**Birla Institute of Technology & Science, Pilani**

**Second Semester 2022-2023**

**Online B.Sc. Computer Science Programme**

**Comprehensive Regular Exam**

Course No. : BCS ZC239

Course Title : Writing Practice

Nature of Exam : Open Book

Weighting : 50%

Duration : 2 Hours 30 Minutes

Date of Exam : 17-02-2023

Note to Students:

1. All parts of a question should be answered consecutively. Each answer should start from a fresh page.
2. Assumptions made if any, should be stated clearly at the beginning of your answer.
3. Write an argumentative paragraph in 150-200 words on the impact of e-learning on students’ academic achievement. [7. 5 Marks]
4. Paraphrase the following paragraph. Avoid using words and phrases from the original text as far as possible. [5 Marks]

Several research studies on metal contamination of surface water, groundwater and rainwater have reported high levels of metals. This review article focuses on the contamination of waters in sub-Saharan Africa by cadmium, lead, mercury and arsenic, because of their toxicity and the health and ecotoxicological consequences linked to their presence in water. These are heavy metals at the origin of several dangerous diseases such as lead poisoning, hydrarygysmus, Itai Itai disease, etc. This article reviews the problems of accessibility to drinking water in communities in terms of quantity and quality, the origins and levels of water contamination by metals as well as analytical methods for metals and the consequences related to the consumption of these waters.

(Adapted from Abdou et al., 2023, p. 1)

1. Paraphrase the following paragraph. Avoid using words and phrases from the original text as far as possible. [5 Marks]

The AI chatbot ChatGPT has brought the capabilities of such tools, known as LLMs, to a mass audience. ChatGPT can write presentable student essays, summarize research papers, answer questions well enough to pass medical exams and generate helpful computer code. It has produced research abstracts good enough that scientists found it hard to spot that a computer had written them. "Worryingly for society, it could also make spam, ransomware and other malicious outputs easier to produce. Although OpenAI has tried to put guard rails on what the chatbot will do, users are already finding ways around them," said the report. That is why Nature is setting out these principles. "Ultimately, research must have transparency in methods, and integrity and truth from authors. This is, after all, the foundation that science relies on to advance," the report mentioned.

(Published in *The Economic Times*, 27th January, 2023)

1. Write a paragraph in 150-200 words describing the results of a study presented in the following figure. [7.5 Marks]

(Santos, 2016)

1. Summarize the following passage in 15-20 words. Avoid using words and phrases from the original text as far as possible. [5 Marks]

Indeed, with the quickly changing employment landscape and global ecosystem, it is becoming increasingly critical that children not only learn, but more importantly learn how to learn. Education thus, must move towards less content, and more towards learning about how to think critically and solve problems, how to be creative and multidisciplinary, and how to innovate, adapt, and absorb new material in novel and changing fields. Pedagogy must evolve to make education more experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centred, discussion-based, flexible, and, of course, enjoyable. The curriculum must include basic arts, crafts, humanities, games, sports and fitness, languages, literature, culture, and values, in addition to science and mathematics, to develop all aspects and capabilities of learners; and make education more well-rounded, useful, and fulfilling to the learner. Education must build character, enable learners to be ethical, rational, compassionate, and caring, while at the same time prepare them for gainful, fulfilling employment. (GOI, 2020)

1. Summarize the following passage in 15-20 words. Avoid using words and phrases from the original text as far as possible. [5 Marks]

The world is undergoing rapid changes in the knowledge landscape. With various dramatic scientific and technological advances, such as the rise of big data, machine learning, and artificial intelligence, many unskilled jobs worldwide may be taken over by machines, while the need for a skilled workforce, particularly involving mathematics, computer science, and data science, in conjunction with multidisciplinary abilities across the sciences, social sciences, and humanities, will be increasingly in greater demand. With climate change, increasing pollution, and depleting natural resources, there will be a sizeable shift in how we meet the world’s energy, water, food, and sanitation needs, again resulting in the need for new skilled labour, particularly in biology, chemistry, physics, agriculture, climate science, and social science. The growing emergence of epidemics and pandemics will also call for collaborative research in infectious disease management and development of vaccines and the resultant social issues heighten the need for multidisciplinary learning. There will be a growing demand for humanities and art, as India moves towards becoming a developed country as well as among the three largest economies in the world. (GOI, 2020)

