ESCUELA SUPERIOR POLITÉCNICA DEL LITORAL
FACULTAD EN INGENIERÍA EN ELECTRICIDAD Y COMPUTACIÓN
SEGUNDA EVALUACIÓN TELEFONÍA DIGITAL
SEGUNDO TÉRMINO 2018

Name: _____ Section: ___ Score: /100

1.   **Multiple choice questions (5 points each).**

a	**Choose the correct statement about NGN Networks. (1 option)**
	Circuit-based Network.
	Does not support broad variety of services.
	Can't be integrated within the existing infrastructure.
X	Application focused-access independent.

b	**Select two advantages of IMS Networks. (2 options)**
	Increased costs due to the complex operator's interoperability.
X	Broader choice of services and reduced time to market.
X	Fixed-mobile convergence.
	Limited user experienced options.
	The back-end need to be integrated with IMS infrastructure and with individual application services.

c	**Select the correct statement about SIP. (1 option)**
	Limited capabilities compared with H.323 protocol.
	Uses RTP protocol for the hand-shake phase during the signaling process.
	Proprietary protocol for media transmission.
X	IETF's standard-based protocol for multimedia applications with one or more participants.

d	**G.711, G.723, G.729, H.261, H.263, RTCP and RTP are used for call control and signaling into the H.323 Stack.**
	True
X	False

| e	**Select the main functions of Gatekeeper in the H.323 architecture. (3 options)**
X	Call control signaling.
X	Call authorization.
	Encode the signal from the audio equipment for transmission into the medium.
	Interconnect to the PSTN.
X	Call management.
	Terminal device that interconnect two or more terminals o gateways to audio or video conference.

f	**In SIP, which message request is used by calling and called parties to release a call? (1 option)**
	INVITE
X	BYE
	CANCEL
	ACK

g	**Select the main characteristics of redirect servers in SIP networks. (2 options)**
	Act on behalf of other clients and contain both client and server functions.
X	Accept SIP requests and sends a response back to the client containing the address of the next server.
X	Do not directly process SIP requests.
	Can rewrite headers before passing them on to other servers.

h	**Given the following figure, identify what kind of call is implemented. (1 option)**

TimeStamp ^	SIO ^	NI ^	... ^	H1H0 ^	CIC ▼	SLS/S... ^	OPC ^	DPC ^
2019-01-22 22:21:22.252	<ISUP	NAT		IAM	0000444	00b	00248b	00296f
2019-01-22 22:21:24.519	>ISUP	NAT		ACM	0000444	005	00296f	00248b
2019-01-22 22:21:24.627	>ISUP	NAT		CPG	0000444	005	00296f	00248b
2019-01-22 22:21:31.419	>ISUP	NAT		ANM	0000444	005	00296f	00248b
2019-01-22 22:21:38.932	<ISUP	NAT		REL	0000444	00b	00248b	00296f
2019-01-22 22:21:39.075	>ISUP	NAT		RLC	0000444	005	00296f	00248b

X	SS7 call
	SIP call

2. Complete the diagram question (10 points).

Select the correct answer for each letter, according to the NGN Architecture.
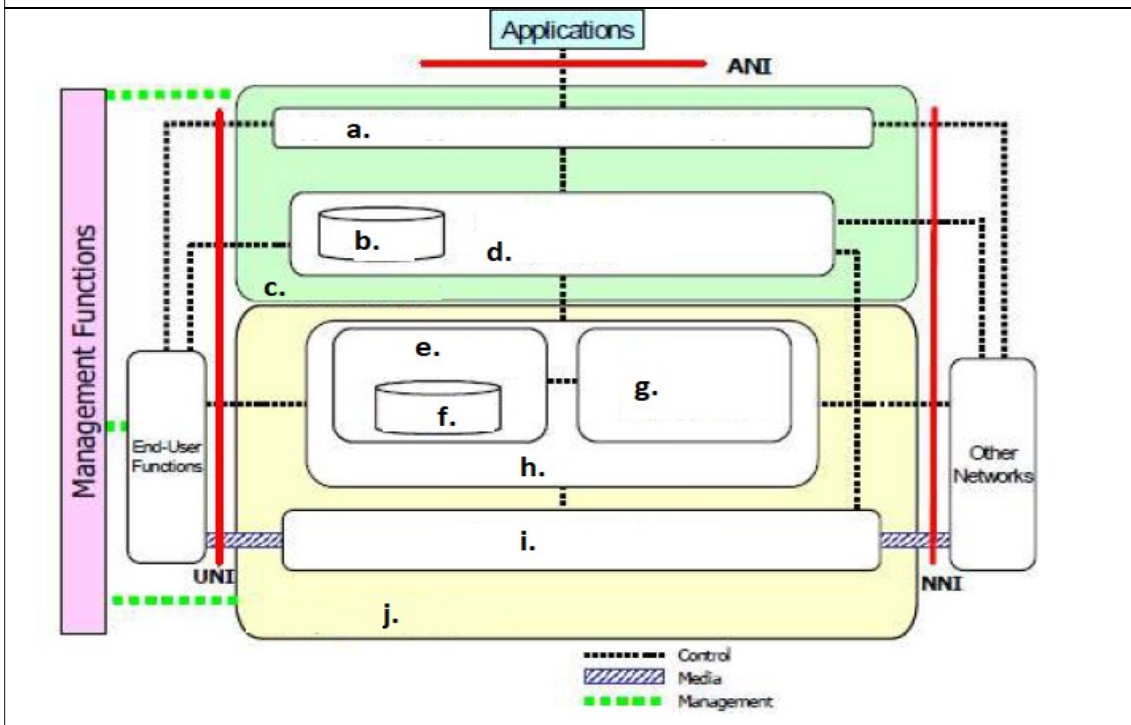
Options	Letter
Network Attachment Control Functions	e
Service Stratum	c
Transport control Functions	h
Resource and Admission Control Functions	g
Application Support Functions & Service Support Functions	a
Service User Profiles	b
Transport Stratum	j
Service Control Functions	d
Transport User Profiles	f
Transport Functions	i

