1.5 m/sec strikes ball B. If coefficient of restitution between B and C is 0.8 and that between A and B is 0.5, Determine velocity of each ball after all collisions have taken place. 	10	3	3	5

END SEMESTER EXAMINATION - SEPTEMBER 2022

7(a)	1) A pile driving hammer of mass 300 kg falls through a height of 4 m on a pile of 500 kg mass. If it drives the pile 0.8 m into the ground, find the average resistance of the ground to penetration. Take perfectly plastic impact between hammer and pile. 	10	3	3	5
7(b)	A flywheel of mass of 1000 kg and radius of gyration 30 cm has a block M of mass 15 kg attached to a cord wrapped around its rim of radius r = 40 cm. If the system is released from rest, find the acceleration of the block M and the speed of the block after it has travelled a distance of 1 m 	10	3	3	5

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End-Sem-II

September- 2022

Max. Marks: **100 marks** Duration: **180 Min**

Class: F.Y B.TECH **C/M/E** Semester: **II** Program: F.Y. B. Tech

Name of the Course: **Engineering Chemistry-II** Course Code : BS-BT-206

Instructions:

1 Question **No** (Q1) is compulsory
2 Attempt any 4 from Q2Q3 Q4 Q5 Q6

14/9/22

Que. No	Question	Points	CO	BL	PI
Q1					
a	A Coal sample contain following composition by weight C=87%, H=5%,O=3%, S=1%,N=1% and Ash=2% calculate gross and net calorific value	**5**	2	3	3.2.1
b	Calculate the Atom Economy for the following reaction with the target product (C6H5NHCOC6H5) $C6H5NH_2 + C6H5COCl \dashrightarrow C_6H_5NHCOC_6H_5 + HCl$	**5**	3	3	3.2.1
c	Calculate the Atom Economy for the following reaction with the target product ($Cl\text{-}CH_2\text{-}CH{=}CH_2$) $CH_3\text{-}CH{=}CH_2 + Cl_2 \dashrightarrow Cl\text{-}CH_2\text{-}CH{=}CH_2 + HCl$	**5**	3	3	3.2.1
d	A coal sample subjected to ultimate analysis. 5.0 g of coal on combustion in bomb calorimeter gave 1.5g BaSO4. Calculate percentage of Sulphur content in sample.	**5**	2	1	3.2.1
Q2					
a	Explain 12 Principal of green chemistry	**10**	3	2	2.2.3
b	Write a note on different green solvents for chemical reaction	**5**	3	2	1.2.1
c	Explain Atom Economy for chemical synthesis	**5**	3	2	2.2.3
Q3					
a	Explain the determination of carbon and hydrogen content using Ultimate analysis with its significance	**10**	1	2	2.2.3

b	Write a short note on the Octane value of petrol fuel	**5**	1	1	1.2.1
c	Explain biodiesel synthesis of oil	**5**	2	1	1.2.1
Q4					
a	Explain protection of metal by cathodic and anodic current	**10**	1	1	2.2.3
b	Write short note on nonmetallic coating for protection of metal	**5**	1	1	1.2.1
c	Explain differential aeration corrosion with a suitable example	**5**	1	1	2.2.3
Q5					
a	Write short on a fractional distillation of crude petroleum and its composition. Explain the types of cracking of crude petroleum with the difference between thermal and catalytic cracking	**10**	1	1	2.2.3
b	Define fuel and explain the calorific value of a fuel	**5**	1	1	1.2.1
c	What are antiknocking agents? Explain the role in petrol	**5**	1	2	2.2.3
Q6					
a	Explain dry corrosion with suitable reaction and mechanism	**10**	1	1	1.2.1
b	How nitrogen content calculated from a coal sample	**5**	2	1	1.2.2
c	Explain calculation of volatile matter content in coal sample and its significance	**5**	2	3	1.2.1

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End Semester – SEPTEMBER 2022 Examination

