UNIVERSITI SAINS MALAYSIA

Second Semester Examination
[Peperiksaan Semester Kedua]

Academic Session 2007/2008
[Sidang Akademik 2007/2008]

April 2008

CST332 – Internet Protocol, Architecture & Routing
[Protokol, Seni Bina & Penghalaan Internet]

Duration : 2 hours
[Masa : 2 jam]

INSTRUCTIONS TO CANDIDATE:
[ARAHAN KEPADA CALON:]

- Please ensure that this examination paper contains **TWO** questions in **NINE** printed pages before you begin the examination.

  *[Sila pastikan bahawa kertas peperiksaan ini mengandungi **DUA** soalan di dalam **SEMBILAN** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]*

- Answer **ALL** questions.

  *[Jawab **SEMUA** soalan.]*

- You may answer the questions either in English or in Bahasa Malaysia.

  [Anda dibenarkan menjawab soalan sama ada dalam Bahasa Inggeris atau Bahasa Malaysia.]

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1. (a) Describe the main function(s) of routers?

(10/100)

(b) State and describe the major phases during router boot-up process.

(15/100)

(c) Once you configure a router there are a few commands that you can use to verify the router configuration. Briefly describe what each of the following commands does?

(i) show running-config

(ii) show startup-config

(iii) show ip route

(iv) show interfaces

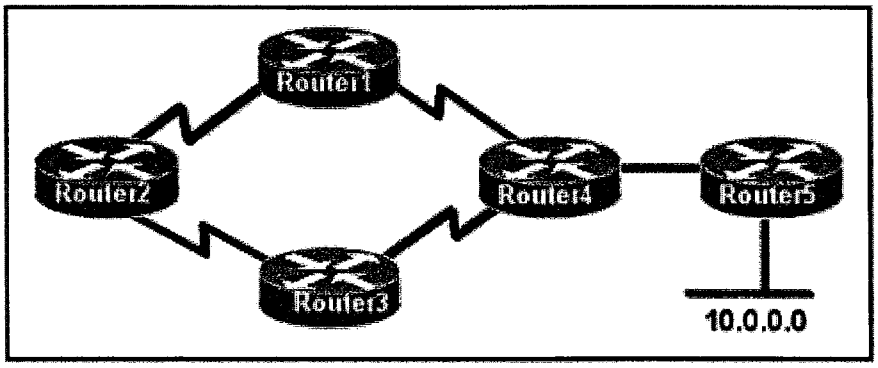
(v) show ip int brief

(15/100)

(d) Describe the difference(s) between Interior Gateway Routing Protocols (IGP) and Exterior Routing Protocols (EGP). Give **one** (**1**) example for each of the routing protocol.

(10/100)

(e) The network shown below is running the RIP routing protocol. State the mechanism and describe how the mechanism keeps Router4 from sending updates about the 10.0.0.0 network back to Router5 and cause routing loops?



(10/100)

(f) (i) Describe the difference(s) between link-state and distance-vector protocols in terms of their attributes.

(ii) State the mechanisms used by link-state routing protocols to build and maintain routing tables?

(25/100)

(g) (i) Give **two (2)** reasons why a network administrator uses loopback interfaces when configuring OSPF.

