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Q NO 1:

RISK LOG:

A Risk Register, also referred to as a Risk Log, is a master document which is created during the early stages of your project. It is a tool that plays an important part in your Risk Management Plan, helping you to track issues and address problems as they arise.

EXPLANATION:

The Risk Register will generally be shared between project stakeholders, allowing those involved in the project to be kept aware of issues and providing a means of tracking the response to issues. It can be used to flag new project risks and to make suggestions on what course of action to take to resolve any issues.

All corporate and organizational projects face risk at one time or another. Having a Risk Register in place simply provides a better means of responding to problems as they arise. The Risk Register is there to help with the decisions making process and enables managers and project stakeholders to handle risk in the most appropriate way. A risk needn't be a threat to your project, it is simply an issue that can arise during the project; if effectively managed, it shouldn't prevent your project from attaining its goals and objectives.

The Risk Register is a document that contains information about identified project risks, analysis of risk severity and evaluations of the possible solutions to be applied. Presenting this in a spreadsheet if often the easiest way to manage things, so that key information can be found and applied quickly and easily.

The following is a brief guide on how to get started in just a few steps:

- Create the Risk Register - this step will be undertaken when the project plan is approved and the Risk Section of the project plan should serve as the basis for the document.
- Record active risks - keep track of active risks by recording them in the Risk Register along with the date identified, date updated, target date and closure date. Other useful information to include is the risk identification number, a description of the risk, type and severity of risk, its impact, possible response action and the current status of risk.
- Assign a unique number to each risk element - this will help to indentify each unique risk, so that you know if that risk eventuates during the project and what the status of the risk is at any given time. Keeping this number consistent throughout the project will make it easy to see how this risk links in to the Project Status Report, Risk Identification and Risk Impact Form.

The risk register addresses risk management in four key steps:

1. Identify potential risks.
2. Identify the consequences to the activity if the risk were to materialize
3. Identify the likelihood and probability that the risk would result in adverse consequences.
4. For those risks that have been ranked as medium, high or extreme, address with mitigating actions:

Medium:

Mitigation actions to reduce the likelihood and seriousness should be identified and appropriate actions to be endorsed at a Divisional level.

High:

If uncontrolled, a risk event at this level may have a significant impact on the operations of a cost centre or the University as a whole. Mitigating actions need to be very reliable and should be approved and monitored by the contract owner with reporting to the responsible Dean or Executive Director. Even with mitigating actions in place, the Executor (contract signatory) should be advised of identified or potential risks which have been graded at this level.

Extreme:

Activities and projects with unmitigated risks at this level should be avoided or terminated. Mitigation actions of these types of risks may outweigh the benefits of the activity to the University. This is because risk events graded at this level have the potential to have significant adverse effects to the budget holder or the University.

5. Identify if there are any controls currently in place to mitigate those risk
6. If not, develop and document Risk mitigation actions. These could include:

Using a risk log to formulate risk management strategy

Following from the creation of a comprehensive risk log, an overview of the total likely risk exposure of the project can be formulated, based on the sensitivity of the budget and programmer to identified risks and their potential impact in terms of budget overrun, delay and impact on the project's performance objectives.

The aim is to determine the most cost-effective strategy of risk avoidance, mitigation and/or transfer. The factors to be considered are:

- the potential impact(s) of each risk;
- the possibility of avoiding the risk through management action, pro- vided that any secondary risks are not too great (secondary risks are those that arise as a consequence of taking the mitigating action); the

possibility of taking actions to mitigate the risk, for example, by carrying out more thorough ground surveys to provide better infor- mation to the project team, its contractors and consultants. In this case, the risk to the probable cost of the ground works must be more than the cost of the survey otherwise the additional cost of the survey is not worthwhile;

- risks may be passed (i.e. transferred) to other parties, for example, a consultant, supplier, contractor or insurance.

In the case of risk transfer, two tests must be applied:

(1) Cost-effectiveness. It is usual for a premium to be charged by the party accepting the transferred risk. The issue is whether or not the premium to be paid is significantly less than the probable cost of accepting the risk in the rest place. There is, however, a second consideration.
(2) The ability of the transferee to manage and accept liability for the risk should it occur. This is particularly important when significant risks to which the project is sensitive are passed to others, for example, contractors or suppliers.

In other cases, the contractor/supplier may claim that the risk was excluded from his contractual responsibilities or was unforeseeable. When such claims are successful, the employer will effectively pay twice for the transfer of the risk:

- once through the premium charged by the contractor/supplier; and once through the successful claim.