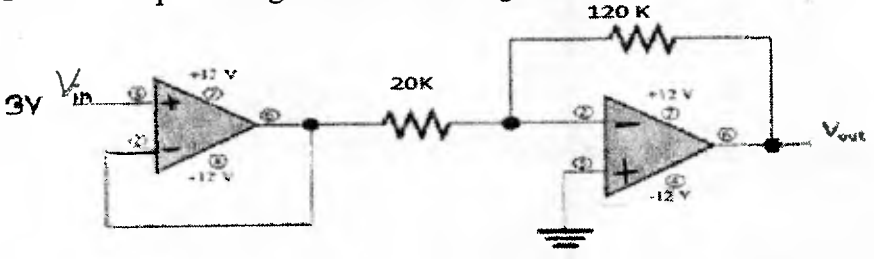
Program: FY(C/M/E) **Duration:3 hours**

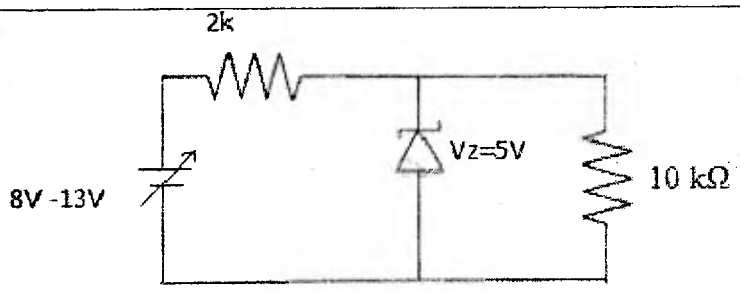
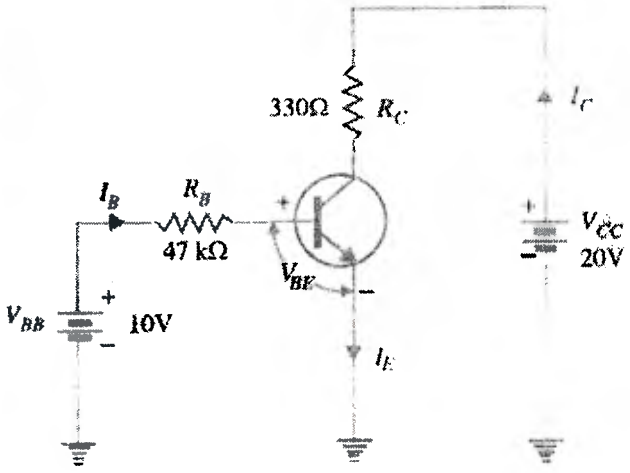
Course Code: ES-BT102 **Maximum Points:100**

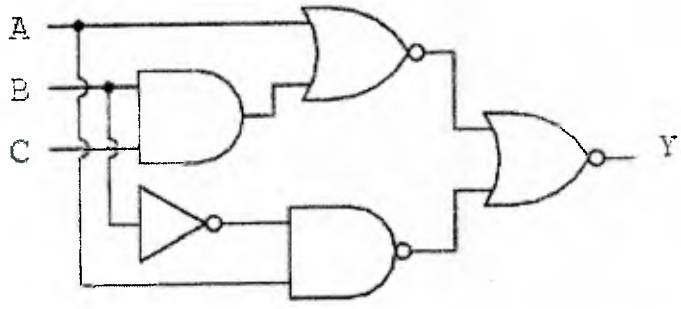
Course Name: Basic Electronics Engineering **Semester:II**

16/9/22

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figures to the right indicates full marks..

Q.No	Questions	Points	CO	BL	PI
Q1a.	What is the use of a filter in a power supply circuit?	5	2	3	2.4.1
b	Compare BJT and FET.	4	1	4	2.4.1
c	Two electrical signals represented by A=101101 and B=110101 are applied to 2 input AND gate. Sketch the output signal and the binary number it represents.	4	4	3	2.4.1
d	Derive the relation between α and β in Bipolar Junction Transistor.	2	1	3	2.4.1
e	Find the output voltage of the following circuit. 	5	3	3	2.4.1
2a.	A full wave rectifier is fed from a transformer having center tapped secondary winding uses two diodes each having a forward resistance of 25 Ω . The rms value of the secondary voltage fed between center tap to each secondary terminal is 48V. The load resistance is 1K Ω. Draw neat circuit diagram. Determine (i) DC output voltage (ii) DC output current (iii) Rectification efficiency. (iv) PIV of the diode.	10	2	3	2.4.1
b.	Figure shows the circuit of a zener diode voltage regulation.. Find the maximum and minimum value of zener current in the circuit.	6	2	3	