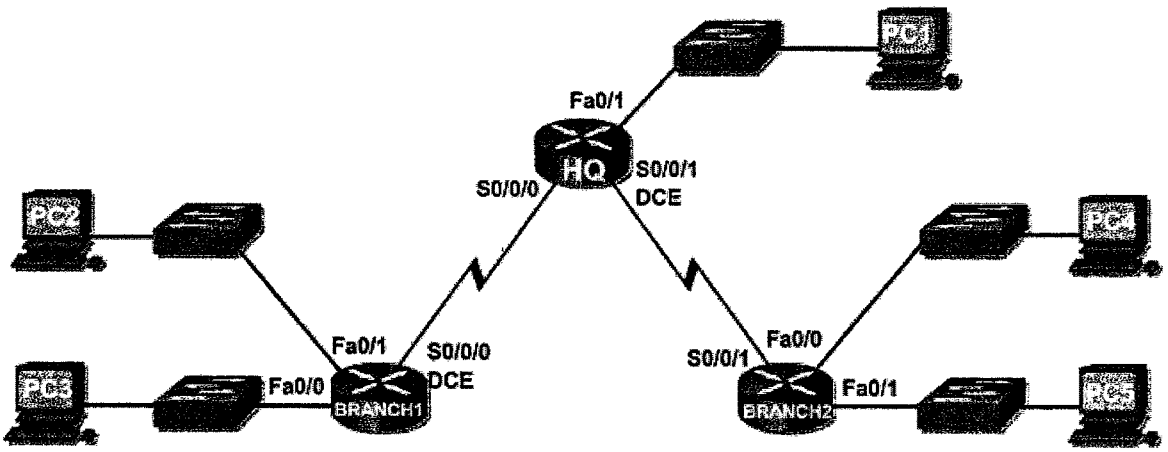
(ii) When a network administrator enters the **router ospf 100** command, what is the function of the number **100**?

(iii) What is the purpose of entering the **bandwidth 56** command on a serial interface on a router running OSPF?

(15/100)

2. (a) You are given the network address of 192.168.9.0/24 to subnet and provide the IP addressing for the network shown in the topology below. The network has the following addressing requirements:

- The BRANCH1 LAN1 will require 10 host IP address
- The BRANCH1 LAN2 will require 10 host IP address
- The BRANCH2 LAN1 will require 10 host IP address
- The BRANCH1 LAN2 will require 10 host IP address
- The HQ LAN will require 10 host IP address for each end of the link.
- The link from HQ to BRANCH1 will require an IP address for each end of the link.
- The link from HQ to BRANCH2 will require an IP address for each end of the link.



(i) How many subnet(s) are needed?

(ii) What will be the subnet mask for the subnetworks?

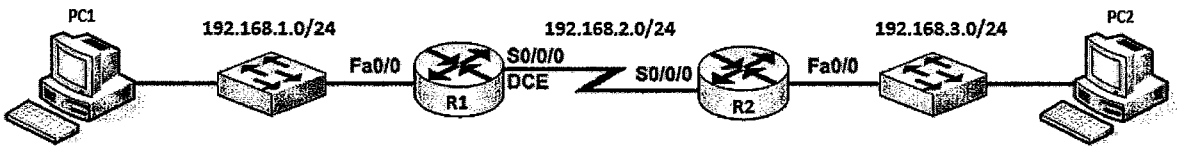
(iii) How many useable host IP addresses are there per subnet?

(iv) Design an IP addressing scheme and fill in the following chart with the subnet information.

Subnet Number	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
⋮				

(20/100)

(b) You are given the following network topology and an addressing table.



Device	Interface	IP Address	Subnet Mask	Def. Gateway
R1	Fa0/0	192.168.1.1	255.255.255.0	n/a
	S0/0/0	192.168.2.1	255.255.255.0	n/a
R2	Fa0/0	192.168.3.1	255.255.255.0	n/a
	S0/0/0	192.168.2.2	255.255.255.0	n/a
PC1	n/a	192.168.1.10	255.255.255.0	192.168.1.1
PC2	n/a	192.168.3.10	255.255.255.0	192.168.3.1

Answer the following questions by providing the right commands. Make sure you include the right prompt when answering the questions.

(i) Erase and Reload the Routers.

- Enter the privileged EXEC mode
- Clear the configuration
- Configure the router name as R1
- Reload the configuration

(ii) Configure the Router R1.

