

MMME2049 Engineering Management 1, Past Exam 2, 2021-2022

Answers Screen for , ()



University of
Nottingham
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Screen

Key:

✓ Correct answer

✗ Incorrect answer

Emboldened words represent the correct response for each question (not the user's answer).

Feedback is displayed in dark red italics



You are the operations manager in a local, family-owned furniture company. The director asks you to review health and safety processes in the organisation and make recommendations to improve safety policy and practices.

Which of the following would NOT be a good activity to start your work in this area:

- ✓ **Publish all risk assessments to allow for transparency**
- Analyse accident statistics
1. Collect information on existing procedures
- Familiarise yourself with existing policy
- Talk to staff about their perceptions of the work and safety practices

As discussed in the lecture on Health and Safety.

1 out of 1

Link the following definitions of safety to the correct descriptions.

		Traditional definition of safety	This is not a valid definition of safety	Resilience engineering-based definition of safety
2.	A. Safety is a condition where the number of adverse outcomes is as low as possible.	<input checked="" type="radio"/> ✓	<input type="radio"/>	<input type="radio"/>
	B. Safety is the ability to succeed under varying conditions, so that	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> ✓

	the number of intended and acceptable outcomes is as high as possible.			
C.	Safety is a necessary prerequisite for all economic activity.	<input type="radio"/>	<input checked="" type="radio"/> ✓	<input type="radio"/>

Discussed in the lecture on health and safety.

3 out of 3

You are the manager of safety in an organisation. Which of the following statements are correct:

- A downward trend in reports of minor incidents always indicates that there is no problem with safety
- An upward trend in reports of minor incidents always indicates a problem with safety
- ✓ **An upward trend in reports of minor incidents can indicate that there are improvements in reporting structures in your organisation**
- 3. ✓ **A downward trend in reports of minor incidents could mean that your staff are fearful of reporting to managers**
- When there is no rise in your numbers of accidents your safety systems are working well

Discussed in the lecture on Health and Safety (L005).

2 out of 2

You are advising a fabrication business making heavy use of power tools.



4.

Put the following solutions in order of preference with respect to their effect on preventing injuries to staff. Enter "N/A" if a solution is not applicable.

N/A ▾

Warn all staff about the risks and remind them that avoiding injuries is

- ✓ their own responsibility
- ✗ Advise staff that injuries can occur when using powered equipment
- ✗ **3rd** Warn all staff about the risk and discipline those that do not follow the rules
- ✓ **2nd** Re-train staff so that they will be able to use the equipment more safely
- ✓ **1st** Change the design of the processes to make sure that people can not make contact with moving parts

Discussed in the lecture on Health and Safety (L005).

3 out of 5

A manager is asking for advice about a health and safety problem. He wants to know whether a solution to the problem is needed and meets criteria to be reasonably practicable. Which of the following are part of the advice that you will give:

- The resources required in solving the problem need not be proportionate with the benefit that will result from the solution, because it is not possible to put a value on human welfare
- Practicability is determined by senior management
- ✗ It is important to do all that is possible to prevent the problem occurring
- 5. ✓ **The resources required in solving the problem should be proportionate with the benefit that will result from the solution**
- It should be considered whether there is a technical solution to the problem**
- Cost should never be considered in decisions relating to safety

Discussed in the lecture on Health and Safety (L005).

1 out of 2

You want to introduce new ideas for safety management, based on the resilience engineering approach. Which of the following would be appropriate:

- Look for all sources of human error and train people to prevent this occurring
- 6. ✓ **Work with staff to understand how their jobs are carried out in practice and identify early indications of where things may be starting to go wrong**
- Improve risk assessment practices to predict and prevent safety problems

- Allow staff to bend the safety rules where this is needed

Discussed in the lecture on Health and Safety.

1 out of 1

Screen

Link the provided characterisations to the appropriate type of ethical theory. Note that more than one characterisation can be linked to a type of ethical theory.

		Virtue ethics	Conventional morality	Egoism	Efficiency ethics	Utilitarianism
7.	A. Evaluating an action by their impact on the person performing the action.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
	B. Judging an action by its effect on the majority of people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	C. Acting to uphold compassion and equality.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	D. A common-sense approach to ethics.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	E. This is not an ethical theory.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	F. Choosing the action with the greatest benefit to most people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	G. Putting one's self-interest above that of others.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Treated in the lecture on ethics.

