

PURBANCHAL UNIVERSITY

2018

B. E. (Computer/Electronics & Comm.)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG2028H: Probability & Statistics (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Students are allowed the Statistical Table (Standard Normal Table, T-distribution Table and Chi-square Table).

Answer EIGHT questions.

8×10=80

1(a) Define Absolute and relative measure of dispersion and Coefficient of variation. 4

(b) Calculate the appropriate measure of central tendencies from the following distribution and support your choice. 6

Wage in Rs.	No. of workers
Below 1000	50
1000-1999	500
2000-2999	555
3000-3999	100
4000-4999	30
5000 and above	15

2(a) Discuss equally likely and exhaustive events with example. 4

(b) The probability that a new airport will get an award for its design is 0.16, the probability that it will get an award for the efficient use of materials is 0.24, and the probability that it will get both awards is 0.11. 6

(i) what is the probability that it will get at least one of the two awards?

(ii) what is the probability that it will get only one of two awards?

(iii) what is the probability that it will get none of awards?

3(a) What do you mean by regression coefficient and write down the basic properties of regression coefficients. 1+3

Contd. ...

(2)

- (b) A sample of 12 fathers and their eldest son gave the following data about their heights in inches. 6

Father	65	63	67	64	68	62	70	66	68	67	69	71
Son	68	66	68	65	69	66	68	65	71	67	68	70

Find the Coefficient of correlation by using the Karl Pearson's method.

- 4(a) Define the Binomial distribution and prove that its mean is equal to np . 2+2
- (b) In proof testing of circuit board, the probability that any particular diode will fail is 0.01. Suppose a circuit board contain 2000 diodes. (i) How many diodes would you expect fail, (ii) What is the approximate probability that at least four diode will fail on randomly selected boards? 6
- (a) What do you mean by mathematical expectation of random variable and mention its physical meaning. 4

- b) Let X be a random variable with $f(x) = \begin{cases} kx(3-x^2), & 0 \leq x \leq 3 \\ 0, & \text{otherwise} \end{cases}$

Find the value of constant 'K', mean and variance of random variable x . 6

- i) Discuss the properties of normal distribution. 4
- j) The average income of 10,000 people in an ideal city of **Republic of Nepal** is found to be normally distributed with mean Rs 75,000 and standard deviation of Rs 15,000.
- (i) If 15% are the poorest, find the minimum income of the remaining rich people.
- (ii) If 5% are the richest, find the minimum income of the richest people. 6

✓ Define the point estimation and interval estimation. Write down the properties of good estimator and explain one of them in brief. 4

✓ Hotel's manager in Kathmandu wants to know the hotels average daily registration. The following table presents the numbers of guest registered each of 27 randomly selected days. Calculate the sample mean, standard errors of mean and 95% confidence limits of population mean: 6

61	57	53	60	64	57	54	58	63
61	50	59	50	60	57	58	62	63
60	54	54	61	51	53	62	57	60

(3)

- 8(a) What is the procedure of testing large sample test for the difference of two mean. 4

- (b) In Kathmandu city out of a random sample of 700 peoples 420 were found below poverty level while in Biratnagar out of 500 peoples 325 were found below poverty level. Is there any significant difference in the poverty level of the people in the two cities? 6

- 9(a) Define student t-distribution with its probability density function and write down its properties. 4

- (b) Two horses A and B were tested according to the time in seconds to run a particular track with the following results: 6

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	

Test whether the two horses have the same running capacity with respect to average at 5% level of significance.

- 10(a) What are the steps of test of significance of independence of attributes? 4

- (b) The following is the distribution of the daily number of power failures reported in a Kathmandu valley on 300 days. 6

Number of power failure	Number of days
0	9
1	43
2	64
3	62
4	42
5	36
6	22
7	14
8	6
9	2

Test at the 0.05 level of significance whether the daily number of power failures in Kathmandu valley is a random variable having Poisson distribution.



PURBANCHAL UNIVERSITY

2017

B. E. (Computer/Electronics & Comm.)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG203SH: Probability & Statistics (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Students are allowed the Statistical Table (Standard Normal Table, T-distribution Table and Chi-square Table).

Answer EIGHT questions.

8×10=80

1(a) Calculate the median marks of following students.

4

Marks	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	12	16	42	45	36	9

(b) Calculate the coefficient of mean deviation from mean from the following information.

6

Temp(°C)	0-10	10-20	20-30	30-40	40-50
No. of days	5	12	25	18	2

2(a) Define and compare correlation and regression. Write down the basic properties of regression.

4

(b) By using the regression analysis estimate the most probable price of the product if the supply is 70:

6

Price (Rs)	160	162	165	161	163	164	166
Supply	62	63	64	63	62	66	68

3(a) State and prove the Bayes's theorem of probability.

4

(b) The probability that a new airport will get an award for its design is 0.16, the probability that it will get an award for the efficient use of materials is 0.24, and the probability that it will get both awards is 0.11.

6

(i) What is the probability that it will get at least one of the two awards?

(ii) What is the probability that it will get only one of two awards?

(iii) What is the probability that it will get neither awards?

4(a) Define and compare probability mass function and probability density function.

4

Contd

(2)

(b) The probability density function of a random variable X is given below as: 6

$$f(x) = \begin{cases} kx^2, & 0 < x < 3 \\ 0, & \text{otherwise} \end{cases}$$

(i) If f(x) is a probability density function find the value of constant k

(ii) P (1 < x < 2) (iii) find the mean of random variable X.

5(a) Define the Binomial Distribution also prove that the mean of binomial distribution is 'np'. 4

(b) From the past experience it is known that in a certain intersection of road, there are on the average 4 traffic accidents per week. Find the probability that, in a given week there will be 4

(i) Less than 2 accidents

(ii) Exactly 2 accidents

(iii) More than 2 accidents

6(a) Define Standard normal distribution. Write down the basic properties of normal probability curve. 4

(b) If the voltage supply for a particular circuit board follows normal distribution and 7% of the times voltage is under 210 and 89 % of the time the voltage is under 335. Find the mean and the standard deviation of voltage supply. 6

7(a) What do you understand by the standard error write down the standard error of sample mean and sample proportion. 4

(b) Random sample of 400 villagers and 900 municipal people were asked whether they would like certain TV program. 250 villagers and 540 municipal were in favor of that TV program. Set up the 95% and 99% confidence limits for the difference of proportion in whole country. 6

8(a) Write down the steps involved in the test of significance of difference of proportion. 4

(b) A whole sale dealer wanted to buy a large quantity of light bulbs from two brands label A and B. He bought 100 bulbs from each bulbs brand and found by testing that brand A had mean life time 1120 hours and standard deviation 75 hours and brand B had mean life time 1062 hours and standard deviation 80 hours. Test at 5% level of significance that whether the average life of two brand

(3)

9(a) Define student t-distribution. What are the assumptions made while testing the single mean for small sample?

(b) If a study of the effectiveness of physical exercise in wear reduction a group of 16 persons engaged in a prescribe program of physical exercise for one month showed the following results of weight in pound.

Before	209	178	169	212	190	192	158	180	170	153	163	165	201	170	243	144
After	196	171	170	207	177	190	159	180	164	152	179	162	199	173	231	140

Use the 1% level of significance to test whether the prescribe program exercise is effective.

10(a) How the goodness of fit is tested? Explain it by suitable steps.

(b) The following is the distribution of the daily number of power failures reported in a Kathmandu valley on 300 days.

Number of power failure	Number of days
0	9
1	43
2	64
3	62
4	42
5	36
6	22
7	14
8	6
9	2

Test at the 0.05 level of significance whether the daily number of power failures in Kathmandu valley is a random variable having Poisson distribution with parameter $\lambda=3.2$.

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PURBANCHAL UNIVERSITY

2016

B. E. (Computer/Electronics & Comm.)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG203SH: Probability & Statistics (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Students are allowed the Statistical Table (Standard Normal Table, T-distribution Table and Chi-square Table).

Answer EIGHT questions.

8×10=80

1(a) Discuss the functions and limitations of Statistics.

(b) The mean and standard deviation of set of 50 observations were found to be 40 and 12 respectively. On checking, it was found that two observations were wrongly taken as 23 and 15 instead of 43 and 18. Calculate correct mean and standard deviation.

2(a) What do you mean by correlation. Discuss the properties of correlation coefficient(r).

(b) Fit the regression equations of Y on X from the following data:

X	11	12	13	14	15	16
Y	11	13	15	17	19	20

Also, estimate y when $x=30$.

3(a) Write short notes on:

- (i) Dependent and independent events
- (ii) Sample space and exhaustive events.

(b) A husband and wife appears in an interview for two vacancies in the same post. The probability of husband's selection is $1/7$, and that of wife's selection is $1/5$. What is the probability that: (i) both of them will be selected?, (ii) only one of them will be selected?, (iii) none of them will be selected?

4(a) Discuss on probability mass function and distribution function.

(b) The probability density function of a random variable X is given below:

$$f(x) = \begin{cases} Kx^3 & 0 \leq x \leq 1 \\ 0, & \text{otherwise} \end{cases}$$

Contd. ...