					
c	Following readings are obtained in a transistor connected in common base configuration I_E=2mA, I_B= 20mA.Compute the values of α, ,I_C and β.	4	1	3	2.4.1
Q3a.	For the given transistor circuit find V_{CE} and I_C.Given V_{BE}=0.7V ,β=200 	8	1	3	2.4.1
Q3b	Explain the Cutoff, saturation and active region with respect to BJT common emitter output characteristics with neat diagrams.	8	1	2	2.4.1
3c.	Draw and explain the transfer characteristics of JFET and write the expression for drain current.	4	1	2	
Q4a	A JFET has a drain current of 5 mA. If I_{DSS}=12mA and $V_{GS(off)}$= -5V,Find the value of V_{GS} and V_p.	6	1	3	2.4.1
b.	With neat diagrams explain the working of FET and and its drain characteristics.	8	1	2	
c	Explain operational amplifier as inverting amplifier with neat circuit diagrams.	6	3	2	
Q5a	Explain working of BJT as an amplifier with neat circuit diagrams.	10	1	2	2.4.1
b	Compare L filter and C filter when used with FWR w.r.t. following points (i) circuit diagram (ii) the way L and C are connected (iii) output waveforms w.r.t. input waveform (iv) ripple factor (v) suitability /application with respect to load connection	10	2	4	

Q6a	What is meant by universal gates? Why are they so called? Explain with relevant circuit diagrams.	10	4	2	2.4.1
b.	AB + A(B + C) + B(B + C) Using Boolean algebra simlify the above expression and draw the logic diagram.	5	4	3	
c.	 Draw a simplified version of the above circuit using Boolean algebra.	5	4	3	
Q7a	Draw and explain the inverting adder circuits with three inputs V_1,V_2 and V_3 Using the same circuit design the amplifier to find the average of the three inputs.	8	3	3	2.4.1
b	Derive the expression for Half wave rectifier for the following parameters, (i) I_{DC} (ii) I_{RMS} (iii) Rectification Efficiency iv)Ripple factor	8	2	3	2.4.1
c	Design an opamp that provides a gain of 5.5.Assume you have a resistor Ri=10k ohms.What value would you choose for R_f .Draw the circuit.	4	3	6	

Bharatiya Vidya Bhavan's
SARDAR PATEL COLLEGE OF ENGINEERING
(An Autonomous Institution Affiliated to University of Mumbai)
End Semester Examination for F.Y.B Tech (Civil/Mechanical/Electrical)
2021-22

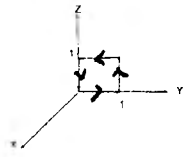
19/09/2022

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** 19/9/22

- **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 assumptions clearly.**
- **Marks will be given on the basis of what will be written in the paper irrespective of your intentions.**Good luck!

Q1.	**Answer any five from (a) to (f)**	Mark	Module	CO	BL	PI
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 a possible electrostatic field. $\overline{E} = k[y^2\hat{x} + (2xy + z^2)\hat{y} + 2yz\hat{z}]$. where k is a constant with appropriate units.	4	1	1	1	1.2.1
c.	Derive continuity equation from Maxwell-Ampere equation.	4	3	2	2	1.2.1
d.	A plane transmission grating produces an angular separation of 0.01radian between two wavelengths observed at an angle 30°. Given mean value of the wavelength as 5000A°, calculate the difference in two wavelengths if the spectrum is observed in the second order.	4	4	3	3	2.1.3
e.	Explain why population inversion is a necessary condition for laser action to take place.	4	5	4	2	1.2.1
f.	Find the electric field at a distance z above the midpoint of a circular loop of radius r, which carries a uniform charge density λ.	2	2	1	2	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 angular spread of a Ruby laser beam due to diffraction, if the beam emerges through a 3mm diameter mirror. How large would be the diameter of this beam when it is incident on a satellite 300km above earth?	4	5	4	3	2.1.3
Q3.						
a.	State Ampere's law in integral and differential form. Find the magnetic field at a distance s from an infinite long straight wire carrying a current I.	10	2	1	1,3	1.1.1 1.2.1