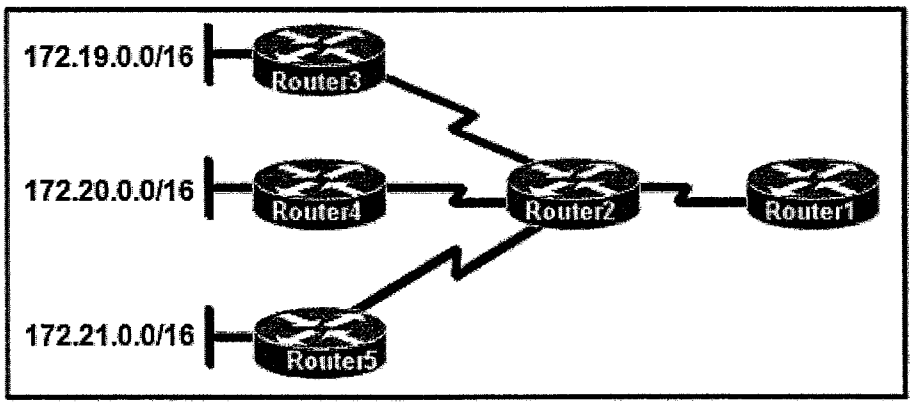
- Enter the privileged EXEC mode
- Enter the global configuration mode
- Configure the EXEC mode password
- Configure the MOTD banner "AUTHORIZED ACCESS ONLY"
- Configure the console password on the router
- Configure the password for the virtual terminal lines
- Configure the FastEthernet0/0 interface
- Configure the Serial0/0/0 interface
- Return to privileged EXEC mode
- Save the R1 configuration

(iii) Verify the configuration by looking the routing table.

(iv) Verify interface configurations.

(55/100)

(c) Network administrator can minimize the number of entries in router's routing table by implementing CIDR. Based for the following network shown in the diagram below, determine the summarized route for Router1's routing table. Make sure you show the steps needed to get the summarized route.



(25/100)

1. (a) Terangkan fungsi-fungsi utama penghala.

(10/100)

(b) Nyata dan terangkan fasa utama semasa proses pembutan penghala.

(15/100)

(c) Setelah anda menatarajah sebuah penghala, terdapat beberapa arahan yang boleh anda gunakan untuk mengesah betul tatarajah penghala. Terangkan secara ringkas apa yang dilakukan oleh setiap arahan berikut.

(i) show running-config

(ii) show startup-config

(iii) show ip route

(iv) show interfaces

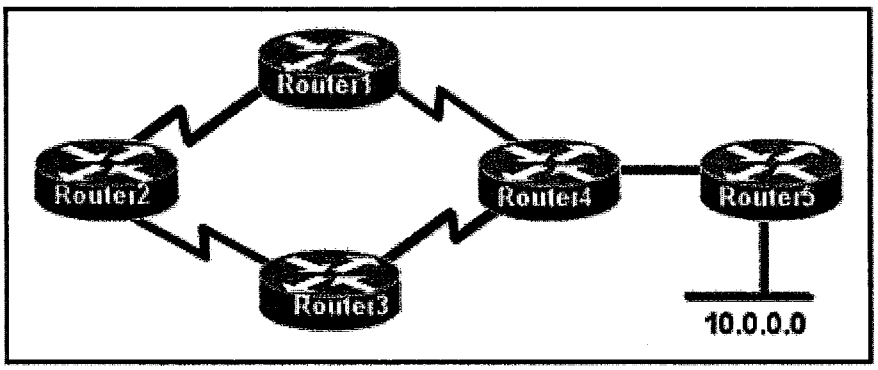
(v) show ip int brief

(15/100)

(d) Terangkan perbezaan di antara Penghalaan Protokol Get Laluan Dalaman (IGP) and Protokol Penghalaan Get Laluan Luaran (EGP). Berikan **satu (1)** contoh untuk setiap protokol penghalaan di atas.

(10/100)

(e) Rangkaian di gambar rajah di bawah sedang menjalankan protokol penghalaan RIP. Nyatakan mekanisma dan terangkan bagaimana mekanisma tersebut menghalang Router4 dari menghantar pengemaskinian tentang rangkaian 10.0.0.0 kembali kepada Router5 lalu menghasilkan gelung penghalaan.



(10/100)

(f) (i) Terangkan perbezaan di antara protokol keadaan-sambungan dan protokol vektor-jarak dari segi atribut mereka.