(2)

- (i) If $f(x)$ is a probability density function find the value of K .
- (ii) Find the mean and variance of X .

5(a) Under what conditions Binomial Distribution possesses Poisson Distribution? Explain.

- (b) A certain screw making machine produces on an average 3 defective screws in a lot. Find the probability that this lot has:
 - (i) none of the screw are defective
 - (ii) at least one of the screw are defective
 - (iii) exactly one of the screw is defective

6(a) Define normal distribution. Discuss the property of normal distribution.

- (b) A sample of 100 mobile battery cells tested to find the length of life produced the following results as mean 13 months and standard deviation of 3 months. Assuming that the data are normally distributed. What percentage of battery cells expected to have life (i) more than 15 months? (ii) less than 6 months? (iii) between 8 months and 12 months?

7(a) Define the terms population parameter and sample statistics. Write down the standard error of mean and proportion.

- (b) The quality control engineer at a light bulb factory needs to estimate the average life of a large shipment of light bulbs. The process standard deviation is known to be 100 hours. A random sample of 64 light bulbs indicated a sample average life of 350 hours. Calculate the standard error of mean. Set up 95% and 99% confidence interval of the true average life of light bulbs in this shipment.

8(a) Write down the necessary steps of hypothesis testing of difference of proportion.

- (b) A Company claims that its light bulbs are superior to those of its main competitor. If a study showed that a sample of 40 of its bulb has mean lifetime of 647 hours. of continuous use with standard deviation of 27 hours., while a sample of 40 bulbs made by its main competitor had mean lifetime of 638 hours of continuous use with standard deviation of 31 hours, does this substantiate the claim at 5% level of significance?

(3)

9(a) Define t-distribution and write down the application t-distribution.

- (b) Two independent samples of 7 and 8 items respectively had following values, whether these two samples are drawn from sample population or not.

Sample-I	9	11	13	11	15	9	12	14
Sample-II	10	12	10	14	9	8	10	-

10(a) Define chi-square test. What are the applications of chi-square test?

- (b) Test of the fidelity and selectivity of 190 radio receive produced the results shown in the following table. Use the 0 level of significance to test whether there is a relations between fidelity and selectivity.

	Fidelity	Low	Average	High
Selectivity				
Low		6	12	32
Average		33	61	18
High		13	15	0

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PURBANCHAL UNIVERSITY

2015

B. E. (Computer/Electronics & Comm.)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG203SH: Probability & Statistics (New Course)

Candidates are required to give their answers in their own words as far as practicable.

Students are allowed the Statistical Table (Standard Normal Table, T-distribution Table and Chi-square Table).

Answer **EIGHT** questions.

8×10=80

1(a) Mention the importance of statistics in engineering field.

✓(b) The mean and standard deviation of a set of 100 observations were found to be 40 and 12 respectively on checking, it was found that two observations were wrongly taken as 23 and 15 instead of 43 and 18. Calculate the correct mean and standard deviation.

2(a) Prove that the value of correlation coefficient lies between -1 and 1.

(b) Find the most likely production corresponding to a rainfall 40mm from the following data:

	Rainfall (mm)	Production (m. tons)
Average	30	500
Standard deviation	5	100

Standard deviation 5

And coefficient of correlation = 0.8

3(a) State and prove additive law of probability.

(b) Rack A contains two white and three red books and rack B contains four white and three red books. One book is chosen at random from one of the rack and is found to be the red. Find the probability that it was drawn from the rack B.

4(a) What do you mean by expected value? A die is thrown random. Find the expected value of number on its upper face.

✓(b) Obtain the probability distribution of number of heads in three tosses of a coin; hence find mean and the variance of distribution.

Contd. ...



(2)

- 5(a) Write three conditions at which poisson distribution are applicable and write two properties of poisson distribution.
- (b) In 800 families with 5 children each with the assumption that probability for boys and girls birth are equal. How many families would be expected to have: (i) three boys and two girls, (ii) at most two girls?
- 6(a) Suppose 220 misprints are distributed randomly throughout a book of 200 pages. Find the probability that a given page contains (i) no misprints (ii) two or more misprints.
- (b) In a normal distribution, 7 percentage of the items are under 45 and 8 percentage are over 64. Find the mean and standard deviation of the distribution.
- 7(a) Define the terms: (i) parameter, (ii) statistics, (iii) point estimation and interval estimation with example.
- (b) A sample of 100 light bulbs from a manufacturing lot had average life of 1416 hours with standard deviation of 30 hours. Set up 95% and 99% confidence limits for the true population mean.
- 8(a) Write down the steps for test of significance of single mean in large sample.
- (b) A machine produced 20 defective articles in a batch of 400 items. After overhauling it produced 10 defective articles in a batch of 300 has the machine improved?
- 9(a) A manufacturer claims that the mean breaking strength of ropes produced by him is 700lbs. To test his claim random sample of 7 ropes has shown the breaking strength as 660, 705, 680, 690, 685, 695 and 670 lbs. Can we support the manufacturers claim at 5 percent level of significance?
- (b) A machinist is making engine parts with axle diameter of 0.7inch. A random sample of 10 parts shows a mean diameter of 0.742 inch with a standard deviation of 0.04 inch. Test whether the sample are drawn from the population or not.
- 10(a) What do you mean by degree of freedom. Also write down the condition for the validity of chi-square test.
- (b) A dice is thrown 60 times with the following results. Test at 5% level of significance of the dice is unbiased or not.

Face:	1	2	3	4	5	6
Frequency:	6	7	12	8	14	11

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PURBANCHAL UNIVERSITY

2014 (New)

B. E. (Computer/Electronics & Comm.)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG203SH: Probability & Statistics

Candidates are required to give their answers in their own words as far as practicable.

Students are allowed the Statistical Table (Standard Normal Table, T-distribution Table and Chi-square Table).

Group A

Answer FOUR questions.

4×10=40

- 1(a) Dr. Singh is the director of the student s financial aid office at a college. He has used available data on the summer earnings of all students who have applied to his office for financial aid. The frequency distribution is given below.

Summer Earnings (Rs.)	No. of Students
0-500	231
500-1000	304
1000-1500	400
1500-2000	296
2000-2500	123
2500-3000	68
3000 and above	23

Find the modal summer earning of Dr. Singh's data.

4

- (b) The mean and standard deviation of a set of 400 observations were found to be 118 and 24 respectively. On checking, it was found that two observations were wrongly taken as 123 and 115 instead of 143 and 128. Calculate the correct mean and standard deviation. Also calculate the correct mean and standard deviation if the wrong observations are omitted. 4+2
- 2(a) Define the Karl Pearson correlation coefficient and mention its Properties? 4
- (b) Estimate the most probable value of sales if the advertisement cost is 57 from the line of regression: 6

(x) Advertisement Expenses (in Rs.)	39	65	62	90	82	75	25	98	36	78
Sales (y)	47	53	58	86	62	68	60	91	51	84

Contd. ...

(2)

The probability that a contractor will get a plumbing contract is $\frac{2}{3}$ and the probability that he will not get an electric contract is $\frac{5}{9}$. If the probability of getting at least one contract is $\frac{4}{5}$. What is the probability that he will get both the contracts? 4

(b) In a factory producing portable radio, there are three machines producing 1000, 2000, and 3000 radio per days respectively. These machines produce 1%, 2% and 1% defectives radios respectively. One radio is selected at random from a day's production of the three machines and found to be defective. What is the probability that this radio is produced from first machine? 4

4(a) Define the term probability mass function and probability density function. 6

(b) A random variable X is distributed at random between the values 0 and 1 so that its pdf is $f(x)=kx^3(4-x)^2$. Where, k is a constant. Find the value of k, using this value of k find mean and variance of distribution. 2+2

5(a) Prove that mean of Poisson distribution and variance are equal. 4

(b) Calculate the expected frequencies from the following data by using Binomial probability law: 6

No. of Success (X)	5	4	3	2	1	0
Frequency	1190	1500	1900	1960	1500	1150

Group B

Answer FOUR questions.

4x10=40

6(a) Define the Normal distribution, Standard normal, Gamma distribution and chi square distribution. 4

(b) An auditor has reviewed the financial records of a hardware store and has found that its billing errors follow a normal distribution with mean of Rs. 1.5 and standard deviation of Rs. 1 ("000).

(a) What proportion of the stores billing are in error by more than Rs 12

(3)

(b) What is the probability that a billing represents an overcharge of at least Rs. 1.50?
(c) What is the probability that a customer has been under charged from Rs. 0.50 to Rs. 1.00

7(a) Define the terms Parameter and statistics. Define any two properties of good estimator. 2+2

(b) A random sample of 16 values from a normal population has a mean of 41.5 inches and sum of squares of deviations from the mean is equal to 135 inches. Another sample of 20 values from an unknown population has a mean of 43 inches and sum of squares of deviations from the mean is equal to 171 inches. Find the standard error of difference of population mean and find the 95% confidence limits for true difference of population mean. 6

8(a) Write the steps of test of significance of difference of mean of large sample test. 4

(b) A company claims that its light bulbs are superior to those of a competitor on the basis of a study which showed that a sample of 40 of its bulbs had an average lifetime of 628 hours of continuous use with a standard deviation of 27 hours. While a sample of 30 bulbs made by the competitor had an average life time of 619 hours of continuous use with a standard deviation of 25 hours. Test at 5% level of significance, whether this claim is justified. 6

9(a) Define the t-distribution. What are the basic assumptions about test of significance of single mean for small sample? 1+3

(b) Eleven students of B.E. were given a test in Statistics. They were given specially coaching and thereafter were given a second test. Marks obtained in the two tests are given below:

Students	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
I-Test	23	20	19	21	18	20	18	17	23	16	19
II-Test	24	19	22	18	20	22	20	20	23	20	18

Do the marks indicate the special coaching has benefited the students at 5% level of significance? 6

PURBANCHAL UNIVERSITY

2011

B. E. (Computer/Electronics & Comm.)/Sixth Semester/*Chance*

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG203HS: Probability & Statistics

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FOUR questions from Group A and THREE from Group B.

