School: S(DE	Level: BE		Invigila	tor's Sign:	
Program:	BEEE	Year/Part: III/II Superintendent's Sign		ntendent's Sign:		
Subject:	Engineering Economics EG653CE			Code No		
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i. ii.	Answers should be given by filling The main answer sheet can be use	the Multiple-C d for rough we	hoice Questions' Answ. ork.	ver Sheet.		
GROU	JP A (Multiple-Choice Questions)		[10x1=10]		Time: 20 Minut	
1	. What happens when Nepal Government	decides to prov	vide tax redemption in E	lectric Vehi	cles?	
	a. Price of EVs increases	r F	b. Price of Die	esel Cars de	creases	
	c. Causes economic benefit to Nepa	.1	d. Price of Pet	crol Cars in	creases.	
2	. Sinking Fund Factor is determined by					
n	a. $(P/F,I,N)$ b. $(A/P, i, N)$) utually avalusi-	C. $(A/F, i, N)$ d. $(F$	P/A, i, N	20.000 IDD = 100/	
3	ii) Project B NPV = Rs 150 000 IPP - 150	W Assuming M	ARR= 12% Which project	vrv = KS. 1.	20,000, IKK = 18% e selected	
	a. Project A h. Pr	oiect B	c. None is selected	d. Both pr	ojects are selected.	
4	A project with uneven cash flows has an	IRR of 22%. Wł	ien calculating Modified	IRR assum	ing a reinvestment	
	rate of 12%, The MIRR is 18%. W why m	night MIRR be a	better metric here?		8	
	a. MIRR assumes reinvestment at th	ie cost of capita	l b. MIRR accounts vary	ing cash flo	ws accurately	
	c. IRR overstates returns by ignorir	ıg scales	d. MIRR is alw	vays higher	than IRR.	
5	. Government of Nepal is evaluating a ro	opeway project	connecting Pathibhara	temple. W	hat is the primary	
	objective of conducting a Social Cost-Ber	nefit Analysis in	this context?			
	a. To access the project's net impact	t on societal we	lfare including externali	ties.		
	b. To calculate the project's profitab	ility for private	sectors			
	c. To determine the payback period	of construction	i costs.			
C	d. To ensure compliance with enviro	onmental regula	ations only.	- hiadiraa	iter Millich of the	
6	 A dam project generates electricity by following is intangible bonefit to include 	ut submerges	forest land, threatening	g bloalvers	sity. which of the	
	a Revenue from electricity sales	h Reduc	ed air pollution due to l	ower fossil	fuelusage	
	c increased employment during const	ruction	d Improved mental he	alth from r	ecreation access to	
	reservoir.	ruction	a. mproved mental net			
7	. A machine purchased for Rs. 45,00,000	has a deprecia	ble life of four years. It v	will have a	n expected salvage	
	value of Rs. 5,00,000 at the end of the de	epreciable life. I	Jsing the straight-line m	ethod, wha	it is the book value	
	at the end of year 2?					
	a. Rs. 27,50,000 b. <i>Rs</i> . 20,00,	000	c. <i>Rs</i> . 25,00,000	d. <i>Rs</i> .	35,00,000	
8	. Which of the following statements is inc	orrect under in	flationary economy?			
	a. In general, a business that has dep	preciable assets	will pay more taxes in r	real dollars		
	b. In general, there will be more dra	in in working c	apital.			
	c. Bond interest rates will be higher	in financial ma	rket so it would cost mo	ore to finano	te a new project.	
n	u. Donowers will always come out a	aneau as they p	ay back with theaper do	uidi S.		
9	a Initial investment in equipment	h Sunb	ost incurred during feas	sihility stud	lies	
	c. Annual Operating expenses	d. Salvao	ze value of machinerv at	project end	1.	
1	0. Project A has the following probability d	listribution of n	et future returns. What i	is its expect	ted NFW	
	ability 0.1 0.2	0.4	0.2	0.1		
Prob						
Prob NFV	V Rs, 12000 Rs. 4000	Rs. 12.0	00 Rs. 20.000	Rs. 30	0,000	

In Words:	Corrected Fill	1. A B C D	6. A B C D
Examiner's Sign: Date:		2. A B C D	7. A B C D
Scrutinizer's Marks:		3. A B C D	8. A B C D
In Words:		4. A B C D	9. A B C D
Scrutinizer's Sign: Date:	υ το το γο	5. A B C D	10. A B C D

Manmohan Technical University Office of the Controller of Examinations **Exam Year: 2082, Jestha (Model Question)**

School: SOE	Level: BE	Time: 3 Hours
Program: BEEE	Year/Part: III/II	Full Marks: 50
Subject: Engineering Economics	s EG653CE	Pass Marks: 20

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

GROUP A (Multiple-Choice Questions in separate paper)[10x1=10]GROUP B (Short Answer Questions - Attempt Any Eight Question)[8x2=16]

- 1. What do you mean by Economic Efficiency? What makes economic decision different from other design decisions?
- 2. What single payment at the end of year 5 is equivalent to an equal annual series of payments of Rs. 80,000 beginning at the end of year 3 and ending at the end of year 12? The interest rate is 8% compounded annually.
- 3. What value of C makes these two cash flows equivalent at an interest rate of 10%?