(ii) Nyatakan mekanisma-mekanisma yang digunakan oleh protokol keadaan-sambungan untuk membina dan menyelengara jadual penghalaan.

(25/100)

(g) (i) Beri **dua (2)** sebab mengapa seseorang pentadbir rangkaian menggunakan antara muka gelung balik apabila mengkonfigurasi OSPF.

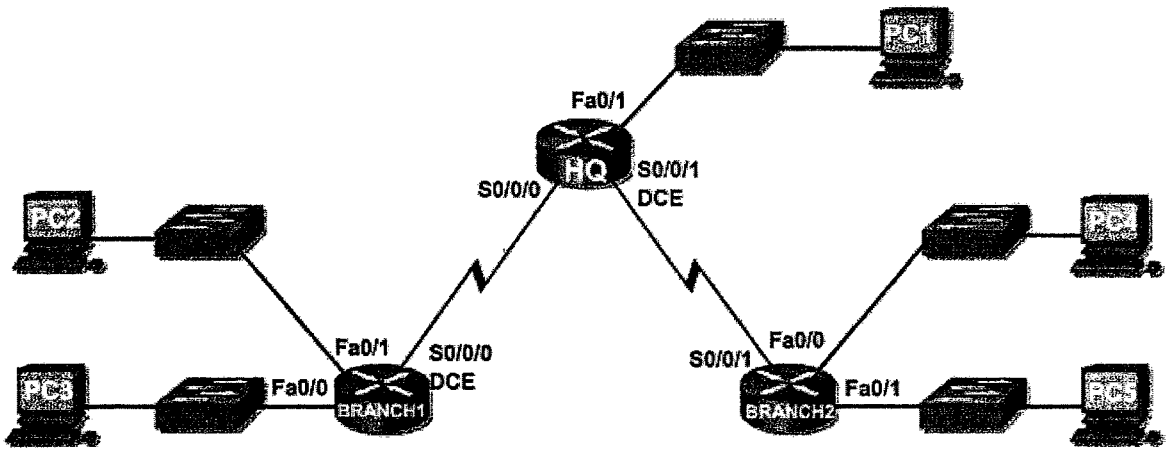
(ii) Apabila sesorang pentadbir rangkaian menggunakan arahan **router ospf 100**, apakah fungsi nombor **100** tersebut?

(iii) Apakah tujuan penggunaan arahan **bandwidth 56** untuk antara muka selari di penghala yang menggunakan OSPF?

(15/100)

2. (a) Anda diberi alamat rangkaian 192.168.9.0/24 untuk disubnet dan menyediakan pengalamatan IP untuk rangkaian yang ditunjukkan di rajah di bawah. Rangkaian tersebut mempunyai keperluan pengalamatan seperti berikut:

- BRANCH1 LAN1 memerlukan 10 alamat IP hos
- BRANCH1 LAN2 memerlukan 10 alamat IP hos
- BRANCH2 LAN1 memerlukan 10 alamat IP hos
- BRANCH1 LAN2 memerlukan 10 alamat IP hos
- HQ LAN memerlukan 10 alamat IP hos untuk setiap penghujung sambungan
- Sambungan dari HQ ke BRANCH1 memerlukan alamat IP hos untuk setiap penghujung sambungan
- Sambungan dari HQ ke BRANCH2 memerlukan alamat IP hos untuk setiap penghujung sambungan



(i) Berapakah subnet yang diperlukan?

(ii) Apakah topeng subnet untuk subrangkaian?

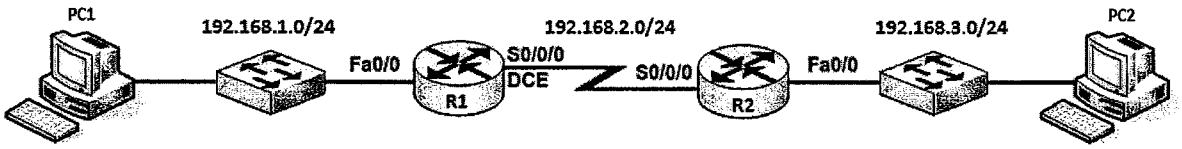
(iii) Berapakah bilangan alamat IP hos yang boleh diguna untuk setiap subnet?