Group A: [4×(5+6)=44]

1(a) The expenditure of 1000 families is given as below

Expenditure	40-59	60-79	80-99	100-119	120-139
No. of Families	50	-	500	-	50

The median of the frequency distribution is Rs. 87. Calculate the missing frequencies.

(b) From the data given below state which series is more variable.

Variable	10-20	20-30	30-40	40-50	50-60	60-70
Score A	10	18	32	40	22	18
Score B	18	22	40	32	29	10

2(a) State and prove the Bayes's theorem of probability.

(b) There are three machines A, B and C producing 1000, 2000 and 3000 articles per hours respectively, these machines are known to be producing 1%, 2% and 3% defective respectively. One article is selected at random from an hour production of the there machines and found to be defective. What is the probability that the article is produced from

(i) machine A, (ii) machine B, (iii) machine C

3(a) Discuss Probability mass function and probability density function.

(b) A random variable X is distributed at random between the values 0 and 1 so that its pdf is

$$f(x) = k x^3 (4-x)^2$$

Where, k is a constant. Find the value of k, using this value of k find mean and variance of distribution.

Contd. ...

(2)

4(a) Discuss Mean, Variance, Covariance of the two dimensional random variable and coefficient of correlation in terms of expectation.

(b) Suppose that the random variable X and Y having the joint pdf

$$f(x, y) = \begin{cases} kx(x-y); 0 < x < 2, 0 < y < 2 \\ 0, \text{otherwise} \end{cases}$$

(i) Evaluate the value of k

(ii) Find the marginal probability of random variable X and Y

5(a) Discuss negative binomial and hyper geometric distribution with their properties.

(b) If 6 of 18 new building in a city violate the building code. What is the probability that a building inspector who randomly selects 4 of the new building, for inspection, will catch.

(i) None of the new building that violate the building code

(ii) 1 of the new building that violate the building code

(iii) 2 of the new building that violate the building code

6(a) Discuss the gamma and chi-square distribution with their properties.

(b) The life of 1000 constructed house are normally distributed with mean 120 years and standard deviation 25 years.

Find the no. of constructed house having the life

(i) more than 110 yrs. (ii) between 100 and 125 yrs.

Group B: [3×(6+6)=36]

7(a) Discuss the properties of a good estimator.

(b) The quality control manager of a tyre company has a sample of 100 tyres and has found the mean life time to be 30,214 KM. The population S.D. is 960 KM. Construct a 95% confidence interval for the mean life time for the particular brand of tyres.

8(a) Define the Type I error and Type II error in sampling. What are the steps for test of significance for difference of mean for large sample.

Contd. ...

(3)

(b) A machine produced 20 defective articles in a batch of 400. After overhauling, it produced 10 defectives in a batch of 300. Has the machine improved?

9(a) Define t-distribution. What are the assumptions made about t-distribution?

(b) The following are the Brinell hardness values obtained for samples of two magnesium alloys.

Alloy I	66.3	63.5	64.9	61.6	64.3	64.7	65.1	64.5	68.4	63.2
Alloy II	71.3	60.4	62.6	63.9	68.8	70.1	64.8	68.9	65.8	66.2

Use the 5% level of significance to test the hypothesis that mean hardness in the population are same.

10(a) What are the assumption of validity of test of goodness of fit. Also mention the steps of test of goodness of fit.

(b) Brick made in two kilns have been graded as facings (high quality), seconds (medium quality) and common (rather poor quality). The production of bricks in a particular period was as follows:

Klin	Facings '000	Seconds '000	Common '000
A	24	43	13
B	31	57	32

Test whether Klin and quality of bricks are independent or not at 10% level of significance.

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PURBANCHAL UNIVERSITY

2011

B. E. (Computer/Electronics & Comm.)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG203HS; Probability & Statistics

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FOUR questions from Group A and THREE from Group B.

Group A

1(a) An experiment shows the height of 51 plants given below.

Height (cm)	10	20	30	40	50	60
No. of plant	2	3	-	21	-	5

If average heights of all the 51 plants are 40 cm find the missing frequencies corresponding to the height 30 and 50 cm.

(b) A purchasing agent obtained samples of incandescent lamps from two suppliers. He had the samples tested in his own laboratory for length of life with the following results. 6

Length of life (hours)	700-900	900-1100	1100-1300	1300-1500
Sample from Company A	10	16	26	8
Sample from Company B	3	42	12	3

- (i) Which company's bulb gives a higher average life?
(ii) Which company's bulbs are more uniform?

2(a) State and prove Bayes's Theorem of probability. 5

(b) Ram and Shyam are asked to solve a problem, the probability of Ram solving it is $\frac{2}{3}$ and that of Shyam solving it is $\frac{3}{4}$. Find the probability that at least one of them will solve it? 6

3(a) Define mathematical expectation of a random variable. Show that mathematical expectation of a random variable is an arithmetic mean of a random variable. 5

(b) A random variable X has the following probability function. 6

X	0	1	2	3	4	5	6	7
P(x)	0	k	2k	2k	3k	k ²	2k ²	7k ² +k

Find: (i) value of k (ii) Find mean and variance of X

Contd. ...

(2)

4(a) Define Joint probability density function and marginal probability density function of continuous bi-variate distribution. 5

(b) Let x and y be two random variables and its joint pdf is given as: 6

$$f(x, y) = \begin{cases} c(2x + y); & 0 < x < 1, 0 < y < 2 \\ 0, & \text{otherwise} \end{cases}$$

(i) Find the value of c

(ii) Find marginal p. d. f of random variable x and y .

5(a) Find the mean and variance of Negative binomial distribution. 5

(b) If 2% of electric bulbs manufactured by a certain company are defective, find the probability that in a sample of 200 bulbs. 6

(a) Less than 2 bulbs are defective.

(b) At least two bulbs are defective.

6(a) Define standard normal distribution and give any six important properties of normal probability curve. 5

(b) In a normal distribution 7% of the items are under 35 & 89 % are under 63. Find the mean and the standard deviation of the distribution. 6

Group B

7(a) What are the properties of estimator? Explain them in brief. 6

(b) Random sample of 400 villagers and 900 municipal people were asked whether they would like certain TV program, 250 villagers and 540 municipal were in favour of the proposal. Set up the 95% and 99% confidence limits for the difference of proportion in whole country. 6

8(a) What are the steps for test of significance for difference of proportion. Also Define the type I error and Type II error in testing of hypothesis. 6

(b) The average hourly wage of a sample of 150 workers in Pokhara was Rs. 25.6 with a standard deviation of 10.8. The average hourly wage of a sample of 200 workers in Biratnagar was Rs. 28.7 with a standard deviation of Rs 12.8. Can an applicant safely assume that the hourly wage paid in Biratnagar is higher than those paid in Pokhara? 6

Contd. ...

(3)

9(a) What are the assumption about the test of difference of mean in small sample and write down the steps of test of significance difference between two mean in small sample. 6

(b) A machine put out 25 defective articles in sample of 600 articles. Another machine put 15 defective articles in a sample of 300 articles. Are the two machines significantly different in their performance? 6

10(a) What is contingency table? What are the steps of test of significance of independence of attributes? 6

(b) 1,072 students were classified according to their intelligence and economic conditions. Test whether there is any association between intelligence and economic condition. 6

Economic Condition	Intelligence			
	Excellent	Good	Poor	Dull
Good	48	199	181	82
Not good	81	185	190	106

PURBANCHAL UNIVERSITY

2017

E. (Computer)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

CG376CO: Multimedia Computing & Technology (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Necessary Tables are may be used.

Answer EIGHT questions.