- It is particularly important therefore that the employer gives very careful consideration to risk transfer through contracts, the risk premium which contractors and suppliers are likely to charge and the types of contract available to achieve the optimum risk minimisation strategy. It must be borne in mind that in competitive bidding, contractors may not be able to fully price the risks that they are expected to carry. If the risk occurs, there is in fact no funding for its consequences or mitigation.
- Whatever type of contract is chosen, it is essential that specialist con- tractors and suppliers who are best able to manage specific risks are used. The following factors must be considered:

- the extent of overlap of design, procurement and construction, if any, to achieve the desired completion date;
- transfer of risk and the premium(s) to be paid; transfer of control;
- transfer of responsibility; and
- the number of interfaces between contractors/suppliers which must be managed.

- It must be noted that theoretical advantages may be difficult to achieve (e.g. price certainty through fixed price contracts where risk is high or the scope is not well defined).
- The objective of any procurement strategy is to achieve the best VFM at the least risk. Fundamental to this is the understanding of realistic cost levels for tenders so that unrealistically low bids are not accepted.

- In so far as risk assessment by the employer is concerned, a detailed understanding of the risks to be carried by contractors and suppliers, or to be shared with them, will enable:

- tender documents to be drafted to ensure that appropriate information is elicited from bidders;
- tender assessments to include a full appreciation of the risk being carried, how they will be managed by the bidders and what the implications are for the employer.

- This is achieved by:

  - ensuring that risks are identified and clearly specified in the tender documents;
  - that the allocation of risks and responsibilities in the contract docu- ments is clearly defined;
  - the risk log can be used as a checklist during the tender assessment.

- As noted above, even when risks have been passed to a contractor or supplier, there is the residual risk that they will not manage or will succeed in passing it back totally or in part through claims. Contingent sums should be allowed in budgets for these residual risks.

Q NO 1

PART B

Risk log/register for the construction project:

Project: Construction of road in Nowshere.

ID	Date raised	Risk description	Risk			Without controls			Controls	Residual risk	Action
			H	M	L	Cost impact	Time impact	Other			
1	**15/2/2019**	There is the risk that people of specific area won't allow to start construction		M		-	It will delay starting of the project	It may result in judiciary cases and stay taken on the project	The resident engineer should regotiate with the recall on the matter	Many people wont allowthe project and will change it after negotiation also	Government orders should be taken to them in the form of letter
2	22/2/2019	There is a risk of traffic adjustment as there is no another alternate road	H			It will disturb the work at the site and will be more costly	It will take more time	It may result in delay	The work should be done when there is no traffic	In case of any emergency it will be difficult for ambulances to pass	Precautionary measures should be taken
3	30/2/2019	There is the risk of weather change			L	It will delay the work as well as cost	It can delay work	-	Force measure	Act of GOD	-
4	2/3/2019	Risk of faulty machinery use			L	The repair will delay the project	It will delay the work done	-	The machinery should well checked before starting	-	
5	10/3/2019	There is the risk of accidents in road culvert as there is no safety borders on site	H			The contractor will pay for loss if any accident occur	It will delay the work done if the one injured take case to court	Safety measures should be taken seriously	As mention in contracts	Sign board should installed	
6	15/3/2019	Contractor delay	H			They contractor should do work on time	Delay project completion	-	-as mention in contract time	To include late penalty on contractor	

Q no 2

COST BENEFIT ANALYSIS (CBA):

In most construction projects, factors other than money must be taken into account. If a dam is built it might drown a historical monument, reduce the likelihood of loss of life due to flooding, increase the growth of new industry because of the reduced dam flooding risk, and so on. Cost–benefit analysis provides a logical framework for evaluating alter- native factors that may be highly conjectural in nature. If the analysis is confined to purely financial considerations, it fails to recognize the overall social objective, to produce the greatest possible benefit for a given cost. At its heart lies the recognition that a factor should not be ignored because it is difficult or even impossible to quantify it in monetary terms. Methods are available to express, for instance, the value of recreational facilities, and although it may not be possible to put a figure on the value of human life, it is surely not something we can afford to ignore.

The essential cost–benefit analysis is to take into account all the factors, which influence either the benefits or the cost of a project. Imagination must be used to assign monetary values to what at rest sight might appear to be intangibles. It should be mentioned that monetary values are highly subjective and must be evaluated with care. Even factors to which no monetary value can be assigned must be taken into consideration. The analysis should be applied to projects of roughly similar size and patterns of cash flow. Those with the higher cost–benefit ratios will be preferred. The maximum net benefit ratio is marginally greater than the next most favored project. The scope of the secondary benefits to be taken into account frequently depends on the viewpoint of the analyst.

