

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

CLASS: M. Tech / Pre-PHD
BRANCH: CS/ IT/ IS / Pre-PHD

SEMESTER: II/ Course Work
SESSION: SP/22

SUBJECT: IT 518 INTERNET OF THINGS (IoT)

TIME: 2:00 HRS

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book /Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1	<p>Answer any four questions:</p> <p>(I) State the characteristics of IoT. Summarize the various applications of IoT.</p> <p>(II) What are the major components of IoT system-explain.</p> <p>(III) How do the blocks and components in IoT IBM conceptual framework and Oracle reference architecture are correlated.</p> <p>(IV) Define M2M. Differentiate between IoT and M2M.</p> <p>(V) List out the major objectives of high level ETSI M2M architecture.</p> <p>(VI) Define cloud computing? And explain the various services (IaaS, PaaS, SaaS and XaaS) provided by the cloud.</p>	[4x2.5=10]
Q.2	<p>(I) Explain generic block diagram of IoT Devices in physical design of IoT.</p> <p>(II) Discuss the various IoT communication APIs: REST API's and Web Socket based API's.</p> <p>(III) Discuss about IoT communication model.</p> <p>(IV) Explain IoT Reference Architecture with its Functional View, Information View, Deployment and Operational View.</p>	[4X2.5=10]
Q.3	<p>(I)What are the features and characteristics of sensors? Differentiate analog sensors and digital sensors. Give examples of one temperature sensor and one proximity sensor.</p> <p>(II)Explain the basic concepts of RFID: RFID tag, RFID reader, antenna, and software?</p> <p>(III) (a) Explain ZigBee coordinator, ZigBee router/FFD and ZigBee end devices/ RFD and their working process with the help of star, cluster, and mesh topologies.</p> <p>(b) Write down how Zigbee is different from Bluetooth.</p>	[3+3+4=10]
Q.4	<p>(I) Compare TCP and UDP-transport layer protocols.</p> <p>(II) Briefly explain Session Layer / Application layer protocol: HTTP, CoAP, XMPP, AMQP, MQTT.</p> <p>(III)Differentiate between IPv4 and IPv6 N/W layer protocols.</p> <p>(IV)Explain 6LowPAN low power personal area n/w technology over IPv6.</p>	[2+4+2+2=10]
Q.5	<p>(I) Explain the IoT challenges: Security, Privacy, Data extraction from complex environment, Connectivity, Power requirements, Complexity Involved and Storages (clouds).</p> <p>(II) (a) Explain the framework of IoT Security and Privacy including end to end view of IoT, H/W security, N/W security, firmware, and software security.</p> <p>(b) Describe Interoperability characteristics of IoT.</p>	[4+6=10]