Describe properties of multimedia system. Explain data stream characteristics for continuous media. 4+6

How is sound and audio generated? Explain various components of speech analysis. 5+5

Define characteristics of television system. Explain techniques of animation control mechanism. 4+6

Explain advantages and disadvantages of compression technique. Compare with application area of lossy, lossless and hybrid coding. 4+6

Define basic technology of optical storage media. Explain principle and area of CD-magneto optical. 4+6

Compare hypertext, hypermedia and multimedia. Explain document architecture SGML. 4+6

Explain importance and issue of synchronization. Define MM synchronization with four layer reference model. 4+6

Discuss relation between QoS and resources. Explain resource management architecture in multimedia communication architecture. 4+6

Write short notes on any TWO: 5+5

(a) Real-time schedule

(b) Toolkit and libraries

(c) Video -on demand and video conferencing



PURBANCHAL UNIVERSITY

2017

B.E. (Civil/Computer/Electronics & Comm.)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG395MS: Engineering Economics (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Explain Principles of engineering economics. 6

(b) A man aged 40 years now had borrowed Rs. 500,000 from a bank for his further studies at the age of 20 years. Interest was charged at 11% per year compounded quarterly. He wished to pay loan in semiannual equal installments with the first installment being 5 years after receiving the loan now. What did he pay in each installment? 10

2(a) Explain elements of costs and describe direct cost and indirect cost with suitable examples. 6

(b) Based on following information calculate: a. Variable overhead variance and b. fixed overhead Variance. 10

	Standards	Actual
Production (Units)	4,000	3,900
Working days	20	21
Fixed overhead (Rs)	40,000	39,000
Variable overhead	12,000	12,000

3(a) What do you mean by break even analysis? Explain with figure. 6

(b) An engineering firm is considering the following mutually exclusive projects.

EOY	Project A1	Project A2	Project A3	Project A4
0	-2500	-1200	-3600	-2000
1	1200	400	1700	800
2	1400	800	2000	700
3	1500	1000	1600	850

Which project should be selected based on IRR method assuming MARR=15% per year. 10

Contd. ...

(2)

4(a) Explain taxation system in Nepal. 4

(b) Following table shows the annual per capita consumption in Kg. of fish when the price in RS. Make Hypothesized regression equation and find out the consumption if the price is set as 145 Rs. Per kg. 12

S.N.	Price/Kg	Demand
1	125	68
2	110	75
3	114	58
4	102	72
5	150	55
6	120	65
7	135	62
8	175	50
9	128	62
10	135	64

5(a) Describe the value of money with suitable examples. 6

(b) Find IRR and ERR of the following project, MARR=15%. 10

Year	0	1	2	3	4	5
Cash flow (Rs.) in Lakh	-50	10	10	10	40	50

6(a) Suppose that there are two alternative electric motors that provide 100hp output. 12

Item	Alpha motor	Beta motor
Purchase cost (Rs.)	12500	16000
Efficiency	74%	92%
Maintenance (Rs.)	500 per year	250 per year
Life (Year)	10	10
Annual tax & insurance	1.5% of the investment	1.5% of the investment
MARR	15%	15%

(i) How many hours per year would the motors have to be operated at full load for the annual cost to be equal? Electricity cost= Rs. 0.05 per KW hour.

(ii) If annual operation hour is 600 hrs. Which motor should be selected?

(b) Write short notes any TWO: 2×2=4

(a) Methods of depreciation (b) Decision Tree

(c) Cash flow

≡

(4)

- (b) Suppose that there are two alternative electric motor that provide 100 HP output:

10

Item	Alpha Motor	Beta Motor
Purchase Cost	Rs. 1250000	Rs. 1600000
Efficiency	74%	92%
O & M Cost	Rs. 50000 per year	Rs. 25000 per year
Life	10 years	10 years
Annual tax and insurance	1.5% of the investment	1.5% of the investment
MARR	15%	15%

- (i) How many hours per year would the motors have to be operated at full load for the annual cost to be equal? Electricity cost = Rs. 5/kw.
- (ii) If annual operation hour is 600 hrs., which motor should be selected?

6. Write short notes on any FOUR:

4×4=16

- (a) VAT
 (b) Recaptured depreciation
 (c) Differed annuity
 (d) Decision Tree
 (e) Market Research

PURBANCHAL UNIVERSITY

2016

B.E. (Civil/Computer/E. & C.)/Sixth Semester / Final

Time: 03:00 hrs.

Full Marks: 80 / Pass Marks: 32

BEG395MS: Engineering Economics (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

5×16=80

- 1(a) Explain the principles of Engineering Economics. Explain the economic system of Nepal. 8

- (b) Find prime cost, overhead cost, non manufacturing costs, total cost and profit for the following: 8

Direct material	: Rs. 24,00,000
Direct labor	: Rs. 5,00,000
Depreciation for factory building	: Rs. 1500
Branch office expenses	: Rs. 40,000
Depreciation for office building	: Rs. 8,000
Depreciation of staff cars	: Rs. 12,000
Insurance:	
Staff cars	: Rs. 1500
Office building	: Rs. 1200
Factory building	: Rs. 1500
Delivery van maintenance and running expenses	: Rs. 1600
Salaries including sales manager and factory chief engineer	: Rs. 3,00,000
Salary of sales manager	: Rs. 25,000
Factory chief engineer	: Rs. 25,000
Finished goods warehouse expenses	: Rs. 20,000
Electricity (including Rs. 4000 for administrative office)	: Rs. 40,000
Advertisement	: Rs. 20,000
Sundry factory expenses	: Rs. 3,40,000
Sales promotion	: Rs. 5,000
Office administration expenses	: Rs. 50,000
Expenses for participating in industrial exhibition	: Rs. 10,000
Sales	: Rs. 42,00,000



- 2(a) A Construction Company is assigned to start up a new office in a city. Two lease options are available, each with a first cost, annual lease cost, and deposit-return estimates shown below:

	Location X	Location Y
First Cost (Rs.)	-150000	-190000
AOC (Rs.)	-35000	-32000
Deposit Return (Rs.)	10000	22000
Life (years)	6	9

Determine which lease option should be selected on the basis of a present worth comparison, if the MARR is 12% per year. 8

- (b) What do you mean by payback period? What are their significances and drawbacks? Find the payback periods of given cash flow: 4+4

Initial investment	: Rs. 25,000
Net annual revenue	: Rs. 8,000
Salvage value	: Rs. 5000
Useful life	: 5 years
MARR	: 12%

- 3(a) Three mutually exclusive alternative are currently under consideration. Their respective costs and benefits are included in the table below. Each of the projects has a useful life of 25 years, and the nominal interest rate is 18% per year. Use IRR to recommend best alternative. 10

	Initial Investment (Rs.)	Annual O&M Cost (Rs.)	Salvage Value (Rs.)	Annual Benefits (Rs.)
A	85000	7500	12500	21500
B	100000	7250	17500	22650
C	120000	7000	20000	25000

- (b) List out the drawbacks of IRR method? How can we eliminate some of these drawbacks? 6

- (c) Suppose that Rs. 100000 is deposited in Bank Account at the end of each quarter over the next twenty years. What is the future worth at the end of 20 years when the interest rate is 12% compound (i) quarterly, (ii) monthly, (iii) continuously. 6

Contd. ...

(3)

- (b) Find both type of B/C ratio using AW and FW formulation following project and determine whether the project is feasible or not?

Initial investment=	Rs. 500000
Annual revenue=	Rs. 80,000
Annual expenses=	Rs. 15,000
Salvage value=	Rs. 10,000
Useful life=	20 years
MARR=	10%

- (c) Consider the following accounting information for a system:

Cost basis, I,=	Rs. 10,000
Useful life, N,=	5 years
Estimated salvage value=	Rs. 778

Compute the annual depreciation allowances and the res book values using the double declining depreciation method

	Alternatives	
	A	B
Capital Investment (Rs.)	3500	5000
Annual Revenue (Rs.)	1900	2500
Annual Expenses (Rs.)	645	1020
Useful life (yrs)	5	5
Salvage value (Rs.)	0	0

- 5(a) What shall be the demand if price is set to be Rs.75/kg? linear regress model.

S.No.	Price (Rs./kg)	Demand (Kg)
1	62	280
2	68	310
3	78	350
4	89	370
5	85	360
6	53	250
7	71	320
8	66	290
9	67	300

Contd.

PURBANCHAL UNIVERSITY

2015

B.E. (Civil/Computer/E. & C.)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG395MS: Engineering Economics (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

5×16=80

1(a) What is engineering economics? Explain about different types of economic systems. 2+4

(b) An entrepreneur is planning to have personal savings totaling of Rs. 2,000,000 when he retires at age of 58. He is now 20 years old. If the annual interest rate is 6% in his saving account, what equal end of year amount must he save to accomplish his goal?

10

2(a) Discuss about job and process costing. 6

(b) The following table gives the data for the production of 100 badminton racquets:

Leather: 40m at Rs. 300/m

Gut: 400m at Rs. 60/m

Graphite: 150kg at Rs. 225/kg

Labour rate: Rs. 60/hr

Total annual direct labour: 300,000 hrs

Total annual factory overheads: Rs. 6000,000

Labour hours needed: 250 hrs.

Find out the manufacturing costs of each racquet. Also breakdown the costs into component of prime costs and overhead costs. 10

3(a) Define nominal and effective interest rates with an example. 6

Contd.

