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Your Roll No

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MCA/II Sem.

Paper MCA-204 – Data Communication and
Computer Networks
(Admissions of 2009 and onwards)

Time 2 Hours

Maximum Marks 50

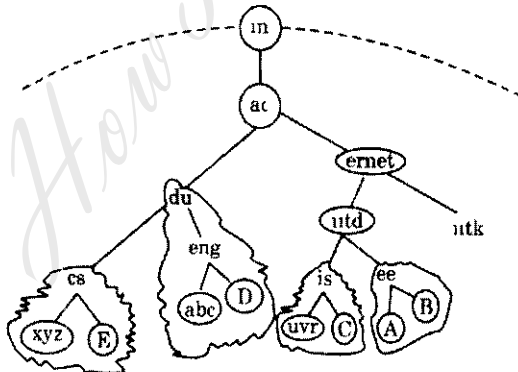
(Write your Roll No on the top immediately
on receipt of this question paper)

All questions are compulsory

Attempt all parts of a question together

Marks are indicated against each question

1 Consider the following tree for a part of DNS name space



Show all the steps (path) to resolve each of the following queries

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- (a) abc eng du ac in to xyz es du ac in
- (b) xyz es du ac in to uvr es ntd ernet in 6
- 2 Aditya has an internet connection at home provided by his ISP 'comsat' He uses gmail to send his mails On Monday at 11 pm, when he is sleeping and computer is off, his friend sends him a mail Next day, he gets up starts his computer, logs into his gmail account and sees his mail there Explain procedure step-wise, how does he get to read his mail even though his computer was off when his friend sent him the mail 6
- 3 Suppose that the clock-driven scheme for generating initial sequence numbers is used with a 15-bit wide clock counter The clock ticks every 100 m sec, and the maximum packet lifetime is 60 sec How often need resynchronization take place
- (a) In the worst case ? Give justification
- (b) When the data consumes 240 sequence numbers/min ? Give justification 5
- 4 Token bucket algorithms is used to regulate a network working at 10 Mbps The token bucket is filled at a rate of 2 Mbps Initially the bucket is filled with capacity 12 megabits How long can the computer transmit at full network speed ? 3
- 5 Suppose a host A is connected to another host B through routers R_1 and R_2 in that order Suppose A wants to

send a TCP message consisting of 1000 bytes of data and 16 bytes of header. Assume that the link between A and R_1 can support a maximum frame size of 1000 bytes including 20 byte header. The link between R_1 and R_2 can support a maximum frame size of 500 bytes including 10 byte header and the link between R_2 and B can support a maximum frame size of 500 bytes including 15 byte header. Show the total length, identification (assume), DF, MF and fragment offset field of the IP header in each packet transmitted over the three links. 8

- 6 Why do we need to have error control in the data link layer, when we are doing it at the transport layer any way ? Explain with example. 3
- 7 In the working of NAT, local IP address is mapped to global IP address before sending out the packet on the internet. Will it work if simply the source address (local IP) of the network header is replaced by the global IP address ? If yes how ? If not, why not ? 4
- 8 A large number of consecutive IP addresses are available starting at 198.16.0.0. Suppose four organizations A, B, C and D request 4000, 2000, 4000 and 8000 addresses respectively and in that order. Give a table showing, for each of these, the first IP address assigned, the last IP address assigned and the mask in the w.x.y.z/s notation. 6

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9 Compare the maximum data rate of a noiseless 4-kHz channel using

(a) Analog encoding QAM-64 with 1 bit use for error control

(b) T1 PCM system

What is the maximum achievable data rate if the signal to noise ratio is 15 db What is the maximum number of signal levels one must have for such a noisy channel ? 6

10 Can there be a network which uses FDM and TDM at the same time ? If yes, give an example of one such network with justification If no, explain why not? 3