35 − 5.5 = 29.5/35

ENGR 301/2 G Midterm C *Name:* AHMAD GHAZALS *ID#:* 4000527
October 2016 **Only Faculty of ENCS approved calculators are allowed.**

Each of the 23 multiple choice questions below has ONE correct answer and is worth 1 mark.
There are 3 open ended questions which are worth 4 marks each.

1 A firm resides at the lowest level of all project management maturity models presented in the text:
- O if its project processes are merely repeatable.
- O if its project management activities are directed by a specialized project office.
- O if lessons learned from one project are captured and transferred to other project management teams.
- ⊗ if its project management processes are ad hoc in nature.

2 A matrix organization is essentially a combination of:
- O Process and inverted organization
- ⊗ Project and functional organizations
- O Project and process organizations
- O Functional and process organizations

3 Which of these is NOT an element of organizational culture?
- ⊗ Organizational culture is held by every member of the organization.
- O Organizational culture consists of rules of behavior.
- O Organizational culture is unwritten.
- ⊗ Organizational culture is taught to all new members.

4 Cost reimbursable contracts include:
- O Cost plus fixed fee.
- O Cost plus fixed fee plus sliding fee.
- O Cost plus fixed percentage.
- ⊗ All of the above.

5 Which of the following stakeholder groups is typically internal?
- O Competitors
- O Clients
- O Suppliers
- ⊗ Functional managers

6 Which component(s) of the project S curve is (are) known before the project work begins?
- O The actual expenditures
- ⊗ The project budget
- ⊗ The project schedule
- O The project baseline

7 The project team manages the work of the project, and the work typically involves:
- O Integrating requirements of profitability, low cost, and legal responsibility.
- ⊗ Competing demands for scope, time, cost, risk and quality.
- O Implementation of software, hardware, and other systems to enhance organizational efficiency.
- O Supporting human factors, communications, discipline, and performance management.

8 A project is:
- O A set of sequential activities performed in a process or system.
- O A revenue generating activity that needs to be accomplished while achieving customer satisfaction.
- O An ongoing endeavor undertaken to meet customer or market requirements.
- ⊗ A temporary endeavor undertaken to create a unique product or service.

9 The power-sizing model can be used to obtain a
- O Ballpark estimate.
- O Feasibility estimate.
- O Comparative estimate.
- O Definitive estimate.

10 Your company intends to purchase a 400 tonne capacity injection moulding machine. A similar machine was purchased eight years ago for $89,500. The price index for heavy duty equipment in the plastics industry was 163.6 eight years ago and is 207.6 now. Estimate the current cost of the machine.
- O $125,000
- O $113,000
- O $108,000
- O $98,000

207.6 / 163.6 . 89.5k = 113570

11 All of the following are communication tools EXCEPT:
- O Memos.
- O Body language.
- O Inputting data into spreadsheets.
- O Verbal circulation or rumor.

12 Which of the following is NOT true of work packages?
- O The project manager should be able to track all work packages.
- O A work package may include several milestones.
- O A work package has one owner.
- O One work package may modify another.

13 Worker hours are typically highest during the:
- O termination phase
- O execution phase
- O planning phase
- O conceptualization phase.

14 Which of the following is true about the WBS?
- O ~~The WBS is another name for the Gantt~~ chart.
- O Work not in the WBS is outside the scope of the project.
- O Work not in the WBS is usually defined in the scope statement of the project.
- O ~~The WBS shows only the critical path~~ activities.

15 All of the following are true about project phases and the project life cycle, EXCEPT:
- O Each phase normally includes a set of defined deliverables.
- O The project life cycle serves to define the beginning and the end of a project.
- O The project life cycle generally involves some form of technology transfer or handoff.
- O Cost and staffing levels are generally symmetrical throughout the project life cycle.

16 Which of the following should be classified as a direct cost?
- O Wages paid to the project's cost accountant
- O Wages paid to the sales staff
- O Wages paid to the construction crew
- O Taxes