(2)

- (b) Evaluate the following project based on AW & FW assumptions, if MARR = 12%. 10

End of Year	Net Cash Flows (In Rs. 000's)
0	-300
1	-100
2	100
3	100
4	100
5	200
6	200

- 4(a) Find modified B/C ratio for the following project. Use PW formulation. Also test the feasibility. 5

Investment (Rs.)	= 1,00,000
Expected life (yrs)	= 5
Salvage value (Rs.)	= 10,000
Annual Benefit (Rs.)	= 80,000
Annual O & M costs (Rs.)	= 40,000
Interest Rate (%)	= 16

- (b) The following data have been established for two mutually exclusive investment alternatives A and B, associated with small engineering project for which revenue as well as expenses are involved. They have useful lives of 5 years respectively. If the expected period of the required service for A and B is only 4 years and MARR=10%, which alternative is more desirable using IRR method? 10

	Alternatives	
	A	B
Capital Investment (Rs.)	3500	5000
Annual Revenue (Rs.)	1900	2500
Annual Expenses (Rs.)	645	1020
Useful life (yrs)	5	5
Salvage value (Rs.)	0	0

(3)

- 5(a) Explain about VAT rules of Nepal.

- (b) Investigate the PW of the following project of a machine over a range of $\pm 20\%$ in (i) Capital investment (ii) Annual net cash flow (iii) Market value (iv) useful life

Initial investment, I = Rs. 11,500

Net Annual Revenue, A = Rs. 3000

Salvage value, S = Rs. 1000

Useful life, N = 6 yrs

MARR = 10%

Draw also the sensitivity diagram.

6. Write short notes on any FOUR:

- Factors affecting accuracy of forecasting
- Recaptured depreciation
- ERR
- Cash flow in Uniform gradient
- Cash flow diagram

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PURBANCHAL UNIVERSITY

2014 (New)

B.E. (Civil/Computer/Electronics & Comm.)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG395MS: Engineering Economics

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

- 1(a) Explain the principles of engineering economics. 6
- (b) Explain the nominal and effective interest rate with suitable examples. What will be the required quarterly payment to repay a loan of \$20,000 in 5 years, if the interest rate is 8% compounded continuously?
- 2(a) What is Inconsistent ranking problem in Rate of Return method and how it can be removed to compare mutually exclusive alternatives? Explain with example. 6
- (b) A company is planning to install new automated plastic molding press. Four different presses are available. The initial capital investment and annual expenses for these four mutually exclusive alternatives are as follows:

	Press		
	P1	P2	P3
Capital Investment (\$)	24000	30400	52000
Useful life (year)	5	5	5
Annual Expenses (\$)	31200	29128	22880

Assume each press has the same output capacity (120000 units per year) and has no market value at the end of its useful life; the selected analysis period is five years; and any additional capital invested is expected to earn at least 10% per year. Which press should be chosen if (a) 120000 non defective units per year are produced by each press and all units can be sold, and (b) each press will produces 120000 units per year but the estimated reject rate is 8.4% for P1, 0.3% for P2, 2.6% for P3, and 5.6% for P4 (all non defective units can be sold). The selling price is 50.375 per unit.

10

Contd

(2)

The City Ridge, has received designs for a new patient room wing to the municipal hospital from two architectural consultants. The three financial estimates are given as:

	Design A	Design B
Construction Cost, \$	1000000	1500000
Building maintenance cost, \$ per year	35000	55000
Savings in operations, \$ per year	200000	450000

The discount rate is 5%, and the life of the building is estimated as 30 years. Use conventional B/C ratio analysis to select design A or B. 8

- (b) The company has \$20000 to allocate next year to new projects. Any or all of the five projects in the table below may be accepted. Each project has an expected life of 9 years. Select the projects to invest if a minimum of 15% return is desired. 8

Project	Initial Investment (\$)	Annual NCF (\$)	Project Life (years)
A	10000	2870	9
B	15000	2930	9
C	8000	2680	9
D	6000	2540	9
E	21000	9500	9

- 4(a) Explain about the taxation system in Nepal. 4

- (b) A computerize machining center has been proposed for a small tool manufacturing company. If the new system, which costs \$125000, is installed, it will generate annual revenues of \$100000 and will require \$20000 in annual labor, \$12000 in annual material expenses, and another \$8000 in annual overhead (power and utility) expenses. The automation facility would be classified as a 7 year MACRS property. The company expects to phase out the facility at the end of 5 years, at which time it will be sold for \$50000. Find the year by year after tax net cash flow for the project at a 40% marginal tax rate based on the net income and determine the after tax net present worth of the project at the company's MARR of 15%. 12

- 5(a) Suppose Ram has \$50000 to invest in the financial market for

(3)

Option 1: Buy 1000 shares of ADC communication @ \$50 per share that will be held for one year. Since this is a new public offering (IPO) there is not much research information available on the stock. This will entail a brokerage fee of \$100. For this size of transaction (for either buying or selling stocks) for simplicity, assume that the stock is expected to provide return at three different levels: high level (A) with a 50% return (\$25000), medium level (B) with a 9% return (\$4500), or low level (C) with a 30% loss (-\$15000), and that the probabilities of these occurrences are assessed at 0.25, 0.40, and 0.35, respectively. There is not anticipated any stock dividend for such a growth oriented company.

Option 2: Purchase a \$50000 bond, which pays interest at an effective annual rate of 7.5% (\$3750). The interest earned by the Treasury bond is non-taxable income. However, there is a \$150 transaction fee for either company.

Ram's question is which alternative to choose to maximize financial gain. At this point, Ram is not concerned about seeking some professional advice on the stock before making a decision. We will assume that any capital gains will be taxed at 20% on any long term gains. Ram's MARR is known to be 5% after tax. Determine the pay off amount at the end of each branch up.

- (b) Write short note on Market Research Techniques and Sales Forecasting.
- 6(a) Your firm has purchased an injection molding machine at a cost of \$100,000. The machine's useful life is estimated at 8 years. Your accounting department has estimated the capital cost of this machine at about \$25,455 per year. If your firm's MARR is 20%, how much salvage value do you think the accounting department assumed at the end of 8 years.
- (b) Write short notes on any THREE:
- Break-even Analysis
 - Opportunity Cost and Sunk Cost
 - Factors affecting Accuracy of Forecasting
 - Recaptured Depreciation

PURBANCHAL UNIVERSITY

2011

B.E. (Computer/Electronics & Comm.)/Sixth Semester/Chance

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG495MS: Engineering Economics

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) What are principles of Engineering Economy? Explain. 4

(b) The information given below shows the records of a manufacturing company comparing the actual data with the data from the standard cost card.

	Standard	Actual
Production (units)	9300	10500
Direct Material (kg)	74400	78750
Direct Material Cost (Rs.)	1860000	1811250
Direct Labor (Hrs.)	102300	136500
Direct Labor Cost (Rs.)	9718500	1337700
Fixed Overhead (Rs.)	21483000	28392000
Variable Overhead (Rs.)	15345000	17199000

Calculate:

(i) Total material cost variance,

(ii) Total labor cost variance,

(iii) Fixed overhead variance and

(iv) Variable overheads variance.

Indicate the separate components of each variable. Also indicate favorable and adverse.

12

Contd. ...

(a) The flows of the cash are given below:

End of year	Cash flows (Rs)
1	-8000
2	-7000
3	-6000
4	-5000

Calculate the present equivalent, $i = 15\%$ per year

(b) Derive

$$F = \left[\frac{(1+i)^n - 1}{i} \right] A$$

Where, symbols have their usual meanings.

- (a) What do you mean by time value of money? Describe with suitable examples.
- (b) Find the ERR from the following project. The external re-investment rate is 12%. Decide the feasibility of project of MARR=12%.

Initial investment (Rs.)	50,00,000
Annual Revenue (Rs.)	60,000
Annual expenses (Rs.)	10200
Salvage Value (Rs.)	50000
Useful life (Yrs.)	25

It is expected that there is a periodic maintenance expenses of Rs. 3 lakhs in 10th year and RS.7 lakhs in 18th year.

- Define the both types of B / C ratio for PW method.
- Find the both types of B / C ratio using AW formulation of the following project and find whether the project is feasible or not:

Initial investment (Rs.)	500,000
Annual Revenue (Rs.)	80,000
Annual O & M cost (Rs.)	15,000
Salvage Value (Rs.)	10,000
Useful life (Yrs.)	20
MARR	10%

Contd. ...

(c) Summarize the basic steps involved in incremental analysis procedure.

- 5 (a) What do you understand by Break even Analysis? Explain.
- (b) Consider the two alternatives with projected cash flow.

	Alternative 1	Alternative 2
Capital Investment (Rs)	-4500	-6000
Useful life	4 Years	8 Years
Annual Revenue (Rs)	1,600	1,800
Annual Expenses (Rs)	-400	-500
Salvage Value (Rs)	800	1,200

Which alternative would you select if the study period is 8 years. The MARR of the company is 15%/year. Use any method.

- 6(a) Perform sensitivity analysis by Investigating its PW over a range of $\pm 20\%$ changes in the estimates for
- Investment
 - Annual net cash flow
 - Market value
 - Useful life

Initial investment (Rs.)	200000
Annual revenue (Rs.)	50000
Annual expenses (Rs.)	5000
Salvage Value (Rs.)	25000
Useful life years	10

MARR 12% per year

Draw also the sensitivity graph.