1. Match each of the sentences (**A-H**) of the given abstract with one of the components (**I-V**) listed below. [8 Marks]

**A.** According to Mircea and Andreesu (2015), cloud computing is a next-generation platform that allows institutions and organizations with a dynamic pool of resources to reduce costs through improved utilization. **B.** Educational institutions these days are facing many problems with the increasing need for IT and IT-related infrastructure. **C.** In such a scenario, cloud computing can be a reliable solution for fulfilling the need for software, storage services, and infrastructure of such institutions as it is based on existing IT technologies such as the internet, grid computing, virtualization etc. **D.** In light of the background mentioned above, this paper explored the role of cloud computing in Indian educational institutions, i.e. how cloud computing, through its various deployment and service models, can help improve the pedagogy of an institution. **E.** Further, this paper critically evaluated the crucial risks and challenges that institutions face in taking advantage of this emerging cost-effective technology which has the potential to bring a revolution in the education sector. **F.** This paper used live case studies of various Indian and international educational institutions utilising this technology to meet the ever-increasing pressure to deliver more for less as the data for discussion. **G.** Very few papers have discussed live cases of educational institutes where cloud computing plays a crucial role and even fewer studies have examined the risks and challenges associated with this technology. **H.** Hence, this study on cloud computing adds to the knowledge base by presenting a better understanding of the application of this technology in the field of education and its implications.

(Adapted from Dhaliwal, 2017)

**Components**

1. Background to the study
2. Importance of the study
3. Aim of the study
4. Methodology
5. Gaps in the existing research
6. Match each of the following components (I-VI) with each portion (A-F) of the given conclusion section of an academic report. [7 Marks]

**Components**

1. Suggesting a future research path
2. Stating the limitation of the research
3. Summarising the main ideas or arguments
4. Analyzing the result
5. Stating the method used
6. Relating the research result with the hypothesis

**A.** In this research work, a novel detection and discrimination mechanism is introduced to detect the abnormal traffic and discriminate DDoS attacks from FC. Both types of traffic have common features in general; however, some key characteristics are different, and can be used to distinguish them from each other. **B.** In this mechanism, various steps are followed to obtain the target objective. The traffic is analyzed, and the analysis data is further processed. The key parameters considered are the number of packets, size of the payload, and interpacket arrival time variances. Ultimately, a naïve Bayesian model is used to detect FC traffic and separate it from the DDoS attacks. Various simulations are made to verify the performance of the system and are also compared with some existing techniques**. C.** Our experimental and simulation results show that the proposed detection system can differentiate DDoS attack traffic from FC with more than 93% accuracy, with 5.2 FPR and 6.3 FNR based on the two real datasets (1998 FIFA World-Cup and CAIDA DDoS attack 2007). In the initial tests with the low level of attack intensity, the proposed work does not perform well. With 10% attack intensity, it gives 14.12% FPR and 14.9%3 FNR, which are not good among the competitors. This is because it operates on the naïve-based probabilistic model with multilevel probabilities. Such types of models require an adequate amount of data so that optimal and more accurate results are achieved. However, for attack intensities of 40% to 90%, the proposed mechanism outperforms all the mechanisms. For the highest attack intensity, DDoDF gives around 93% detection rate, 5% FPR, and 6% FNR, which are the most optimal values in the experiments**. D.** The results are encouraging and prove that the proposed mechanism performs well in the target domain. **E.** In the future, the detection accuracy can be enhanced by combining some additional parameters, such as payload patterns and hop count information, with the existing parameters to build a strong detection system. The proposed system can also be simulated on multiple datasets, i.e., HTTP logs, NLANR, and MIT Lincoln, with additional parameters for evaluation. This work can be implemented on other ad hoc networks with some alterations. **F.** This work only detects and discriminates DDoS attack traffic from FC, and it does not prevent the network from DDoS attacks. The prevention module can also be added to the detection module to prevent all the attacker nodes in the network.

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