It is obvious that, in comparing alternatives, each project must be designed within itself at the minimum cost that will allow the fulfilment of objectives including the appropriate quality, level of performance and provision of safety.

Perhaps more important, the viewpoint from which each project is assessed plays a critical part in properly assessing both the benefits and cost that should be attributed to a project. For instance, if a private electricity board wishes to develop a hydroelectric power station, it will derive no benefit from the coincidental provision of additional public recreational facilities, which cannot therefore enter into its cost–benefit analysis. A public sector owner could quite properly include the recreational
benefits in its cost–benefit analysis. Again, as far as the private developer is concerned, the cost of labor is equal to the market rate of remuneration, no matter what the unemployment level. For the public developer however, in times of high unemployment, the economic cost of labour may be nil, since the use of labour in this project does not preclude the use of other labor for other purposes

The Purpose of Cost Benefit Analysis

The purpose of cost benefit analysis in project management is to have a systemic approach to figure out the pluses and minuses of various paths through a project, including transactions, tasks, business requirements and investments. Cost benefit analysis gives you options, and it offers the best approach to achieve your goal while saving on investment.

There are two main purposes in using CBA:

1. To determine if the project is sound, justifiable and feasible by figuring out if its benefits outweigh costs.
2. To offer a baseline for comparing projects by determining which project's benefits are greater than its costs.

Calculate Cost Benefit Analysis
For standard CBA, the formula, the benefit/cost ratio, is fairly simple:

While there are slightly more complex formulas, the benefit-cost ratio is essentially just taking into account all of the direct or indirect costs and benefits and seeing if one outweighs the other. Additionally, running a CBA often takes into account opportunity cost and is frequently used to compare different options by calculating their benefit-cost ratios.

The formula reflects the sum of all the benefits divided by the sum of all the costs, with consideration for the duration of the decision or action (or, analysis horizon).

Cost Benefit Analysis Steps
Cost benefit analysis is fairly simple to execute, and can be helpful when considering a new course of action or strategy.

Step 1: Compile lists
The first thing to do when running a cost benefit analysis is to compile a comprehensive list of all the costs and benefits associated with the potential action or decision.

Consider not only the obvious costs (like the cost of installation for new software, or for the software itself) but also possible intangible costs like the opportunity cost of picking one software over another, or over another option like hiring a new employee.

Additionally, consider all the possible benefits of the course of action or decision - how much might it add to your revenue? What other benefits may be inherent in the action that would make it outweigh the costs? For example, would a new software improve efficiency or capabilities that could promote new business or make current operations run smoother? Be sure to also consider intangible benefits as well as obvious, fiscal ones.

Step 2: Give the costs and benefits a monetary value
Once you have two comprehensive lists of costs and benefits for the action, assign monetary values to each individual cost or benefit.

Step 3: Set up the equation and compare
Take the sum of the benefits (the sum of all the monetary values assigned to the benefits of the action) and the sum of the costs (all the monetary values of the costs of the action) and plug them into the b/c equation.

The equation should be a numerical equation, and if the numerical benefits (the sum of the fiscal values for the benefits of the action) outweigh the costs, it is advisable to proceed with the decision. If not, the company or individual should re-examine the potential action and make adjustments accordingly.

This equation can also be set up for multiple different options or projects and can help companies compare options side by side.

Example
The assumptions for the investments are that option 1 would build 300 houses, renting 50 of them for 10 years at $3,000 per year. The 50 rented units would be sold after 10 years for $60,000.

Construction costs for option 1 would be $80,000 per house, which would sell for $100,000 each. The cost of a sales office would be $1,000,000 and the salaries of sales staff would be $200,000 each year. The project would last 2 years, with a financing cost of $2,000,000 per year.

For option 2, the construction company could build 200 houses, renting 25 of them for 5 years at $3,500 per year. The 25 units could be sold after 5 years for $70,000.

Construction costs for option 2 would be $70,000 per house, and the rest of the homes would sell for $110,000 each. The cost of a sales office would be $2,000,000 and sales staff salaries would be $150,000 each year. The project would last 1 year, with a financing cost of $1,500,000 per year.