- (b) What are the taxation laws in Nepal? Explain.
7. Write short notes on any FOUR:
- (a) Payback Period method
 - (c) Depreciation
 - (e) Demand Analysis by Market research

(b) Decision Tree
(d) Vat

PURBANCHAL UNIVERSITY

2010

B.E. (Computer/Electronics & Comm.)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 / Pass Marks: 32

BEG495MS: Engineering Economics

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Mr. Ramesh wants have Rs. 10,00,000 for the studies of his daughter after the period of 15 years, how much rupees does he has to deposit each year for 15 continuous years in saving account that earns 8% interest annually. 6

(b) Following information has been obtained form the records of manufacturing company using standard cost system. 10

	Standard	Actual
Production (units)	11,000	8,000
Direct Material (kg.)	55,000	61,250
Direct material cost (Rs.)	1,350,000	1,450,250
Direct Labor (Hrs.)	100,500	68,250
Direct Labor cost (Hrs.)	12,750,000	8,525,000
Fixed Overhead (Rs.)	12,700,000	8,875,125
Variable Overhead (Rs.)	8,300,000	5,790,250

Calculate: (i) Total material cost variance (ii) Total wage variance,

(iii) Fixed overhead variance

(iv) Variable overheads variance.

Indicate adverse and favorable condition

2(a) What do you mean by IRR? Find IRR for the following project. 8

End of Year	Net Cash Flow (Rs.)
0	-450,000
1	-42,000
2	+92,800
3	+386,000
4	+614,000
5	-202,700

Contd. ...

b) Solve the above problem by ERR method. Take external rate of re-investment equal to 12%. Why are the two results slightly different?

3(a) Define break even point. Discuss on the use of break even analysis in engineering studies. 6

(b) Find both types of B/C ratio for the following projects. 10

Initial investment = Rs. 250,000

Annual Revenue = Rs. 80,000

Annual O and M cost = Rs. 15,000

Salvage Value Rs. 25,000

Life = 20 yrs

MARR = 12%

Project	A	B
Initial Investment (Rs)	4,00,000	700,000
Annual Revenues (Rs)	1,30,000	1,70,000
Annual Cost (Rs)	25,000	35,000
Salvage value (Rs)	75,000	100,000
Useful life (yrs)	8	12
MARR (%)	12%	12%

Table 4(b)

4(a) Define mutually exclusive, independent and contingent project. 6

(b) Using future worth formulation recommends which one is best out of following two projects. Assume repeatability method. [See table 4(b)]. 10

5. Define risk, certainty and uncertainty. Also, perform sensitivity of the following project over the range of $\pm 30\%$ in (a) initial investment (b) Net annual revenue and (c) Useful life. Use PW formulation. Draw sensitivity graph and mention the most sensitive parameter. 16

Project	A
Initial Investment (Rs)	450,000
Annual Revenues (Rs)	140,000
Annual Cost (Rs)	25,000
Salvage value (Rs)	75,000
Useful life	8
MARR (%)	12%

Contd. ...

(3)

6(a) Consider the following mutually exclusive investment which project would you select based on ERR investment assuming that MARR is 10% per year.

Project	ALTERNATIVES		
	A	B	C
Capital investment (Rs.)	900	1500	2500
Annual revenues (Rs.)	150	270	400

The useful life of each alternative is 10 years. Rupees thousands.

(b) What is VAT? Discuss the taxation system in Nepal

7. Write the short notes on any FOUR:

(a) Demand analysis

(b) Decision tree analysis

(c) Economic system

(d) Classification of cost

(e) Job costing and process costing

PURBANCHAL UNIVERSITY

2018

B.E. (Computer)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG375CO: Computer Network (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer EIGHT questions.

- 1(a) Mention the important benefits of computer networks. 5
(b) Briefly explain each layer of OSI model. 5
- 2(a) Briefly explain with suitable example of CSMA/CD protocol. 5
(b) Explain RAID in detail. 5
- 3(a) What are the three major classes of guided media? Briefly explain them. 5
(b) Describe and distinguish between FDMA and TDMA. 5
- 4(a) What is an Ethernet address? Explain IEEE802.3 and the Ethernet. 1+4
(b) What are the drawbacks in 802.3 which are overcome in 802.4? 5
- 5 Explain leaky-bucket and token bucket algorithms. 5+5
- 6(a) Briefly explain TCP/IP protocol architecture. 5
(b) Differentiate between IPv4 and IPv6. 5
7. What is non-adaptive routing algorithm? Explain various types of adaptive routing algorithms? 2+8
- 8(a) What is protocol? Classify IP address on the basis of classes and version. 5
(b) What is ICMP protocol? Explain types of error generated by ICMP. 1+4.
9. Write short note on any TWO. 2×5=10
(a) Domain model (b) Bridge (c) Aloha

PURBANCHAL UNIVERSITY

2017

B. E. (Computer)/Sixth Semester/Final

Time: 01:30 hrs.

Full Marks: 40 /Pass Marks: 16

BEG391MS: Project and Organization Management (New Course)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×8=16

- Define project. Describe the four main phases of the project life cycle.
- Draw a CPM network for the project activities shown below. Calculate EST, EFT, LST, LFT, FF, TF, IF, Int F and the critical path of the project.

Activity	A	B	C	D	E	F	G	H	I	J	K
Duration (Days)	12	14	6	10	6	6	7	7	10	6	15
Predecessor	-	-	A	A	B	B	E	C,G	C,G	F,H	D,I,J

- "Management is the art of getting things done through people or others." Are you agree with this statement? Explain.

Group B

Answer SIX questions.

6×4=24

- Define organization and list out its types.
- What do you mean by project environment? Explain its components.
- Differentiate between CPM and PERT.
- What are the primary uses of job analysis?
- Explain project Management Information System (PIMS).
- Explain dual factor theory of motivation.
- Explain the trade union movement in Nepal.
- Describe the importance of HRM

PURBANCHAL UNIVERSITY

2017

B. E. (Computer)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG375CO: Computer Network (New Course)

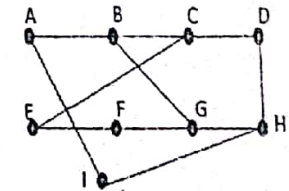
Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer EIGHT questions.

- Define computer network. Discuss any four application of computer network. 5
 - What is network topology? Explain different types of network topology. 5
- What is transmission media? What are different types of media? Explain. 5
 - Describe how CSMA/CD works. 5
- What is Multiplexing? Describe time division and frequency division multiplexing techniques. 5
 - What do you mean by packet switching? 5
- A bit word 1011 is to be transmitted. Construct the even parity seven-bit Hamming code for this data. 5
 - Explain go back N sliding window protocol. 5
- Explain link state routing algorithm. 5
 - For the given network construct a new routing table for node I using distance vector routing algorithm on the basis of given information. 5

From\To	A	B	C	D	E	F	G	H	I	
A	0	10	24	38	12	24	16	19	9	IA Delay = 8
H	20	31	19	8	30	19	6	0	7	IH delay = 12



- What do you mean by congestion in network? How congestion occurs in network?

(2)

(b) Differentiate between Leaky bucket and Token bucket algorithm. 5

7(a) Give the overview of TCP/IP. How it differs from OSI reference architecture? 5

(b) Draw a packet format for UDP. Describe each field in brief. 5

8(a) A company is granted a site address 201.70.64.0. The company needs six subnets. Design the subnets. 5

(b) What is firewall? Describe the basic components of firewall. 5

9. Write short note on any TWO. 2×5=10

(a) Connection oriented and connection less service

(b) FDDI

(c) OSI reference architecture.

(d) Router and Bridge



PURBANCHAL UNIVERSITY

2014 (New)

B.E. (Computer)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG375CO: Computer Network

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer EIGHT questions.

- 1(a) What do you understand by Computer Network? Write down the various network topologies and explain any one of them. 5
- (b) Explain OSI reference model. 5
- 2(a) Explain in brief NIC, Switches, Routers. 6
- (b) Explain in brief CSMA/CD, IEEE 802.3. 4
- 3(a) Explain PCM briefly. 3
- (b) What are different encoding schemes? Explain details. 7
- 4(a) Explain Go-Back N-ARQ and Selective-Repeat ARQ with figure. 6
- (b) What is routing? Explain briefly flooding. 4
- 5(a) Describe link state routing with algorithm and example. 6
- (b) What are adaptive and non-adaptive algorithms? 4
- 6(a) What is error detection technique? Explain CRC with the help of example. 5
- (b) List the performance comparison between IEEE 802.4 and IEEE 802.5. 5
- 7(a) What is firewall? Explain its techniques and types. 5
- (b) What is Icmp? Explain different types of error generated by Icmp. 5
- 8(a) What is congestion? List the comparison between Leaky Bucket and Token Bucket algorithm. 5

Contd. ...

(2)

- (b) What is IP address and subnet mask? What are the functions of subnetting? Give example of subnetting. 5
- 9(a) What are different Guided or Wired transmission medium. Explain any two of them in detail. 6
- (b) Differences between Circuit Switching and Packet Switching. 4
10. Write short notes on: 5×2=10
- (a) Aloha
- (b) Http
- (c) ARP, RARP
- (d) Port address and MAC address
- (e) Digital Signature

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PURBANCHAL UNIVERSITY

2016

B.E. Computer / Sixth Semester / Final

Time: 03-00 hrs.

