



AUTUMN END SEMESTER EXAMINATION 2023

3rd Semester, B.Tech. (Course)

SCIENTIFIC & TECHNICAL WRITING

EX20003

(For 2022 Admitted Batches)

Time: 3 Hours

Full Marks: 50

Answer ALL questions.

The figures in the margin indicate full marks.

Candidates are required to answer all parts of a question at one place only.

Question No	Question	Marks	Learning levels as per Bloom's taxonomy	Course Outcomes (CO)
1 .	(a) Mention two major characteristics of creative writing. Is an autobiography an example of creative writing? Why? Ans: Major characteristics: artistic freedom/ information through entertainment/ multiple points of view/ exploring philosophical themes/ adapting previous creative works (any two) Yes or no (depending on the student). Yes: because autobiography can include descriptive passages, storytelling, and character development. No: Autobiography is supposed to be factual. Creative writing is supposed to be imaginary.	[2+1+2=5]	1, 2	CO1
	(b) The user guide for the latest smartphone model will be read by a mixed audience. Who might be the possible members of a mixed audience? Explain each category briefly, with examples. Ans: Possible members of a mixed audience may include all of the following: (i) primary, secondary, and tertiary audiences, (ii) experts, executives, gatekeepers, and non-specialist audiences Primary audience: Explanation + example. Mostly non-specialist audience. Secondary audience: Explanation + example. Mostly experts who will be consulted to make sure the document is error-free. Experts can also be gatekeepers, determining how much information needs to be included. Tertiary audience: Explanation + example. Mostly executives who need to know the legal/ financial/ public aspect of the document. They can also be gatekeepers.	[2.5+2.5=5]	2	CO1
	OR			

	(a)	<p>Do you think that creative writing is allowed in science writing? Justify your answer.</p> <p>Mention at least three characteristics of science writing where it may need to utilise creative writing.</p> <p>Ans: Yes or no (depending on the student).</p> <p>Yes: Science writing falls under imaginative non-fiction, using factually accurate text with literary and creative style. Writers like Richard Feynman, Carl Sagan, Oliver Sacks, and Bill Bryson use this kind of writing.</p> <p>No: Creative writing does not match the kind of language needed to depict scientific facts and figures.</p> <p>Three characteristics: (i) diversity of content, like topic of popular interest, research debate, new discoveries, interviews, podcasts etc. cannot be covered with a single kind of language, (ii) non-specialist audience cannot understand scientific terms, so the language has to be simplified and attractive, (iii) to attract as much audience as possible, the language includes analogy, metaphor, and narrative technique.</p>	[1+2+2=5]	1, 2	CO1
	(b)	<p>Is an IKEA furniture assembly manual suitable for a non-expert audience? Explain how it is suitable, with reference to the knowledge level of the audience and the language used.</p> <p>Ans: Yes.</p> <p>Knowledge level of audience: non-expert i. e. they are not expert furniture makers</p> <p>Language used: simple, clear, easy-to-understand language, step-by-step instructions, usually numbered steps, with illustrations. All this is suitable for a non-expert audience.</p>	[1+4=5]	2	CO1
2 .	(a)	<p>What is the reason for using italics in writing? When does scientific writing use italics? Illustrate your answer with two examples.</p> <p>Ans: Italics are used for biological nomenclature/ foreign words included within English/ titles of books/ films/ plays/ newspapers/ works of art/ emphasis (sometimes).</p> <p>Scientific writing can use italics for variables (depending upon style guide)/ biological nomenclature/ foreign words included within English.</p> <p>Two examples.</p>	[1+2+2=5]	1	CO2
	(b)	<p>Answer as directed:</p> <p>(i) Insert appropriate punctuation marks in the following sentence to create a single, grammatically correct sentence:</p> <p>Outstanding athletes use their time wisely this trait makes them highly sought-after by many employers</p> <p>Ans: Outstanding athletes use their time wisely; this trait makes them highly sought-after by many employers.</p> <p>(ii) Change the following passive-voice sentence into an active-voice sentence:</p> <p>Aeration experiments were conducted by a group of scientists in a brick masonry tank of 10 m³ capacity to study</p>	[2.5+2.5=5]	3	CO2

