JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech-VII Semester (CSE/IT/ECE/CE/BT/BI)

COURSE CODE (CREDITS): 19B1WCI738 (3) MAX. MARKS: 35

COURSE NAME: Introduction to Deep Learning

COURSE INSTRUCTORS: Dr. Hari Singh, Dr. Kushal, Dr. Vipul MAX. TIME: 2 Hours

Note: (a)*All questions are compulsory.*

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q1. Prove that a multi-layer network that uses only the identity activation function in all its layers reduces to a single-layer network performing linear regression. **[CO2][03 Marks]**

Q2. Write advantages of momentum based gradient descent. Explain mathematically as how is momentum based gradient descent better than the normal gradient descent? **[CO2][04 Marks]**

Q3. Describe the convolution operation. In an input image of size Lq x Bq, if the convolution is applied with a filter of size Fq x Fq then what is the spatial dimension of the obtained image for the following.

(a) half-padding,
(b) valid-padding,
(c) full-padding.

Q4. Describe the different variations of recurrent networks with missing inputs and outputs and the applications where these are used? **[CO3][04 Marks]** **[CO4][03 Marks]**

Q5. (a) Describe the architecture of LSTM with a neat and clean diagram. **[CO4][02 Marks]**
(b) Discuss the significance of all the gates used along with mathematical equations. **[CO4][02 Marks]**
(c) Does the LSTM solve the issue of poor long-term memory in RNNs? **[CO4][02 Marks]**

Q6. Describe the application to automatic image captioning with a RNN using a suitable diagram. **[CO4][03 Marks]**

Q7. Describe the process of training an autoencoder using back propagation for the real valued inputs. **[CO5][04 Marks]**

Q8. How do the contarctive autoencoders apply regularisation and bring generalization? **[CO5][03 Marks]**

Q9. Prove that the global minimum of the virtual training criteria C(G) is achieved if and only if PG=PData. Where PG is the distribution of the data generated by the GAN modeland PData denotes the true data distribution. **[CO5][05 Marks]**