3.5 out of 3.5

An aviation business is writing a bid for a new contract and you are required to comment on the company's approach to engineering ethics. Which of the following statements would you NOT include in the proposal:

8. We will do our best to avoid accidents and unnecessary loss of life
- We work with honesty and integrity

- We demonstrate respect for life, law, the environment and public good
- We work with accuracy and rigour
- We always act in a way that produces the smallest harm for the smallest number of people**

Discussed in the lecture on ethics.

0 out of 1

Which of the following are correct:

- Having either a good intention or a good motive is sufficient when considering whether an action is ethical
 - The circumstances must warrant a specific action for this to be ethical**
 - A desirable outcome is needed for an action to be ethical
- 9.
- A good intention and good motive are needed when considering whether an action is ethical**

Discussed in the lecture on Ethics (L005).

2 out of 2

Which of the following are NOT suitable reasons for having codes of ethics and conduct for engineers:

- To compete with other professions**
 - To justify the relevance of ethics in business**
 - To consistency promote ethical behaviour
- 10.
- Indicate to others that engineers practice in a responsible manner
 - Help to justify or support ethical behaviour when there is a conflict
 - To safeguard against immoral behaviour
 - Act as a guide or reminder

- Provide deterrence and discipline

Discussed in the lecture on Ethics (L025).

2 out of 2

Screen

Which of the following behaviours are NOT part of the ethical principles stated by the Engineering Council:

- Do not engage in deceptive activity

- Avoid conflicts of interest**

- ✗** Always behave reliably

- Report bribery and improper influence**

11.

- ✗** Be aware of how your own behaviour affects others

- Respect confidentiality

- Uphold fairness

As discussed in the lecture on ethics.

0 out of 2

Which of the following are the four fundamental principles of ethics for engineers:

- Honesty and intelligence

- Accuracy and rigour**

- Leadership and communication**

12. **✓** **Honesty and integrity**

- ✗** Respect for the built environment

- ✗** Respect for the profession

- Accuracy and detail

✓ **Respect for life, law, the environment and public good**

Discussed in the lecture on Ethics (L025).

2 out of 4

An unethical action is necessarily an illegal action.

Is this statement true or false?

13. True ✓ **False**

General question about the relationship between law and ethics.

1 out of 1

Screen

Which of the following are appropriate statements about the interest returned by a financial investment:

- | | Yes | No | |
|-----|------------------------------------|------------------------------------|---|
| | <input checked="" type="radio"/> X | <input type="radio"/> | N It is a sum of money, due per period of time, as a proportion of an amount loaned |
| | <input checked="" type="radio"/> ✓ | <input type="radio"/> | Y A high interest rate will normally result in a high amount of interest |
| | <input type="radio"/> | <input checked="" type="radio"/> X | Y It is a sum of money, due as a proportion of an amount loaned |
| | <input type="radio"/> | <input checked="" type="radio"/> ✓ | N It will always be returned to the investor |
| 14. | <input checked="" type="radio"/> X | <input type="radio"/> | N Interest normally accrues over one year |
| | <input type="radio"/> | <input checked="" type="radio"/> ✓ | N It is determined by the interest rate and the principal but by not the frequency of payments |
| | <input checked="" type="radio"/> X | <input type="radio"/> | N It is affected by time preference |
| | <input type="radio"/> | <input checked="" type="radio"/> ✓ | N It is a sum that has been lent |
| | <input checked="" type="radio"/> X | <input type="radio"/> | N It is a sum that can not be borrowed |

Discussed in the lecture on the evaluation of flows of money.

2 out of 4.5

You are evaluating the cash flows associated with the provision of temporary accommodation for workers.

- 15.



The following cash flows are projected:

Year 0	-£195000
Year 1	£14000
Year 2	£12000
Year 3	£14000
Year 4	£10000

Calculate the return on investment (as defined in the lecture). Note that the cash flows are not subject to discounting.

✓ **-74.36 %**

As defined in the lecture on financial project evaluation.

4 out of 4

A saver deposits money into a savings account in which the interest rate is fixed and paid annually.

If the saver invests £7500 into an account offering 8% interest, how much money will be in the account after 3.5 years?

16. ✓ **9447.84 £**

Application of compound interest, as discussed in the lecture on the evaluation of financial flows. Note here that the interest is paid annually

4 out of 4

A saver is offered a savings account with a fixed interest rate.

17. If the saver invests £35000 into an account offering 10% interest quarterly, how much money will be in the account after 3 years?

✓ **109844.99 £**

Application of compound interest, as discussed in the lecture on the evaluation of financial flows. Note here that the interest is paid every six months.