		the design characteristics of circular stepped cascade (PCSC) aeration system. Ans: A group of scientists conducted an aeration experiments in a brick masonry tank of 10 m³ capacity to study the design characteristics of circular stepped cascade (PCSC) aeration system.			
		OR			
	(a)	What is self-plagiarism? Mention three steps to avoid self-plagiarism. Ans: Definition of self-plagiarism. Three steps to avoid self-plagiarism.	[2+3=5]	1	C02
	(b)	Answer as directed: (i) Replace the three nominalizations in the following sentences with appropriate verbs: The police conducted an investigation of the murder. Ans: The police investigated the murder. A comparison was made of the effects of inflation on the stock market by Smith and Jones. Ans: Smith and Jones compared the effects of inflation on the stock market. People have the belief that black cats bring bad luck. Ans: People believe that black cats bring bad luck. (ii) Locate the Latin term in the following sentence and write its meaning: The post mortem revealed that the man had been murdered. Ans: 'Post mortem', meaning 'after death'. Here it means autopsy or examination of a body after its death.	[3+2=5]	2	C02
3	(a)	Rewrite the following paragraph using four transition words/phrases: Drawing is all about taking the time to master each step. Mastering the art of drawing does not happen in a day. It is a skill that takes daily practice. It is a skill that takes dedication. Drawing needs patience. You must not let your hand or your mind be impatient. It is important not to burn yourself out. You need to stick with it. Ans: Drawing is all about taking the time to master each step. Mastering this art does not happen in a day, since it is a skill that takes daily practice, and dedication. Drawing also needs patience, therefore you must not let your hand or your mind be impatient. However, it is important not to burn yourself out, so you need to stick with it.	[5]	3	C03
	(b)	(i) Write the list of materials in the table of contents in a sequential order for a B. Tech. Thesis. Ans The list of materials or topics appearing in the content should be there along with their corresponding page numbers. List of materials in the table of contents	[2.5+2.5=5]	1	C04

		<p>Acknowledgements.....Corresponding page no in Roman letter</p> <p>List of publication (If existing)..... Page no in Latin numerals</p> <p>Abstract..... Page no in Latin numerals</p> <p>Contents..... Page no in Latin numerals</p> <p>Abbreviations Page no in Latin numerals</p> <p>List of Figures..... Page no in Latin numerals</p> <p>List of Tables Page no in Latin numerals</p> <p>Chapter numberPage no. in cardinal numerals</p> <p>Chapter headingPage no. in cardinal numerals</p> <p>Section headingPage no. in cardinal numerals</p> <p>Subsection headingPage no. in cardinal numerals</p> <p>References Page no. in cardinal numerals</p> <p>Appendix Page no. in cardinal numerals</p> <p>(iii) List the contents of prefatory material in a sequential order for a Thesis.</p> <p>Ans</p> <p>Prefatory material</p> <p>Cover Page Material</p> <p>First Inner Page Material</p> <p>Approval by the Examining Board</p> <p>Certificate by the Supervisors</p> <p>Declaration by the Student</p> <p>Acknowledgements and Conflict of Interest Statement</p> <p>List of Symbols and Abbreviations</p> <p>Abstract and Keywords</p> <p>Table of Contents</p> <p>(It should be in a sequential order)</p>			
		OR			
	(a)	<p>Rearrange the following sentences to create a 'narrative' paragraph. Please do not copy the sentences. Write the serial numbers of the sentences in the correct order:</p> <p>(i) A seat in the Illinois legislature had opened up, and several friends suggested that I run, thinking that my work as a civil rights lawyer, and contacts from my days as a community organizer, would make me a viable candidate.</p> <p>(ii) I was thirty-five at the time, four years out of law school, recently married, and generally impatient with life.</p> <p>(iii) I went to block club meetings and church socials, beauty shops and barbershops.</p> <p>(iv) And everywhere I went, I'd get some version of the same two questions.</p>	[5]	3	C03