(iv) Reka bentuk satu skema pengalamatan IP dan isikan jadual di bawah dengan maklumat subnet.

Nombor Subnet	Alamat Subnet	Alamat Hos Pertama Yang Boleh Diguna	Alamat Hos Terakhir Yang Boleh Diguna	Alamat Penyiaran
. . .				

(20/100)

(b) Anda diberi topologi rangkaian dan satu jadual pengalamatan seperti di bawah.



Peranti	Antara muka	Alamat IP	Topeng Subnet	Get Laluan Lalai
R1	Fa0/0	192.168.1.1	255.255.255.0	n/a
	S0/0/0	192.168.2.1	255.255.255.0	n/a
R2	Fa0/0	192.168.3.1	255.255.255.0	n/a
	S0/0/0	192.168.2.2	255.255.255.0	n/a
PC1	n/a	192.168.1.10	255.255.255.0	192.168.1.1
PC2	n/a	192.168.3.10	255.255.255.0	192.168.3.1

Jawab soalan-soalan berikut dengan memberi arahan yang betul. Pastikan anda sertakan pengesa yang betul dalam jawapan anda.

(i) Padam dan muat semula Penghala.

- Masuk mod privileged EXEC
- Kosongkan konfigurasi
- Konfigurasi nama penghala sebagai R1
- Muat semula konfigurasi

(ii) Konfigurasi Penghala R1.

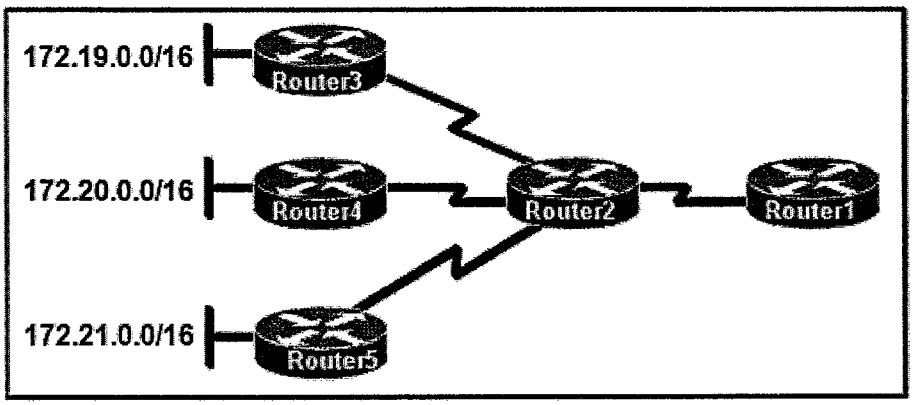
- Masuk mod privileged EXEC
- Masuk mod konfigurasi global
- Konfigurasi kata laluan mod EXEC
- Konfigurasi baner MOTD "AUTHORIZED ACCESS ONLY"
- Konfigurasi kata laluan konsol untuk penghala
- Konfigurasi kata laluan untuk talian terminal maya
- Konfigurasi antaramuka FastEthernet0/0
- Konfigurasi antaramuka Serial0/0/0
- Kembali ke mod privileged EXEC
- Simpan konfigurasi R1

(iii) Sah betul konfigurasi dengan melihat jadual penghalaan.

(iv) Sah betul konfigurasi antara muka.

(55/100)

(c) Pentadbir rangkaian boleh mengurangkan bilangan kemasukan ke jadual penghalaan penghala dengan mengimplentasi CIDR. Berdasarkan rangkaian di gambar rajah di bawah, tentukan hala yang dikurangkan untuk jadual penghalaan Router1. Pastikan anda tunjukkan langkah-langkah yang diperlukan untuk mendapatkan hala yang diringkaskan.



(25/100)