4 out of 4

A proposed project exhibits the cash flow profile shown below, with an investment being made in Year 0:

Year	Cash flow
0	-£67000
1	£33000
2	£33000
3	£35000

18. The financier has set the minimum acceptable rate of return to 20%. Calculate the cumulative present value of the projected cash flows after Year 3 subject to this rate.

✓ **3671.3 £** within a tolerance of 20 (3651.3 £ - 3691.3 £)

Described in the section on minimum acceptable rate of return (MARR) in the lecture on financial project evaluation.

6 out of 6

An individual leaves a sum of £135 in an account with no interest. If the inflation rate is 8.5% per year, what is the initial sum worth at the end of five years?

Note: please provide the amount rounded to the nearest pound.

19. £96
 £91
 £203
 £90
 £67

Simple discounting of a future cash flow.

3 out of 3

Screen

To diversify your portfolio of investments, you are considering a low-risk fixed income investment in a government bond.

The bond pays a fixed level of interest at 5.0% per year. The duration of the investment is 9 years and you are ignoring inflation. What is the total non-discounted value of the cash inflows associated with the investment (including repayment of the principal) if you are planning to invest £55000?

20.

✘ **79750 £**

Discussed in the lecture on financial evaluation. Note that the cash inflows include the repayment of the deposit/principal.

0 out of 4

An investor makes a fixed income investment of £77000 with the deposit being paid back after three years. The interest paid annually by the investment is 4.0%.

What is the present value of total amount paid back to the investor subject to an annual a discount rate of 8.0%?

21.

✔ **69062.54 £**

Discussed in the lecture on financial project evaluation. Note that the interest is paid out every year so the deposit doesn't grow.

6 out of 6

You are investigating the internal rate of return of a project.

In your analysis, you have identified the cumulative net present values of the cash flows in the project at three different discount rates. Your estimations are as follows:

22.

Discount rate	Cumulative present value
22%	-£600
18%	-£130
9%	£1200

Use a graphical or numerical method to estimate the internal rate of return.

✓ **17.1 %**

As discussed in the lecture on financial project evaluation, based on assuming different discount rates. Note that both methods work by interpolation (i.e. finding the X-intercept).

6 out of 6

A potential buyer of a sportscar is interested in the costs of a vehicle per mile travelled at net present value. The buyer is planning to sell the car after three years of operation at residual value.



The car costs £30000.00 to purchase and the buyer incurs costs for insurance, fuel and maintenance of £1400.00 per year. The car is expected to depreciate in value by £4500.00 per year (straight line depreciation). The buyer is planning to travel 20000 miles per year.

23. For simplicity, it is assumed that all payments occur at the end of each year, with the exception of the purchase payment, which is due immediately.

What is the total cost of ownership per mile travelled at net present value, assuming that all payments arise annually and are subject to a discount rate of 8%. Note that the miles travelled are not subject to discounting.

✗ **0.34 £**

This question combines the concepts of "Total Cost of Ownership" with discounting to NPV. The car is sold at residual value so this positive cash flow is also discounted. The answer is: (total non-discounted purchasing price + total discounted operating cost in Y1 + total discounted operating cost in Y2 + the sum of total discounted operating cost in Y3 minus residual value, both discounted) / total mileage travelled. Note that the order of steps matters in the calculation. You need to discount to net present value after summing the cash flows in each year and before cumulating.

0 out of 6

Screen

Which of the following is true of the internal rate of return:

- 24.
- | True | False | |
|----------------------------------|----------------------------------|---|
| <input type="radio"/> | <input checked="" type="radio"/> | T It will usually be positive if the investment of project is successful |
| <input type="radio"/> | <input checked="" type="radio"/> | F It evaluates the benefits generated by the project from internal sources of money |
| <input checked="" type="radio"/> | <input type="radio"/> | F It is the rate of return at which any non-discounted investment equates to discounted future returns |
| <input type="radio"/> | <input checked="" type="radio"/> | F It shows the discount rate at which the discounted investment and any non-discounted future returns are in balance |
| <input checked="" type="radio"/> | <input type="radio"/> | T It provides information on the conditions under which the discounted positive and negative cash flows are equal |
| <input type="radio"/> | <input checked="" type="radio"/> | T It is an accepted indication of the real benefit of a project, and can be preferred over ROI |

Discussed in the lecture on evaluating the flows of money.