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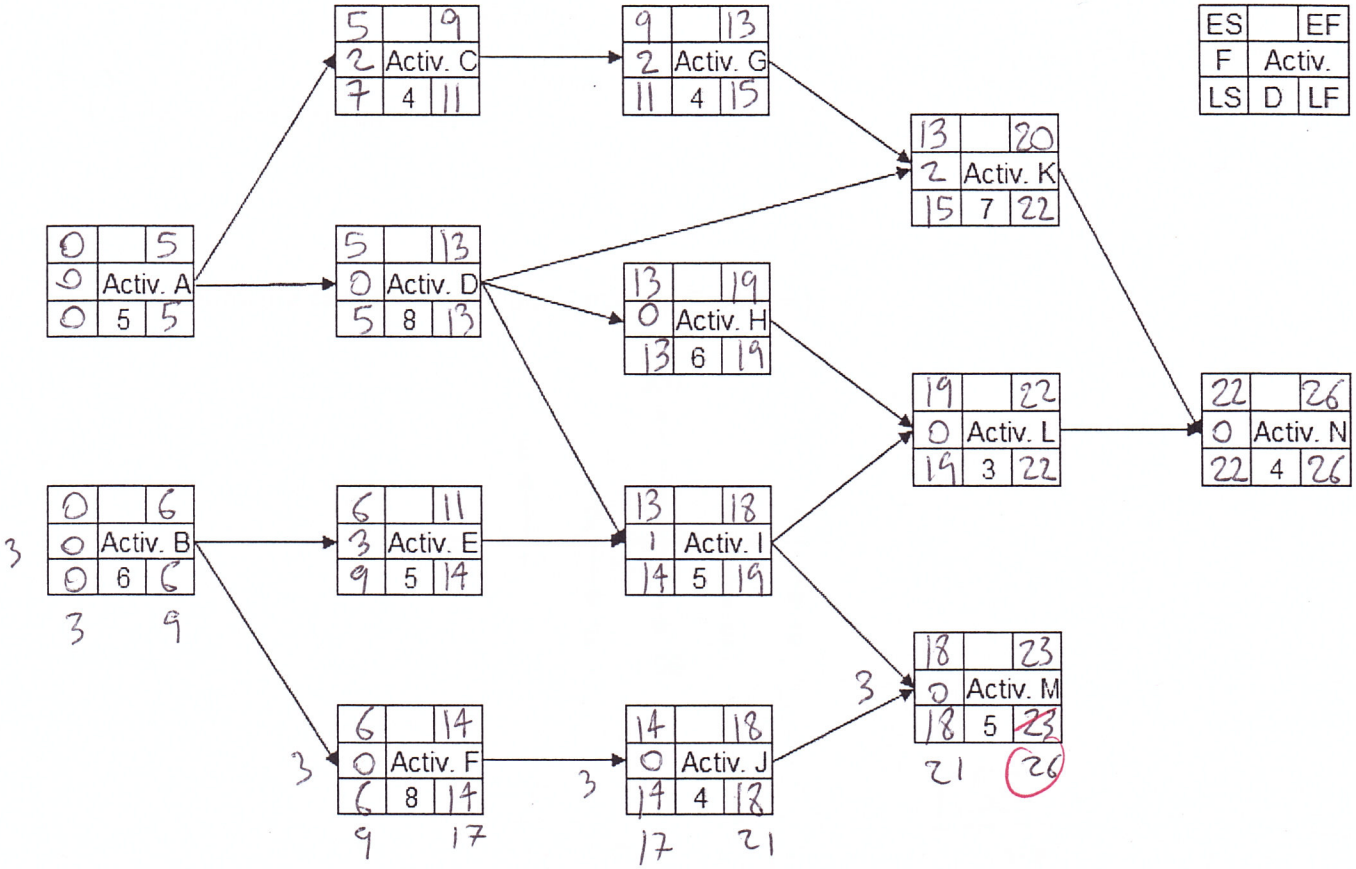
Network diagram for questions 17-22: ES = earliest start, LS = latest start, EF = earliest finish, LF = latest finish, F = float, D = activity duration.



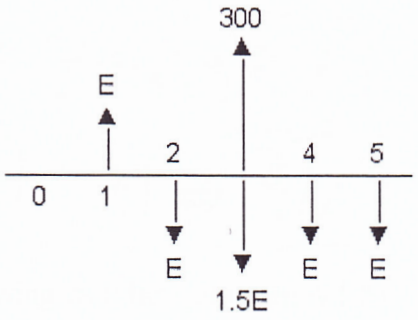
17	Project duration is:	O 27	O 74	X 26	O 25	O other
18	Critical path(s) is(are):	O ADILN	X ADHLN	O BEILN	O all three	O other
19	LF of activity C is:	O 13	O 12	X 11	O 10	O other
20	EF of activity K is:	O 19	X 20	O 21	O 22	O other
21	F of activity G is:	O 1	O 3	X 2	O 0	O other
22	No. of critical activities is:	O 7	X 5	O 8	O 6	O other

23 During a project, earned value analysis is performed resulting in the following numbers:
EV = 413,000, PV = 513,000, AC = 533,000. Which of the following results are correct?