		<p>(v) After discussing it with my wife, I entered the race and proceeded to do what every first-time candidate does: I talked to anyone who would listen.</p> <p>(vi) If two guys were standing on a corner, I would cross the street to hand them campaign literature.</p> <p>(vii) It's been almost ten years since I first ran for political office.</p> <p>Ans: Correct sequence – vii – ii – i – v – iii – vi – iv</p> <p>(Excerpt from Barack Obama's <i>The Audacity of Hope</i>)</p>																										
	(b)	<p>The following data are available for a journal. What is its impact factor of the journal in the year 2020?</p> <table><tr><th rowspan="2">Year</th><th rowspan="2">No of Papers Published</th><th colspan="3">Number of Citations</th></tr><tr><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>2017</td><td>30</td><td>20</td><td>100</td><td>40</td></tr><tr><td>2018</td><td>30</td><td>–</td><td>100</td><td>20</td></tr><tr><td>2019</td><td>15</td><td>–</td><td>–</td><td>12</td></tr></table> <p>Ans</p> $IF = \frac{\sum \text{Number of Citation}}{\sum \text{No of paper published}}$ $IF = \frac{\text{Citation}_{2017} + \text{Citation}_{2018} + \text{Citation}_{2019}}{\text{Publications}_{2017} + \text{Publications}_{2018} + \text{Publications}_{2019}}$ $IF = \frac{20 + 200 + 72}{30 + 30 + 15} = 3.89$	Year	No of Papers Published	Number of Citations			2017	2018	2019	2017	30	20	100	40	2018	30	–	100	20	2019	15	–	–	12	[5]	2,4	CO 4
Year	No of Papers Published	Number of Citations																										
		2017	2018	2019																								
2017	30	20	100	40																								
2018	30	–	100	20																								
2019	15	–	–	12																								
4	(a)	<p>Write an abstract of the below-mentioned passage. Suggest an appropriate title. And give five keywords in proper format.</p> <p>In recorded history, the tsunami due to the Great Sumatra earthquake of 26 December 2004 has been the most devastating, causing the loss of over 230,000 lives besides extensive damage to most of the coastal provinces bordering the Indian Ocean. Real-time predictions of tsunami wave heights and resultant inundation of inland coastal areas are essential to safeguard the life and property of the coastal community.</p> <p>Dr. P. L. N. Murty and his team designed finite-element-based Advanced Circulation (ADCIRC) model (widely used for storm surge simulations) to compute tsunami wave height and associated coastal inundation due to the 2004 event. The prime focus is on the Cuddalore coast along the east coast of India, which was heavily affected due to the tsunami. A grid resolution of around 50 m was used in the Cuddalore region to simulate the inundation in the area. Computed results are validated against the available observations by Dr. Murty's team. The authors noticed that the model computations are in good agreement with the observations. Simulation results depict that because of its computational efficiency and accuracy, the ADCIRC can be used for near real-time prediction across the tsunami warning centers.</p> <p>Ans</p> <p>Abstract: [2 Marks]</p> <p>Realtime prediction of tsunami wave heights and resultant inundation of inland coastal areas are essential to safeguard the life</p>	[2 + 2 + 1 = 5]	2,3	CO 5																							

	<p>and property of the coastal community. In the present work, a finite-element-based advanced circulation (ADCIRC) model (widely used for storm surge simulations) is used to compute tsunami wave height and associated coastal inundation due to the to the Great Sumatra earthquake took place in 2004. The study mostly focused on the heavily affected areas, such as Cuddalore coast and east coast of India. A grid resolution of around 50 m was used in the Cuddalore region to simulate the inundation in the area. The computed results are validated against the recorded observations. The model computations are in good agreement with the recorded observations. Because of its computational efficiency and accuracy, the ADCIRC can be used for near realtime prediction across the tsunami warning centers.</p> <p>Title: [2 Marks]</p> <p>Finite Element Modeling of Tsunami-induced Water Levels and Associated Inundation Extent</p> <p>Keywords: Tsunami; Sumatra earthquake; ADCIRC; Finite element method [1 Marks]</p>			
(b)	<p>List the different referencing styles used in research documentation. [3 Marks]</p> <p>Ans</p> <p>1. Author-Date style: This is also known as Harvard style. Variations of this style are: -APA (American Psychological Association) style: APA format: Surname of the author, Initial of first name of the author., Initial of middle name of the author.,(Year of publication). Title of the article. <i>Name of the Journal. Volume Number</i> (Issue number), Page numbers. (Note: Journal name is italicized, the Volume number is in italic, and the abbreviations, Vol., No., and pp., are omitted.) Example: Jenamani, M., Mohapatra, P. K. J., & Ghose, S. (2002). Benchmarking for Design Evaluation of Corporate Web Sites. <i>Quarterly Journal of Electronic Commerce</i>. 3(2), 391–415 -MLA (Modern Language Association) style. MLA format: Surname of the author, First name of the author, Middle name of the author. Title of the article. <i>Name of the Journal. Volume Number</i> (Year of publication), Page numbers. Example: Vizayakumar, Kurumunchi, and Pratap Kumar Jagadev Mohapatra. "Environmental Impact Analysis: A Synthetic Approach." <i>Long Range Planning</i>. 24.6 (1991): 102–6.</p> <p>2. Author-Number style: It is also known as the Vancouver style. It uses the author's surname (or the name of the organization) for a citation. But the surname is followed by a number (written within parentheses) that represents the sequence of appearance of the citations in the text. the list of references is arranged according to these numbers.</p> <p>3. Numerical style:</p>	[5]	1, 2	CO 5