For option 1, costs would include:

Construction cost = $24,000,000

Sales office cost = $1,000,000

Cost of sales staff = $400,000

Financing cost = $4,000,000

Total costs would therefore be $29,400,000.

For option 1, benefits would include:

Income from rentals = $1,500,000

Income from sales = $25,000,000

Income from sales after rental = $3,000,000

Total benefits would therefore be $29,500,000. Using the cost benefit analysis formula b/c, the ratio would be 29,500,000/29,400,000, or 1.0. Since the equation is possible, the benefits for option 1 outweigh the costs. However, since the developer is trying to decide between two projects, the same analysis needs to be performed for option 2.

For option 2, costs would include:

Construction cost = $14,000,000

Sales office cost = $2,000,000

Cost of sales staff = $150,000

Financing cost = $1,500,000

Total costs would therefore be $17,650,000.

For option 2, benefits would include:

Income from rentals = $437,500

Income from sales = $19,250,000

Income from sales after rental = $1,750,000

So, the total benefits for option 2 would be $21,437,500. The b/c ratio for option 2 would therefore be 21,437,500/17,650,000, or 1.2.

Comparing both options together, it is clear that option 2 has a higher benefit-to-cost ratio (and costs less to execute) and would therefore be the most fiscally resourceful option for the developer to pick.

Q no.3

NORMAL PROBABILITY DISTRIBUTION:

The normal distribution is a probability function that describes how the values of a variable are distributed. It is a symmetric distribution where most of the observations cluster around the central peak and the probabilities for values further away from the mean taper off equally in both directions. Extreme values in both tails of the distribution are similarly unlikely.

This will be the most important distribution in this class. You need to get very comfortable with dealing with the tables that describe probabilities associated with each distribution.

The Normal pdf: $f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-(x-\mu)^2}{2\sigma^2}}$ where

μ = mean

σ^2 = variance

π=3.14159=ratio of the circumference to diameter e = 2.71829

Important things about at the normal distribution

(1) There are infinitely many variations of the normal distribution differentiated by

μ and σ^2.

(2) The highest point of a normal is at the mean which is also the median.
(3) The normal distribution is symmetric. This implies that

$F(x) = 1 - F(-x)$

(b)Suppose that the data concerning the first-year salaries of employees is normally distributed with the population mean μ = 60000 PKR and the population standard deviation σ = 15000 PKR. Find the probability of a randomly selected employees earning less than 45000 PKR annually. Hint: To answer this question, you have to find the portion of the area under the normal curve from 45 all the way to the left. Find Z-Score table at the end of the paper (Table 2)

Ans:

Given data:

Mean μ = 60000 PKR----------1

Standard deviation σ = 15000 PKR----------2

x≤45,000----------3

Required:

The portion of the area under the normal curve from 45 all the way to the left?

Z-Score table at the end of the paper (Table 2)?

SOLUTION:

The natural log of **normally distributed with the population mean μ = 60000 PKR is 11.002** and **standard deviation σ = 15000 PKR** is**9.6158**What is **the probability of a randomly selected employees earning less than 45000 PKR annually** This is a tougher one. First lets find out what the natural log of **15,000**. Its **9.6158**. Next we need the standard deviation of log income. Its**9.6158**.

Now we can form a z score.

Z= (x-u)/ σ----------1

Put value in equ 1

Z=(10.714-11.002)/9.615

=-.03

What is P(Z=-.03)

From table 2 we have **(.51197)**

Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.500 00	.503 99	.507 98	.511 97	.515 95	.519 94	.523 92	.527 90	.531 88	.535 86
0.1	.539 83	.543 80	.547 76	.551 72	.555 67	.559 62	.563 56	.567 49	.571 42	.575 35
0.2	.579 26	.583 17	.587 06	.590 95	.594 83	.598 71	.602 57	.606 42	.610 26	.614 09
0.3	.617 91	.621 72	.625 52	.629 30	.633 07	.636 83	.640 58	.644 31	.648 03	.651 73
0.4	.655 42	.659 10	.662 76	.666 40	.670 03	.673 64	.677 24	.680 82	.684 39	.687 93
0.5	.691 46	.694 97	.698 47	.701 94	.705 40	.708 84	.712 26	.715 66	.719 04	.722 40
0.6	.725 75	.729 07	.732 37	.735 65	.738 91	.742 15	.745 37	.748 57	.751 75	.754 90
0.7	.758 04	.761 15	.764 24	.767 30	.770 35	.773 37	.776 37	.779 35	.782 30	.785 24
0.8	.788 14	.791 03	.793 89	.796 73	.799 55	.802 34	.805 11	.807 85	.810 57	.813 27
0.9	.815 94	.818 59	.821 21	.823 81	.826 39	.828 94	.831 47	.833 98	.836 46	.838 91
1.0	.841 34	.843 75	.846 14	.848 49	.850 83	.853 14	.855 43	.857 69	.859 93	.862 14
1.1	.864 33	.866 50	.868 64	.870 76	.872 86	.874 93	.876 98	.879 00	.881 00	.882 98
1.2	.884 93	.886 86	.888 77	.890 65	.892 51	.894 35	.896 17	.897 96	.899 73	.901 47
1.3	.903 20	.904 90	.906 58	.908 24	.909 88	.911 49	.913 09	.914 66	.916 21	.917 74
1.4	.919 24	.920 73	.922 20	.923 64	.925 07	.926 47	.927 85	.929 22	.930 56	.931 89
1.5	.933 19	.934 48	.935 74	.936 99	.938 22	.939 43	.940 62	.941 79	.942 95	.944 08