b.	Deduce wave equations for electric and magnetic fields from Maxwell's equations.	6	3	2'	2	1.2.1 2.1.3
c.	A Newton's rings experiment arrangement is used with a source emitting two wavelengths $\lambda_1=6x10^{-7}m$ and $\lambda_2=4.5x10^{-7}m$ and it is found that n^{th} dark ring due to λ_1 coincides with $(n+1)^{th}$ dark ring due to λ_2. If the radius of curvature of the lens used is 90cm, find the diameter of the n^{th} dark ring of λ_1	4	4	3	3	1.2.1
Q4.						
a.	Derive and explain Poynting's theorem.	10	3	2	2	1.2.1
b.	Explain principle of construction and reconstruction processes of Holography using lasers.	6	5	4	1	1.2.1
c.	Check the Stoke's theorem (curl theorem) for the function: $(2xz + 3y^2)\,\hat{j} + 4yz^2\hat{k}$ for a square surface in the y-z plane having sides of unit length. 	4	1	1	3	1.1.1 1.2.1
Q5.						
a.	State the expression for the intensity distribution through a diffraction grating and state the conditions for maxima, minima and subsidiary maxima. Also plot diffraction curve for the value of N=6, b=2a (upto scale).	10	4	3	1,2	1.2.1
b.	Explain spherical coordinate system and hence derive line element and volume elements in the spherical coordinate system.	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 $4x10^8m$ 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.	Derive an expression for path difference in the transmitted system when light falls on a uniform thin film of equal thickness.	6	4	3	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.	State 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).	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.	Write down the electrodynamic equations before and after Maxwell's corrections.	4	3	2	3	1.2.1

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

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

Term End EXAMINATIONS - September 2022

Program: F.Y.B.Tech (C/M/E) **Duration: 3 Hrs**
Course Code-MC-BT001. **Maximum Points: 100**

Course Name: Constitution of India **Sem-II** 2019/22.

Instructions: i. Attempt Any six Questions. ii. Label the answers with suitable articles.

Q.No.	Questions	Points	CO	BL	PI
1 (A)	Choose the correct alternatives from the following: 1) Constituent assembly was presided by_____ a) Dr B.R Ambedkar b) Jawaharlal Nehru. c) Sardar Patel d) Dr Rajendra Prasad 2) _____ is an Introduction to Indian constitution a) Writs. b) Preamble c) Fundamental Rights d) Emergency 3) Right to education is referred in article _____. a) 44 b) 20 c) 21A d) 14 4) _____ means "to bring the body " before the court. a) Habeas corpus b) certiorari c) Quo warranto d) Injunction 5) Directive principles are adapted from constitution of _____. a) Ireland b) Australia c) Germany d) USA 6) _____is an inseparation part of the parliament. a) Attorney general b) President c) Prime minister d) Chief justice of supreme court. 7) Objective Resolution was moved by _____. a) K.M Munshi b) B.N Rao c) Jawaharlal Nehru d) Sardar Patel. 8) Fundamental Rights are provided in article _____. a) 48 b) 40 c) 19 d) 51A 9) Constitution of _____is the longest written constitution in the world. a) USA b) England C) India d) Canada	10	3	5	6.1.1