1.5 out of 3

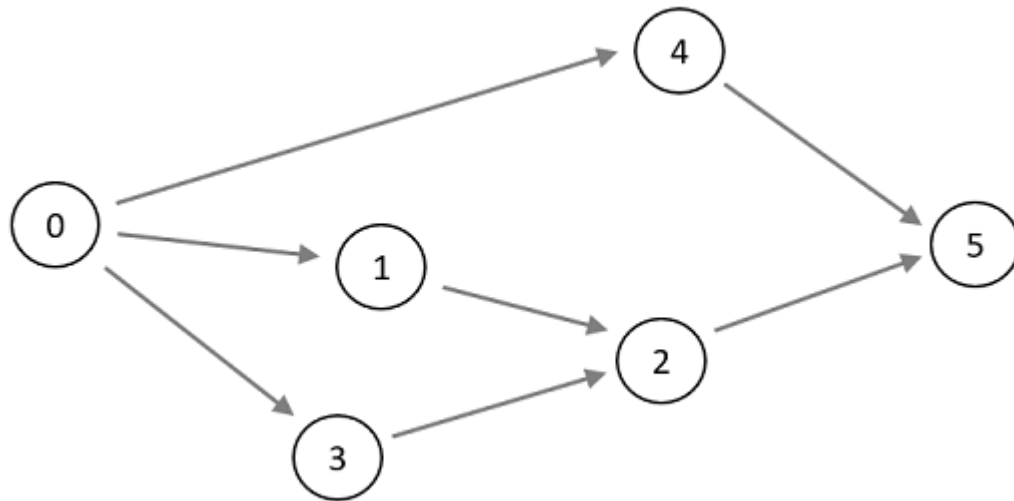
Which of the following statements is true for the Earliest Activity Start (EAS) and Latest Activity Finish (LAF) as established by forward pass and backward pass:

- 25.
- | True | False | |
|----------------------------------|----------------------------------|--|
| <input checked="" type="radio"/> | <input type="radio"/> | T The EAS is equal to LAF minus the duration of the associated activity for activities on the critical path. |
| <input type="radio"/> | <input checked="" type="radio"/> | F If an event has different times of occurrence in the backward pass, the latest time is the EAS of the activity preceding the event. |
| <input checked="" type="radio"/> | <input type="radio"/> | T The sum of activity duration and EAS is equal to LAF for activities on the critical path. |
| <input checked="" type="radio"/> | <input type="radio"/> | F The EAS is the latest occurrence of any activity preceding this activity. |
| <input type="radio"/> | <input checked="" type="radio"/> | F The EAS is equal to LAF for activities on the critical path. |
| <input type="radio"/> | <input checked="" type="radio"/> | F The EAS is the delayed occurrence of the event preceding this activity. |
| <input type="radio"/> | <input checked="" type="radio"/> | F The EAS is the non-occurrence of the event preceding this activity. |
| <input type="radio"/> | <input checked="" type="radio"/> | F The EAS is the simultaneous occurrence of the activity preceding this event. |

Discussed in the lecture on project planning and scheduling.

3.5 out of 4

26. You are planning a project and have identified the following events network for your project:



The durations of the activities associated with the events are as follows:

E0,1	2
E1,2	1
E2,5	3.5
E0,3	0.5
E3,2	10.5
E0,4	2
E4,5	3

Using the backward pass, determine the Latest Activity Finish (LAF) associated with Event 4.

✓ **11.5**

Discussed in the lecture on PERT. Compute the critical path first and then do a backward pass.

6 out of 6

Screen

Is the following statement about risk assessment true or false:

Risk is always bad and needs to be avoided

27.

True **False**

Discussed in the lecture on Risk Management (L008).

1 out of 1

In risk management, which of the following apply to scenario planning activity:

- It aims to increase the capability of the managers**
- It aims to stretch the capacity of the workers
- It is designed to establish the comfort zone of managers**
- It is a practical exercise to recover the business
- 28. **It is a static approach in which a tried and tested methodology can be applied**
- It is normally carried out as part of business continuity management**
- It is dynamic and responsive to managers' decisions**

Presented and discussed on slide 20 of the risk management lecture.

1 out of 3

Which of the following is NOT likely to be included in a risk register:

- Ownership of risks**
- Frequencies and probabilities of risk**
- Status of risks
- Mitigations for risks
- 29. Description of risks
- List of attendance**
- Likelihoods and impacts of risks

Discussed in the lecture on Risk Management (L008).

1 out of 2

You are considering risk choices associated with the design of a home appliance.

30.



You think that a cheaper and less heat resistant material could be used, but this may double the likelihood of malfunction. You are convinced that the choice of the alternative material maintains an acceptable level of risk.