	<p>This style is mostly used for intext citation. The citation is denoted by a number after a quoted text or statement of the refereed author. Such as, [5], ⁵, ^{5,7}, ^{5,7}, [5, 7], [5,7]. The list of references is sorted by the numerical order of the citations in the text or by the alphabetic ordering of the surnames in the list of references.</p> <p>4. Footnote style:</p> <p>The footnote style also uses the numerical style. Authors in the field of humanities sometimes use this style. The reference in the text is denoted by a superscripted number (e.g., 5). Reference details are given as a footnote on the same page.</p> <p>How a research article is introduced as in-text citation and as reference while writing a scientific research paper. [2 marks]</p> <p>Ans</p> <p>In-text citation is mostly used with the text (body of the article) to cite the statement(s)/ remark(s)/ conclusion(s) made by an author to whom the present author of the article is referring. This can be introduced by the present author by rewriting the statement of the referred author followed by (Surname of the author(s), Year of publication of the article) or can be denoted by a number after a quoted text or statement of the refereed author.</p> <p>Example: The autoignition temperature of methane is higher than gasoline (Hotta, Mohanta and Sahoo, 2013) / Hotta, et. al., (2013)/ [* Sl. number of the article in the list of references] such as [5] or ⁵.</p> <p>Whereas, while introducing the article as a reference, the details of the article have to be listed in the list of references either in MPA/ MLA format.</p>			
	OR			
(a)	<p>List and explain the approaches through which literature review can be organized.</p> <p>Ans</p> <p>There are at least three ways a literature review can be organized:</p> <p>(1) Chronological organization</p> <p>Divide the years of publications into periods. Highlight the specific contributions made during each period with regard to issues addressed, research methods adopted, results obtained, and conclusions drawn</p> <p>(2) Thematic organization</p> <p>In this method the research problem is bifurcated in different aspects or them. For each theme a literature summary is presented in following domain.</p> <ol style="list-style-type: none"> dominant viewpoints of the authors, sequence of developments in the thematic context, debates and the controversies that these works have led to, and an independent critical analysis of the work. 	[5]	1	CO 5