1.6	.945	.946	.947	.948	.949	.950	.951	.952	.953	.954
	20	30	38	45	50	53	54	54	52	49
1.7	.955	.956	.957	.958	.959	.959	.960	.961	.962	.963
	43	37	28	18	07	94	80	64	46	27
1.8	.964	.964	.965	.966	.967	.967	.968	.969	.969	.970
	07	85	62	38	12	84	56	26	95	62
1.9	.971	.971	.972	.973	.973	.974	.975	.975	.976	.976
	28	93	57	20	81	41	00	58	15	70
2.0	.977	.977	.978	.978	.979	.979	.980	.980	.981	.981
	25	78	31	82	32	82	30	77	24	69
2.1	.982	.982	.983	.983	.983	.984	.984	.985	.985	.985
	14	57	00	41	82	22	61	00	37	74
2.2	.986	.986	.986	.987	.987	.987	.988	.988	.988	.988
	10	45	79	13	45	78	09	40	70	99
2.3	.989	.989	.989	.990	.990	.990	.990	.991	.991	.991
	28	56	83	10	36	61	86	11	34	58
2.4	.991	.992	.992	.992	.992	.992	.993	.993	.993	.993
	80	02	24	45	66	86	05	24	43	61
2.5	.993	.993	.994	.994	.994	.994	.994	.994	.995	.995
	79	96	13	30	46	61	77	92	06	20
2.6	.995	.995	.995	.995	.995	.995	.996	.996	.996	.996
	34	47	60	73	85	98	09	21	32	43
2.7	.996	.996	.996	.996	.996	.997	.997	.997	.997	.997
	53	64	74	83	93	02	11	20	28	36
2.8	.997	.997	.997	.997	.997	.997	.997	.997	.998	.998
	44	52	60	67	74	81	88	95	01	07
2.9	.998	.998	.998	.998	.998	.998	.998	.998	.998	.998
	13	19	25	31	36	41	46	51	56	61
3.0	.998	.998	.998	.998	.998	.998	.998	.998	.998	.999
	65	69	74	78	82	86	89	93	96	00
3.1	.999	.999	.999	.999	.999	.999	.999	.999	.999	.999
	03	06	10	13	16	18	21	24	26	29
3.2	.999	.999	.999	.999	.999	.999	.999	.999	.999	.999
	31	34	36	38	40	42	44	46	48	50
3.3	.999	.999	.999	.999	.999	.999	.999	.999	.999	.999
	52	53	55	57	58	60	61	62	64	65
3.4	.999	.999	.999	.999	.999	.999	.999	.999	.999	.999
	66	68	69	70	71	72	73	74	75	76
3.5	.999	.999	.999	.999	.999	.999	.999	.999	.999	.999
	77	78	78	79	80	81	81	82	83	83
3.6	.999	.999	.999	.999	.999	.999	.999	.999	.999	.999
	84	85	85	86	86	87	87	88	88	89
3.7	.999	.999	.999	.999	.999	.999	.999	.999	.999	.999
	89	90	90	90	91	91	92	92	92	92
3.8	.999	.999	.999	.999	.999	.999	.999	.999	.999	.999
	93	93	93	94	94	94	94	95	95	95
3.9	.999	.999	.999	.999	.999	.999	.999	.999	.999	.999
	95	95	96	96	96	96	96	96	97	97

THIS IS JUST

1-P(Z<.03) = 1-F(.03)= **1- .51197=.48803**