Course: BCCN Computer Network (New Course)

Full Marks: 80 / Pass Marks: 32

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer **EIGHT** questions.

- 1(a) Differentiate between OSI reference model and TCP/IP model. 4
- (b) Differentiate between TCP and UDP protocol. 1+3
- 2(a) Briefly explain about hub, switch and router in terms of collision domain and broadcast domain. 1+4
- (b) Explain with suitable example about multicast, unicast and broadcast addressing. 5
- 3(a) Explain briefly about different kinds of transmission media used in computer networks. 4
- (b) Describe and distinguish between FDMA and TDMA. 2+4
- 4(a) Briefly explain about IEEE 802.4 frame format. 2+2
- (b) Give out different types of error detection and correction techniques. How Hamming code is different from CRC? 2+2+2
- 5(a) Explain leaky bucket algorithm and compare it with token bucket algorithm. 4
- (b) What are the routing algorithms? Briefly explain about distance vector and link state routing algorithms with suitable example. 2+4
- 6(a) Briefly explain application layer protocols HTTP, SMTP, POP and IMAP. 10

Contd. ...

(2)

- 7(a) What is sub-netting? Why is it so important in IP addressing? Briefly explain different types of classes of IP addresses with their network and host addresses. 1+2+4
- (b) What is the importance of IPv6 over IPv4? 3
- 8(a) Discuss jitter control. 4
- (b) Discuss importance of gateways and bridges. 6
9. Write short note on any TWO. 3+5
- (a) Symmetric cryptography (DES, AES)
- (b) ICMP
- (c) Substitution Cipher

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PURANCHAL UNIVERSITY

2016

B. B. (Computer) / Sixth Semester / Final

Time: 01:30 hrs.

Full Marks: 40 / Pass Marks: 16

REG391MS: Project and Organization Management (New Course)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×8=16

1. Define project. What do you mean by project environment? Describe three main project environments.
2. Draw a CPM network for the project activities shown below. Calculate EST, EFT, LST, LFT, FF, TF, IF, Int F and the critical path of the project.

Activity	A	B	C	D	E	F	G	H	I
Immediate Predecessor	-	-	-	A	A	B,D	C	G	F,G
Duration	6	8	9	10	13	11	10	10	10

3. "Management is the art of getting things done through people." Do you agree with this statement? Explain functions and skills of management.

Group B

Answer SIX questions.

6×4=24

4. Define organization and list out its types.
5. Explain the different levels of management.
6. What do you mean by project control cycle? Explain with figure.
7. What are the primary uses of job description?
8. Discuss about management by objectives. Why is it important for middle level management?
9. Explain goal setting theory of motivation.
10. Explain the trade union movement in Nepal.
11. Describe the Project Information Management System.

PURBANCHAL UNIVERSITY

2016

B.E. (Electronics & Communication)/Seventh Semester/Chance
 Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16
 BEG-491MS: Project & Organization Management (New Course)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks. Each question carries equal marks.

Group A

Answer TWO questions.

2x8= 16

1. Define project. Describe the important characteristics of a project.
2. Draw a CPM network for the project activities shown below. Calculate EST, EFT, LST, LFT, FF, TF, and the critical path of the project.

Activity	Duration (Days)	Earliest Start (ES)	Earliest Finish (EF)	Latest Start (LS)	Latest Finish (LF)	Total Float (TF)	Free Float (FF)
A	3	0	3	0	3	0	0
B	5	0	5	0	5	0	0
C	4	0	4	0	4	0	0
D	5	3	8	3	8	0	0
E	5	5	10	5	10	0	0
F	6	4	10	4	10	0	0
G	4	8	12	8	12	0	0
H	2	10	12	10	12	0	0
I	5	12	17	12	17	0	0

3. "Employees are the most important asset of the organization. Do you agree with this statement? If yes, explain from the point of view of the personnel management. List down the key activities of the personnel management.

Contd. ...

PURBANCHAL UNIVERSITY

2015

B.E. (Electronics & Communication)/Seventh Semester/Chance
 Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16
 BEG-491MS: Project & Organization Management (New Course)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks. Each question carries equal marks.

Group A

Answer ALL questions.

3x8= 24

1. Define project life cycle. Explain the steps involved in project life cycle. 8
2. Describe project environment. Explain social economical and environmental impact on project. 6
3. Draw Network diagram. Find Critical path/Critical activities. Minimum completion time of the Project and ES, EF, LS, LF, TF, FF and IF. 10

Activities	Predecessors	Time (Days)
A	None	3
B	None	5
C	None	4
D	A	5
E	B	5
F	B,C	6
G	B,D	4
H	E,F	2
I	G,H	5

Group B

Answer ALL questions.

4x4= 16

4. Describe Health, safety and compensation in brief. 4
5. Explain Leadership. Describe Leadership Styles and ... of Leadership. Are leaders born or made? 4

(2)

Describe Maslow's Need hierarchy Theory of Motivation and write differences between Maslow's hierarchy theory and Herzberg theory of motivation. 4

4+4

Write short notes on any TWO:

(a) MBO

(b) Time management

(c) Project Control Cycle

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(2)

Group B

Answer SIX questions.

4. Define organization and list out its types.
5. Explain the various levels of management along with their
6. Differentiate between CPM and PERT.
7. Discuss about the (WBS) work breakdown structure.
8. Explain Maslow's Needs-Hierarchy theory of motivation.
9. Explain the trade union movement in Nepal.
10. What do you mean by industrial relation? Explain.

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PURBANCHAL UNIVERSITY

2015

B.E. (Electronics & Communication) / Seventh Semester / Final

Full Marks: 40 / Pass Marks: 16

Time: 01:30 hrs.

BEG491MS: Project & Organization Management (New Course)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks. Each question carries equal marks.

Group A

2×8= 16

Answer TWO questions.

1. Define Project and discuss Project life Cycle in detail.

2. Define job Analysis and discuss its benefits.

3. Draw the network diagram of the project from the provided information of the project given in the table below:

(a) Compute Earliest Start Time (EST), Latest Start Time (LST), Earliest Finish Time (EFT), Latest Finish Time (LFT), Total Float (F_T), Free Float (F_F), Independent Float (F_I).

(b) Determine the Critical Path of the project. Note: Schedule Completion Time is 55 days.

Activity	A	B	C	D	E	F	G	H	I	J	K
Duration (Days)	12	14	6	10	6	7	7	10	6	15	
Predecessor	-	-	A	A	B	B	E	C, G	C, G	F, H	D, I, J

Group B

6×4= 24

Answer SIX questions.

1. Discuss the function and role of management in brief.

2. Discuss the characteristics of a successful project manager.

3. Differentiate between CPM & PERT.

4. List out the types of organization and discuss them in brief.

5. What are the drawbacks of Management by Objectives approach? What are its remedial measures?

6. Discuss leadership styles. Explain how a manager is different from a leader.

7. What is trade union? Discuss trade union movement in Nepal?

8. Describe Maslow's Need Hierarchy Theory of motivation.



PURBANCHAL UNIVERSITY

2016

B.E. (Electronics & Communication) / Seventh Semester / Final

Full Marks: 40 / Pass Marks: 16

Time: 01:30 hrs.

BEG491MS: Project & Organization Management (New Course)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks. Each question carries equal marks.

Group A

2×8= 16

Answer TWO questions.

1. Define Project. Describe the various phases and characteristics of the project management.

2. Draw a CPM network for the project activities shown below. Calculate EST, EFT, LST, LFT, FF, TF critical path and the shortest path of the project.

Activity	A	B	C	D	E	F	G	H	I
Immediate Predecessor	-	-	-	A	A	B, D	C	C	F, G
Duration	6	8	9	10	13	11	10	10	10

3. What do you mean by Project Environment? Explain the different types of project environment:

Group B

6×4= 24

Answer SIX questions.

4. Define the organization and mention its types.

5. Explain the different levels of management.

6. Differentiate between CPM & PERT.

7. What are the components of job analysis? Explain.

8. Explain the concept of industrial relation.

9. Explain the Maslow's Need Hierarchy Theory of motivation.

10. Describe in brief history of trade union movement in Nepal.

11. Describe the important functions of HRM.



PURBANCHAL UNIVERSITY

2012

B.E. (Civil/Computer/Electronics & Comm.)/Seventh Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32 .

BEG494MS: Project Management

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1. Define project. Describe the major features of engineering project in Nepalese prospective.
2. What are CPM and PERT? How do they differ from each other? Explain in briefly.
3. What is work breakdown structure? What are the needs for using work breakdown structure?
4. What are manpower leveling and materials scheduling in limited resources? Describe with examples.
5. Identify and explain the characteristics of social impact analysis.
6. Write short notes on any FOUR:
 - (a) Fixed and flexible Budget
 - (b) Feedback control system
 - (c) Project goals
 - (d) Matrices
 - (e) EIA



PURBANCHAL UNIVERSITY

2014 (New)

B. E. (Computer)/Sixth Semester/Final

Time: 01:30 hrs.

Full Marks: 40 /Pass Marks: 16

BEG391MS: Project and Organization Management

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Group A

Answer TWO questions.