		<p>Independent judgment on each of these aspects should be given by the author which can bring out the scope for future work.</p> <p>(3) Methodological organization</p> <p>In this approach, the literature are calorized basis on the methodology adopted to address the research problem. For example, qualitative/quantitative or theoretical/experimental/ computational approached may be followed to address the same research problem. This method also focus on the relative strengths and weaknesses of each approach to address a specific issue.</p>																											
	(b)	<p>Draw a bar graph based on the information given in Table 1 indicating the variation of BP, BSFC, and BTE with changes in CR. Label the graph with figure number, caption, X-axis and Y-axis variables, and legend in appropriate format.</p> <table><caption>Table 1: Effect of CR on BP, BSFC and BTE</caption><thead><tr><th>CR</th><th>Maximum BP (kW)</th><th>Minimum BSFC (kg/kWh)</th><th>Maximum BTE (%)</th></tr></thead><tbody><tr><td>10</td><td>3.4</td><td>0.94</td><td>22.5</td></tr><tr><td>11</td><td>3.8</td><td>0.85</td><td>24.8</td></tr><tr><td>12</td><td>4.0</td><td>0.82</td><td>25.8</td></tr><tr><td>13</td><td>4.4</td><td>0.76</td><td>27.9</td></tr><tr><td>14</td><td>4.7</td><td>0.71</td><td>29.8</td></tr></tbody></table> <p>Ans</p> <p>Fig. 1: Effect of CR on BP, BSFC and BTE</p> <p>[For figure no and caption: 1 mark, for X-label: 1 mark, for Y-label: 1 mark, for labeling the legend: 1mark, for plotting the figure: 1 mark]</p>	CR	Maximum BP (kW)	Minimum BSFC (kg/kWh)	Maximum BTE (%)	10	3.4	0.94	22.5	11	3.8	0.85	24.8	12	4.0	0.82	25.8	13	4.4	0.76	27.9	14	4.7	0.71	29.8	[5]	2, 3	CO 6
CR	Maximum BP (kW)	Minimum BSFC (kg/kWh)	Maximum BTE (%)																										
10	3.4	0.94	22.5																										
11	3.8	0.85	24.8																										
12	4.0	0.82	25.8																										
13	4.4	0.76	27.9																										
14	4.7	0.71	29.8																										
5	(a)	<p>Represent the data of Fig.1 in a Table in appropriate format. Read off the data from the figure up to two places of decimal. Label the Table with appropriate caption and write the data and units of the given parameters in proper format.</p>	[5]	2, 3	CO 5																								

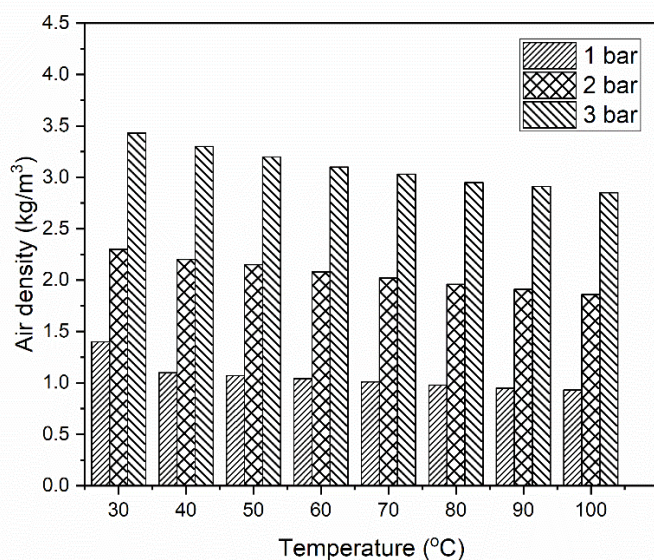


Fig.1 Effect of pressure and temperature on the density of dry air

Ans

Table 1: Effect of pressure and temperature on the density of dry air

Temperature (°C)	Air density (kg/m³)		
	At pressure (1 bar)	At pressure (2 bar)	At Pressure (3 bar)
30	~1.27	~2.26	~3.45
40	~1.15	~2.24	~3.32
50	~1.08	~2.18	~3.21
60	~1.00	~2.15	~3.15
70	~0.99	~2.10	~3.10
80	~0.95	~2.01	~2.99
90	~0.93	~1.98	~2.88
100	~0.81	~1.88	~2.78

[For table no and caption: 2 marks, for labeling the columns with appropriate heading and units 2 marks, for writing the data in two decimal places: 1 mark]

(b)

The history of science, and indeed the philosophy of the social sciences, has taught us that we should regard 'facts' with some scepticism. Yet in auto/biography there is often evidence of a relatively simplistic attitude to, and use of, facts. Biographers collect 'facts' about their subjects, authors remember 'facts' about themselves and what is forgotten is that these 'facts' arose out of particular circumstances and particular exchanges.

The above-stated text was written by Mary Evans of London School of Economics on page 45 of the second edition of a book titled Research Methods for English Studies, which was edited by Gabriele Griffin and published by Edinburgh University Press in the year 2005.