(B)	10) Procedure to remove president is called _____. a) Impeachment b) Doctrine of lapse c) Doctrine of severability d) Escheat. Answer the following:- 1) Define the term "Constitution " 2)What do you mean by "March Rush"? 3) Define the concept "Preventive Detention" 4)What is meant by "Fundamental Rights "? 5) Explain the concept "Judicial review "	10	4	3	6.2.1
Q2 (A)	Describe the key -words of preamble to Indian constitution	10	2	4	6.2.1
(B)	Critically analyse the fundamental duties as per constitution.	10			
Q3 (A)	Explain the salient features of Indian constitution	10	1	2	6.1.1
(B)	State the position and role of Rajya sabha.	10			
Q4 (A)	Discuss the multi -functional role of Indian parliament.	10	3	4	6.1.1
(B)	Write a note on Uniform civil code.	10			
Q5 (A)	Explain the classification of Directive principles of state policy.	10	3	1	8.2.2
(B)	Give an account on parliamentary sovereignty.	10			
Q6 (A)	Illustrate the fundamental Rights provided in article 14-30 in the Indian constitution.	10	2	1	6.2.1
(B)	Discuss the powers and functions of president.	10			
Q7 (A)	Narrate the five writs as referred in article 32 of Indian constitution.	10	1	2	6.2.1
(B)	Discuss the issue of reservation.	10			

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Sardar Patel College of Engineering

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Munshi Nagar, Andheri (West), Mumbai – 400058.
End Sem Exam (September 2022)

Max. Marks: 100 Duration: 3 hours
Class: F.Y.B.Tech (C, M, E) Semester:II Program: (C/E/M)
Name of the Course : Computer Programming
Course Code : ES-BT207

21/9/22

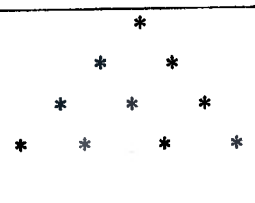
Instructions:

- **Question ONE is Compulsory**
- Attempt any FOUR out of the remaining SIX Questions.
- Assume suitable data wherever necessary.

Q. No.			Points	CO	BL	PI
1.	A	Explain the different Types of Inheritance. (Program not expected) Or Write a c++ program to sort an array in descending order.	04	3	2,4	1.4.1
	B	Draw a flow chart to find greater of the three numbers entered.	04	1	3	2.2.3

	C	The output of the following Program will be:
		
		#include<iostream.h>
		void main()
		{
		int a = 1;
		switch(a)
		{
		case 1: cout<<"One";
		case 2: cout<<"Two";
		case 3: cout<<"Three";
		default: cout<<"Four";
		}
		}
			04	4	3	2.4.3

	D	Discuss the datatypes supported by C++. (Program not expected)	04	1	2	1.4.1
	E	Write a program to divide two numbers using functions.	04	2	4	2.2.3
2.	A	Write a program using functions to print the following patterns:	10	2	4	2.2.2

						
	B	Write a program to multiply two matrices. (Take the order of the matrix to be 3*3).	10	2	4	2.2.3
3.	A	Write a function to raise a number m to power n. The function takes a double value of m and int value of n and returns the value correctly. Use another function which takes default value of 2 for n to make the function calculate squares when n argument is omitted. Write a program that gets the values of m and n from the user to test the functions.	10	2	4	2.2.3
	B	Write a program to determine whether the entered number is Armstrong or not. (Eg. $153 = 1^3 + 5^3 + 3^3$ is Armstrong number.)	10	1	4	2.2.3
4.	A	Write a program to enter vaccination details (number of covid vaccine doses taken) of 100 people. Find how many people have taken single dose, two doses and two doses with booster. Use arrays.	10	2	4	2.2.3
	B	Write a program to enter a number and find if it's prime or not.	10	1	4	2.2.3
5.	A	Explain the following with an example i. While loop ii. Switch statement	10	1	2	1.4.1
	B	Write a program to find the area of the rectangle using class and objects and make the length as a private data member in the class.	10	3	3	1.4.1
6.	A	Explain the difference between Call by Value and Call by Reference with example.	10	2	3	1.4.1
	B	Write a program to add two time in hours and minutes using OOPs.	10	3	4	2.2.3
7.	A	Explain constructors with example.	10	3	3	1.4.1
	B	**Write short notes on the following [syntax and examples are required]** 1.function overloading (3) Or Recursive Function (3) 2. access modifiers (3) 3 scope resolution operator in c++. (4)	10	3,4	2	1.4.1