Which of the following statements are appropriate:

- | Yes | No | |
|----------------------------------|----------------------------------|--|
| <input type="radio"/> | <input checked="" type="radio"/> | N Because the design of the device is not changing this is a case of risk retention. |
| <input checked="" type="radio"/> | <input type="radio"/> | N It would be immoral to accept a higher level of risk since lives are at stake. |
| <input checked="" type="radio"/> | <input type="radio"/> | Y If you decide to use the lower temperature material it is a case of risk exploitation. |
| <input type="radio"/> | <input checked="" type="radio"/> | N Accepting increases in risk in pursuit of profit objectives is unacceptable, because the malfunctions could kill someone. |
| <input checked="" type="radio"/> | <input type="radio"/> | N If you choose the cheaper material you are displaying an "open" attitude towards risk. |
| <input type="radio"/> | <input checked="" type="radio"/> | Y If you choose the cheaper material you are displaying a "hungry" attitude towards risk. |
| <input checked="" type="radio"/> | <input type="radio"/> | Y The material is less heat resistant but you can still use it. |
| <input checked="" type="radio"/> | <input type="radio"/> | Y The material is less heat resistant so the risk may be increasing. |

As discussed in the lecture on risk management.

2.5 out of 4

Link the following correct risk choices to the appropriate situations.

		Transfer	Avoid	Exploit	Retain	Reduce
31.	A. If it is the best and safest option	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	B. The risk is acceptable and part of normal business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	C. It is possible to implement risk controls	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

D.	This can occur where a third party supplier is used	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E.	There is an opportunity for greater return of investment	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Discussed in the lecture on Risk Management (L008).

5 out of 5

Screen

Valid reasons for preferring Earned Value Analysis (EVA) over a Milestone plot are:

32. EVA is a more simple method to use
- A manager can see the progress of individual tasks
- There is no reason to prefer EVA
- EVA can be used to forecast cost and completion date**
- The plot indicates cost and time relative to the plan
- EVA allows the use of cost and schedule indices to indicate progress**

Discussed in the lecture on project monitoring (L009)

2 out of 2

You are monitoring a project consisting of two stages, Stage A and Stage B.

At the time of review, you have estimated a cumulative Budgeted Cost of Work Performed for the full project of £90000. At this point of time, the planned expenditure in Stage A of the project is £56000. The planned expenditure in Stage B is £16000.

Calculate the Schedule Performance Index (SPI) at the time of review.

33.

1.25

Discussed in the lecture on Project Monitoring. This simply requires the formula for SPI

0 out of 4

One of the tasks in a project requires the installation of an electronics component. At the point of review, there is some confusion about progress in the project.

The original data provided are as follows for the time of review:

- Budgeted Cost of Work Scheduled: £85000
- Budgeted Cost of Work Performed: £40000

Additional investigation suggests that the value of the work completed is in fact 25% less than reported, and that the speed with which the project will progress after the time of review will double.

34.

Calculate the true Schedule Variance of this task at the time of review.

✓ **-55000 £**

This is the simple application of the Schedule Variance (SV) discussed in the lecture on Earned Value Analysis. Note that the result is negative.

6 out of 6

You are monitoring a project that has been set up to manufacture a food packaging system. The following information shows the project at the time of review.

Task / Work Package	Budget	Spend	Simplified Gantt chart							
			Jan	Feb	Mar	Apr	May	Jun	Ju	
Machine design	£20,000	£28,000	█							
Buy materials	£12,000	£15,000		█						
Purchase bought-in components	£10,000	£10,000			█	█	█	█		
Build frame	£12,000	£12,500			█	█	█	█	█	
Install wiring	£8,000	£8,000								█
Install additional components	£1,000	£250								
Install control system	£5,000	£0								
Product launch	£500	£0								

35.

Additionally, your team informs you that the status of each task is as follows:

Machine design	100% complete
Buy materials	100% complete
Purchase bought-in components	100% complete
Build frame	100% complete
Install wiring	66% complete
Install additional components	28% complete
Install control system	0% complete

Product launch

0% complete


Calculate the Budgeted Cost of Work Performed (BCWP) for the incomplete tasks at the time of review.

✘ **5560 £**

Calculation as discussed in the lecture on project monitoring.

0 out of 4

Summary of Marks

Your mark	86 out of 121
Random mark	22.16 
Pass Mark	40%
Your percentage	64.59% (adjusted)
Started	06/06/2023 14:05

Close Window