You are required to block-quote the text, given above, with the reference details. Start your sentence as follows:

[5]

2, 3

C0 5

	<p>Mary Evans of London School of Economics gives an interesting explanation to “facts” of life in the context of auto/biography . . .</p> <p>While block-quoting, (i) highlight the word “simplistic attitude” and (ii) omit the second sentence.</p> <p>Ans</p> <p>Mary Evans of London School of Economics gives an interesting explanation to “facts” of life in the context of auto/biography. “The history of science, and indeed the philosophy of the social sciences, has taught us that we should regard ‘facts’ with some scepticism. Yet in auto/biography there is often evidence of a relatively simplistic attitude to, and use of, fact. Biographers collect ‘facts’ about their subjects, authors remember ‘facts’ about themselves and what is forgotten is that these ‘facts’ arose out of particular circumstances and particular exchanges” (Evans, M., (2005). <i>Research Methods for English Studies</i>, Gabriele Griffin, London, Edinburgh University Press, Second edition, 45).</p>																		
	OR																		
(a)	<p>A research student conducted four rounds of Delphi questionnaire. For Question number 1 in the questionnaires, she obtained the median and the interquartile range for each round. They are as follows:</p> <p>Round 1: 85.2, 10.525; Round 2: 87.25, 5. 42; Round 3: 87, 2.2; Round 4: 86.92, 2.19</p> <p>Tabulate the results. Give a suitable table heading. Write footnotes indicating that (a) the questionnaire was conducted during April–June 2020 and (b) 10 panellists participated in Round 1, but they were 5 in the next three rounds.</p> <p>Ans</p> <p>Table 1: Results of Delphi questionnaire for question number 1</p> <table><tr><th>Round No</th><th>Median</th><th>Interquartile range</th></tr><tr><td>1</td><td>85.2</td><td>10.525</td></tr><tr><td>2</td><td>87.25</td><td>5. 42</td></tr><tr><td>3</td><td>87</td><td>2.2</td></tr><tr><td>4</td><td>86.92</td><td>2.19</td></tr></table> <p># The questionnaire was conducted during April–June 2020 #10 panellists participated in Round 1, but they were 5 in the next three</p>	Round No	Median	Interquartile range	1	85.2	10.525	2	87.25	5. 42	3	87	2.2	4	86.92	2.19	[5]	2, 3	CO 6
Round No	Median	Interquartile range																	
1	85.2	10.525																	
2	87.25	5. 42																	
3	87	2.2																	
4	86.92	2.19																	

	<p>(b) Kalinga Institute of Medical Sciences (KIMS) allows its patients to access their blood test reports through Internet. When a patient makes a payment for the blood test, the system creates a unique user ID and password which are printed on the payment receipt. The patient is allowed to log on to KIMS website on or after the specified date, to access the report. After logging on to the website the customer is required to input his/her email address after which the system automatically sends the test report to that email address.</p> <p>After sending the email, the system automatically signs off the patient and displays the message: “Your report has been sent to your email address.”</p> <p>If the patient tries to log on before the report receiving date, the system displays the message: “Your report would be available on the date specified on your payment receipt.”</p> <p>The user ID and password are valid only for fifteen days after the date on which the report becomes available.</p> <p>Draw a logic flowchart to depict the above process from patient sign in to automatic sign off.</p> <p>Ans</p> <pre> graph TD START((START)) --> Payment[Payment (Payment for blood Test)] Payment --> Generate[Generate ID and Password] Generate --> Print[Print Print the Payment Receipt with generated ID and Password along with the message of availability of report and validity of the given ID and password] Print --> Login[Login (Direct the customer to enter user ID and password)] Login --> Validate{Validate (The login credentials)} Validate -- No --> Invalid[Your Login Credentials are Invalid or Expired] Invalid --> Login Validate -- Yes --> CheckDate{Check The Current Date (Is it before the date mentioned in the receipt)} CheckDate -- No --> LoginSuccessful[Login Successful] LoginSuccessful --> EnterMailID[Enter Your Mail ID] EnterMailID --> EmailSent[Email Sent] EmailSent --> SignOff[Sign Off] SignOff --> ReportSent[Your Blood Report is Sent to Your Mail ID] CheckDate -- Yes --> Display[Display (Your Report is available on or after the date mentioned in your receipt)] ReportSent --> END((END)) Display --> END </pre>	[5]	3, 4	CO 6