O CV = 120,000 and SV = 100,000
O CV = 100,000 and SV = 120,000
O CV = –100,000 and SV = –120,000
⊗ CV = –120,000 and SV = –100,000
O The above answers are all wrong

$CV = EV - AC$ -120
$SV = EV - PV$ -100

24 Given the following cash flow diagram. Calculate E for i = 12%.



$$\frac{E}{1.12} - \frac{E}{(1.12)^2} + \frac{300}{(1.12)^3} - \frac{1.5E}{(1.12)^3} - \frac{E}{(1.12)^4} - \frac{E}{(1.12)^5} = 0$$

$$213.5 = 2.17E$$

$$\boxed{E = 98.2}$$ ✓

$$E\left(\frac{1}{1.12} - \frac{1}{(1.12)^2} - \frac{1.5}{(1.12)^3} - \frac{1}{(1.12)^4} - \frac{1}{(1.12)^5}\right) = \frac{-300}{(1.12)^3}$$

$$E(-2.175) = -213.5$$

$$E = 98.2$$

25 If the design of the 4th engine takes 603 hours and of the 7th engine 559 hours,

A. Calculate the learning rate .91 ⇒ 91%.

B. Calculate how long it takes to design the 10th engine 533 hrs

① $T_n = T_1 \cdot N^b$

② $603 = T_1 \cdot 4^b$
$559 = T_1 \cdot 7^b$

③ $\frac{559}{7^b} = \frac{603}{4^b} \Rightarrow \ln\left(\frac{559}{603}\right) = b \ln\left(\frac{7}{4}\right) \Rightarrow$

④

⑤ $b = \frac{\ln 559/603}{\ln 7/4} = \boxed{-.135}$

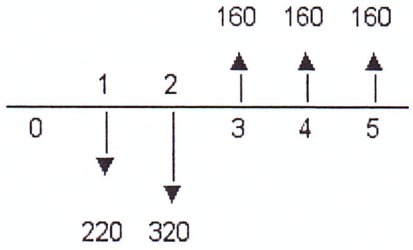
⑥ $T_1 = \frac{T_n}{N^b} = \frac{603}{4^{-.135}} = \boxed{727}$

⑦ $e^{(-.135 \cdot \ln 2)} = .91 \Rightarrow \boxed{91\%}$

⑧ $T_{n_{10}} = 727 \cdot 10^{-.135}$

$T_{n_{10}} = 533$ hrs ✓

26 The interest rate for the following cash flow diagram is 12%.



A. Calculate which single sum of money at t = 2 is equivalent to the cash flow diagram shown on the right. 182$

B. Calculate which single sum of money at t = 4 is equivalent to the cash flow diagram shown on the right. 228$

$$A\,\frac{A}{(1.12)^2} = \frac{220}{(1.12)} + \frac{320}{(1.12)^2} - \frac{160}{(1.12)^3} - \frac{160}{(1.12)^4} - \frac{160}{(1.12)^5}$$

$A = 182\$$

−0.5

$$B\,\frac{1}{1.12^4} = \frac{220}{1.12} + \frac{320}{(1.12)^2} - \frac{160}{(1.12)^3} - \frac{160}{(1.12)^4} - \frac{160}{(1.12)^5}$$

145.2

$B = 228\$$

Summary of Useful Formulas for Discrete Models

Name	Symbol and Formula
Compound amount factor	$(F/P,i,N) = (1+i)^N$
Present worth factor	$(P/F,i,N) = \frac{1}{(1+i)^N}$
Sinking fund factor	$(A/F,i,N) = \frac{i}{(1+i)^N - 1}$
Uniform series compound amount factor	$(F/A,i,N) = \frac{(1+i)^N - 1}{i}$
Capital recovery factor	$(A/P,i,N) = \frac{i(1+i)^N}{(1+i)^N - 1}$
Series present worth factor	$(P/A,i,N) = \frac{(1+i)^N - 1}{i(1+i)^N}$
Arithmetic gradient to annuity conversion factor	$(A/G,i,N) = \frac{1}{i} - \frac{N}{(1+i)^N - 1}$
Arithmetic gradient to present worth conversion factor	$(P/G,i,N) = \frac{(1+i)^N - iN - 1}{i^2(1+i)^N}$
Geometric gradient to present worth conversion factor	$(P/A,g,i,N) = \frac{(P/A,i^o,N)}{1+g}$ $(P/A,g,i,N) = \left(\frac{(1+i^o)^N - 1}{i^o(1+i^o)^N}\right)\frac{1}{1+g}$ $i^o = \frac{1+i}{1+g} - 1$
Capitalized value formula	$P = \frac{A}{i}$
Capital recovery formula	$A = (P-S)(A/P,i,N) + Si$

Effective interest rate per year: $i_e = (1+r/m)^m - 1$

where r = nominal interest rate per year
m = number of compounding periods per year

Learning curve: $T_N = T_1 N^b$

where T_N = time required to produce the N^{th} unit
b = log(learning rate)/log(2)