Figure 13

- You want to choose between the following investment alternatives:
 [Option A: an investment pays 9% interest compounded monthly.] and
 [Option B: an investment pays 9.2% interest compounded semiannually.]
 Select the best investment option.
- 5. A newly constructed water treatment facility in Duhabi cost Rs. 2 crores. It is estimated that the facility will need revamping to maintain the original design specification every 30 years at a cost of Rs. 1 crore. Annual repairs and maintenance costs are estimated to be Rs. 10 lakhs. At an interest rate of 8%, determine the capitalized cost of the facility, assuming that it will be used for an indefinite period.
- 6. You purchased a building 5 years ago for Rs 1,00,00,000. Annual Maintenance cost is Rs 5,00,000 per year. At the end of 3 years Rs 9,00,000 was spent on roof repairs. At the end of 5 years, you sell the building for Rs 1,20,00,000. During the period of ownership, you rented the building for Rs. 1,00,000 per year paid at the beginning of each year. Use equivalent worth method to evaluate the investment if MARR = 12%.
- 7. What are the objectives of Social Cost Benefit Analysis using UNIDO approach?
- 8. Consider the following accounting information for an excavator,

Cost basis of the asset (I) = Rs. 1,50,00,000; Useful Life (N)= 5 years; Estimated Salvage value (S): Rs. 20,00,000.

Compute the annual depreciation allowances and the resulting values using the double-decliningbalance depreciation method.

9. CG group manufactures and sells Wai Wai. The company's sales and expenses for a recent month based on a sales volume of 25,000 units are as follows:

	Total	Per Unit
Sales	Rs. 500,000	Rs. 20
Less Variable Expenses	Rs. 250,000	Rs. 10
Contribution Margin	Rs. 250,000	Rs. 10
Less fixed expenses	Rs/ 150,000	

Income (before tax)	Rs. 100,000		

- a. What is the monthly break-even point in units sold and in sales.
- b. How many units would have to be sold each month to earn a minimum target net income of Rs. 50,000

<u>Group C</u>

Attempt any six questions $[6 \times 4 = 24]$

- 10. If you are looking for a 4% real return (inflation-free interest) on your investment, would you be interested in an investment opportunity that produces a 10% return on investment (market interest rate) if the inflation rate is 6%? What is the minimum market interest rate for the above scenario?
- 11. Choose the best project among these alternatives using IRR, if MARR = 15% and study period is 10 years, Salvage value is 20% of the investment.

Project	А	В	С	D
Investment (in Rs. '000)	900	1500	2500	4000
Annual Revenue (in Rs.	150	276	400	925
'000)				

12. Engineering projects B1, B2, C1, C2 and D are being considered with cash flows estimated over four years are as shown in table below. Using the PW method and MARR = 10% per year, determine what combination of projects is best if the capital to be invested is unlimited.

The combination of project is

Project B1and Project B2 (mutually exclusive and independent of C set)

Project C1and Project C2 (mutually exclusive and contingent on the acceptance of B2 Project D (contingent on the acceptance of C1)

Cash flow for end of year (Rs.)						
Project	0	1	2	3	4	
B1	-50000	20000	20000	20000	20000	
B2	-30000	12000	12000	12000	12000	
C1	-14000	4000	4000	4000	4000	
C2	-15000	5000	5000	5000	5000	
D	-10000	6000	6000	6000	6000	

- **13**. Describe different types of Depreciation Methods with proper examples.
- 14. A new absorption chiller system costs Rs. 3,60,00,000 and will save Rs. \$52,50,000 in each of the next 12 years. The asset is classified as a seven-year MACRS property for depreciation purpose. The expected salvage value is Rs. 20,00,000. The firm pays taxes at a combined rate of 40% and has a MARR of 12%. What is the net present worth of the system?
- 15. Perform sensitivity analysis to identify the most sensitive parameter, among considered parameters by plotting the graph, using IRR computations for a project having following information over the range of \pm 15% (interval of 5%) for the parameters (i) Net Annual Revenue (ii) Salvage Value (iii) Life Span

Investment (Rs.)	Net Annual Revenue (Rs.)	Salvage Value (Rs.)	Life of Project (Year)
8,00,000	2,00,000	80,000	10

16. From the following information, calculate NPW for each scenario by assuming I= 5,00,000, MARR = 12% and life of project is 8 years.

Variable Considered	Worst Case Scenario	Most-Likely Case	Best Case Scenario
Unit demand/year	8,000	10,000	12,000
Unit Price (Rs.)	240	250	270
Variable cost (Rs.)	85	75	60
/Unit			
Fixed cost (Rs.)/year	55,000	50,000	40,000
Salvage Value (Rs.)	1,50,000	2,00,000	2,50,000