3. **Diagram + essay question**
   (a) **Using a diagram to plot the IMS Network Architecture (must contain all the protocols used for signaling and media). (10 points)**
   (b) **Describe the main function of each network element of the IMS Network Architecture. (10 points)**

   (a) (b)
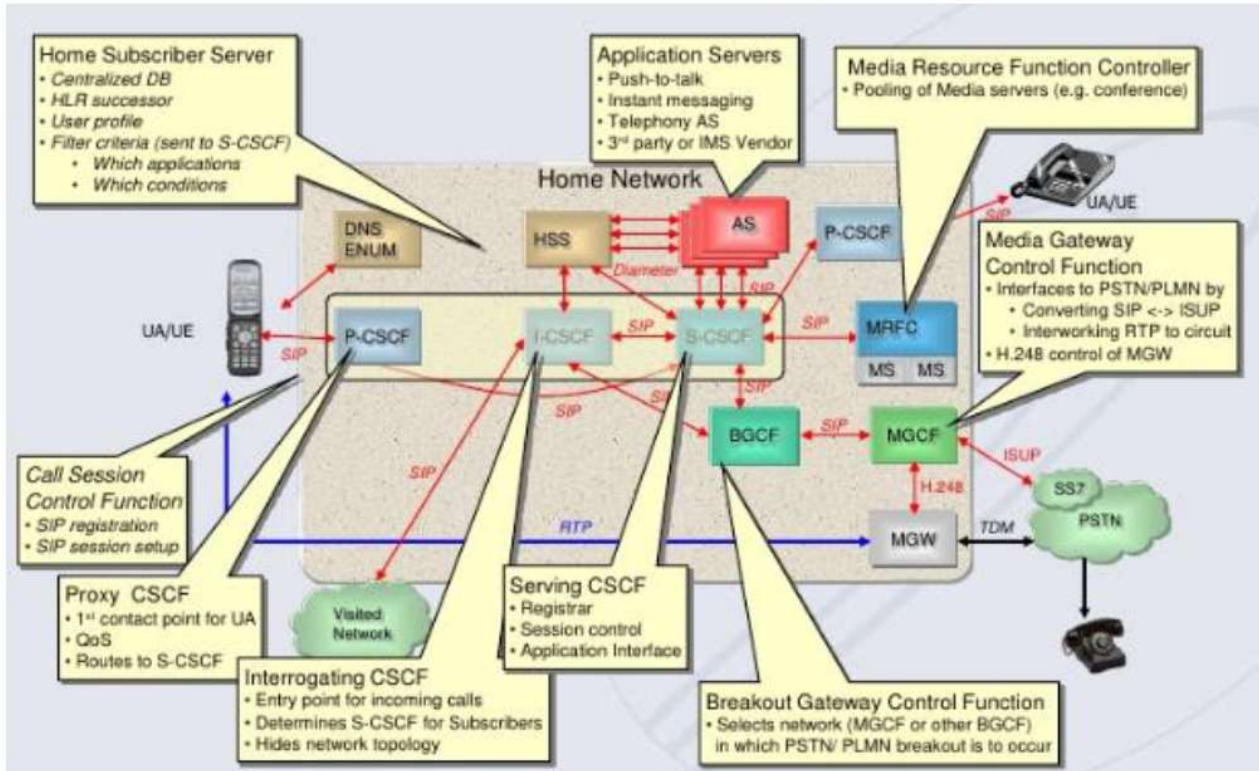
4. **Diagram + essay question**
   (a) **Describe the main operational steps to bring a two-way call to succession in the SIP-Proxy Server case. (10 points)**
   (b) **Use a graphic example to show the operation described in the above question, i.e., sketch a functioning system with the interactions between the basic elements and main messages requests used. (20 points)**

(a) The operational steps in the proxy mode needed to bring a two-way call to succession are as follows:

1. The proxy server accepts the INVITE request from the client.
2. The proxy server identifies the location by using the supplied addresses and location services.
3. An INVITE request is issued to the address of the location returned.
4. The called party user agent alerts the user and returns a success indication to the requesting proxy server.
5. An OK (200) response is sent from the proxy server to the calling party.
6. The calling party confirms receipt by issuing an ACK request, which is forwarded by the proxy or sent directly to the called party.

(b)

Proxy Mode of Operation

SIP Call Flow–Proxy

cs.edcs.edu

4 Location Server

1 INVITEsalmon@cs.edcs.edu
From: jz@cs.jamaica.ba
To: salmon@cs.edcs.edu
Call-ID: 28854267@parrot.cs

INVITEjed@out
From: jz@cs.jamaica.ba
To: salmon@cs.edcs.edu
Call-ID: 634267@parrot.cs

cs.jamaica.ba

jz@cs.
jamaica.ba

2 salmon   3 jed@out

8 200 OK
From: jz@cs.jamaica.ba
To: salmon@cs.edcs.edu
Call-ID: 28854267@parrot.cs

parrot

9 CONNECTEDsalmon@cs.
edcs.edu
Call-ID: 28854267@parrot.cs

Tune

out   jed

6 200 OK
From: jz@cs.jamaica.ba
To: salmon@cs.edcs.edu
Call-ID: 634267@parrot.cs
CONNECTEDjed@out
From: cz@cs.columbia.edu
To: salmon@cs.edcs.edu
Call-ID: 634267@parrot.cs

10
11 200 OK