2×8=16

1. Define Project and discuss Project life cycle.
2. Draw the network diagram and compute EST, EFT, LST, LFT, TF, FF, IF and Interfering Floats for each activities of the project having precedence relationship as shown below. Also find out the critical path:

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Duration	10	9	7	9	8	5	11	6	9	12	10	8
Predecessor	-	-	A	A	B	B	D,E	C,G	H	G	G,F	K

3. Do you think that management plays a significant role also in any technology based organization? Justify your answer.

Group B

6×4=24

Answer SIX questions.

4. What do you mean by business organization? Explain.
5. Discuss disadvantages of GANTT CHART.
6. Describe Project Environment in brief.
7. Describe Maslow's motivation theory.
8. Why a job description is important to any organization?
9. How do democratic leaders differ from autocratic leaders?
10. What is the role of Trade Union?
11. Describe the functions of management in brief.



PURBANCHAL UNIVERSITY

2014 (New)

B. E. (Computer)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG376CO: Multimedia and Computing and Technology

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Necessary Tables are may be used.

Answer FIVE questions.

- 1(a) Define Multimedia and Medium. Explain the Classification of media with respect to different criteria [ISO93a]. 1+1+6
- (b) What is Sequencer and what is its use. Explain Speech Recognition System with its technique. 1+7
- 2(a) What do you understand by binary-valued image? Explain image synthesis, image analysis and image transmission. 2+6
- (b) Relate video and animation with main difference. Explain computer based animation basic concept with different stages. List and explain methods of controlling animation. 8
- 3(a) Compare source encoding and entropy encoding. Describe the JPEG image compression process. 2+6
- (b) Explain with neat and clean diagram the steps of data compression. Describe basic technology of optical storage media. 2+6
- 4(a) Describe document architecture and its element. What do you understand by multimedia operating system? List the features of real time systems. 8
- (b) Describe Earliest deadline first Algorithm in Detail. 8
- 5(a) Define interprocess communication. Describe session management with its Architecture. 2+6

Contd. ...

(2)

- (b) Explain the application of multimedia in different sectors.
6. Write short notes on any FOUR: 4+4
- (a) Abstraction Levels
- (b) MHEG
- (c) Color encoding techniques
- (d) MIDI Message
- (e) Video Conferencing

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PURBANCHAL UNIVERSITY

2018

B.E. (Computer)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG377CO: Theory of Computation (New Course)

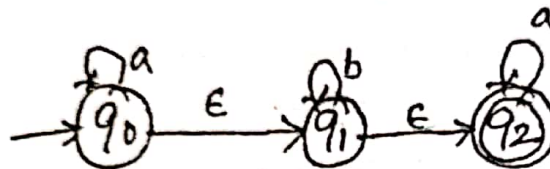
Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

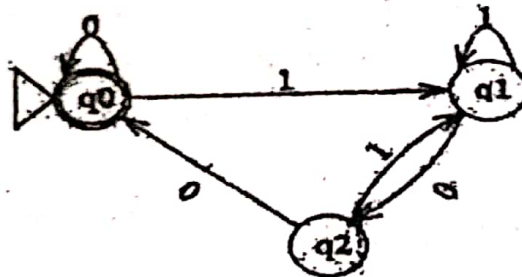
Answer EIGHT questions.

1(a) Define finite automata. Discuss its significance. 4

(b) Convert the following NFA to DFA: 6



2. State Arden's theorem. Use this theorem to find the equivalent RE of the following DFA. 3+7



3(a) Design a DFA that accepts language $L(M) = \{W:WE\{a,b,\}^* \text{ and } W \text{ does not contain even numbers of } a\text{'s and } b\text{'s.}$ 6

(b) Prove that for each NFA, there is an equivalent DFA. 4

4(a) Using the pumping lemma for regular sets prove that the language $L = \{ww / w \in \{a,b,\}^*\}$ is a palindrome is not regular. 4

(b) Show that regular languages are closed under union and intersection. 6

5(a) When will the derivation tree be ambiguous? Explain its solution. 4

(b) Convert the following grammar into CNF: 6

$S \rightarrow aA/bB$

$A \rightarrow aAA/bs/b$

$B \rightarrow bBB/as/a$

Contd. ...

(2)

- 6(a) Design a Turing machine that accepts the language of all the strings of even length. 5
- (b) Design a PDA for the given language $L = \{WCWR^R : W \in \{a, b\}^*\}$. 5
- 7(a) Differentiate between recursive and recursively enumerable languages. 5
- (b) What do you mean by instantaneous description of a TM? 5
- 8(a) Differentiate between DPDA and NPDA with an example. 4
- (b) Show that $L = \{a^n b^n c^n \mid n \geq 0\}$ is not context free. 6
9. Write short notes on any TWO: 5+5
- (a) Computational Complexity
 - (b) Church Turing Thesis
 - (c) NP Complete Problems.

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PURBANCHAL UNIVERSITY

2017

B.E. (Computer)/Sixth Semester/*Final*

Time: 03:00 hrs.

Full Marks: 80 / Pass Marks: 32

BEG377CO: Theory of Computation (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer EIGHT questions.

- 1(a) Explain induction principle with suitable example. 4
(b) Define DFA. Design a DFA that accepts the language $L = \{x \in \{0,1\}^* : 0110 \text{ occurs as a substring in } x\}$. 6
- 2(a) Define PDA. Construct a Push Down Automata (PDA) that accepts the language $L = \{a^n b^{2n} \mid n > 0\}$. 5
(b) "Regular languages are closed under union, concatenation and kleene star operation". Discuss. 4
- 3(a) State Pumping lemma for regular languages. Use pumping lemma to prove that $L = \{a^n b^{2n} : n \geq 1\}$ is not regular. 5
(b) Define Context Free Grammar (CFG) with proper example. 5
Explain the significance of Context Free Grammar (CFG) in Theory of Computation. 5
4. Define Turing Machine Formally. Design a Turing machine which accepts the set of all palindromes over alphabets $\{0, 1\}$. 3+7
5. Describe CNF. For a CFG given by $G = (V, \Sigma, R, S)$ with $V = \{S\}$, $\Sigma = \{a\}$ and production rule P is defined as: 4+6
 $S \rightarrow SS,$
 $S \rightarrow a,$ obtain the language generated by $L(G)$.
- 6(a) What are the various steps involved in converting a NFA into DFA? Explain with the help of suitable example. 7
(b) Differentiate Recursive and Recursively enumerable language. 3
- 7(a) Describe P and NP problems with suitable example. 5
(b) Explain pumping lemma for context free languages with an example. 5

Contd. ...

(2)

- 8(a) What are undecidable problems? In what sense are they different from intractable problems? 3+3
- (b) Describe Church Turing Thesis. 4
9. Write short notes on any TWO: 5+5
- (a) Universal Turing Machine
 - (b) Halting Problem
 - (c) GNF

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PURBANCHAL UNIVERSITY

2018

B.E. (Computer) / Sixth Semester / Final

Time: 03:00 hrs.

Full Marks: 80 / Pass Marks: 32

200377CO: Theory of Computation (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer EIGHT questions.

- (a) Discuss the importance of finite automata in the field of computer science. 4
- (b) Design a DFA to accept the language that contain substring 0111 over the alphabet {0, 1}. 6
- (c) Convert the following Non deterministic finite automation (NDFA) in DFA. 6



- (d) Find the regular expression for the following languages over the alphabet {0, 1}: 2+2
 - (i) with four consecutive zeros
 - (ii) ending with 01
- (e) Describe pumping lemma for regular languages. Prove that the language, $L = \{0^n 1^n \mid n \geq 1\}$ is not regular language. 5+5
- (f) Let G be the grammar having the following productions:

$$S \rightarrow 0B \mid 1A, A \rightarrow 0 \mid 1AA, B \rightarrow 1 \mid 1S \mid 0BB$$
 For the string 00110101, find: (i) the leftmost derivation, (ii) the rightmost derivation. 3+2
- (g) Reduce the given grammar to Chomsky Normal form. 5

$$S \rightarrow bA \mid aB$$

$$A \rightarrow bAA \mid aS \mid a$$

$$B \rightarrow aBB \mid bS \mid b$$

Contd. ...

4(a) Find a grammar equivalent to

$$S \rightarrow AB|CA$$

$$A \rightarrow A$$

$$B \rightarrow BC|AB$$

$$C \rightarrow aA|b$$

with no useless symbols.

(b) What are intractable problems? Discuss.

6(a) What is push down automaton (PDA)?

(b) Design a PDA accepting the language

$$L = \{a^n b^n | n \geq 1\} \text{ by final state.}$$

7. What is Turing machine? Describe its working principle. Design a Turing machine that accepts the language:

$$\{a^n b^n | n \geq 1\}$$

8. Explain pumping lemma for context free language. Discuss how it is used to prove that a language is not context free using a suitable example.

9(a) Discuss about the Universal Turing machine.

(b) Discuss about time complexity with the help of a suitable example.

10. Write short notes on:

(a) Properties of recursive and recursively enumerable language

(b) Closure properties of context free language

PURBANCHAL UNIVERSITY

2014 (New)

B. E. (Computer)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

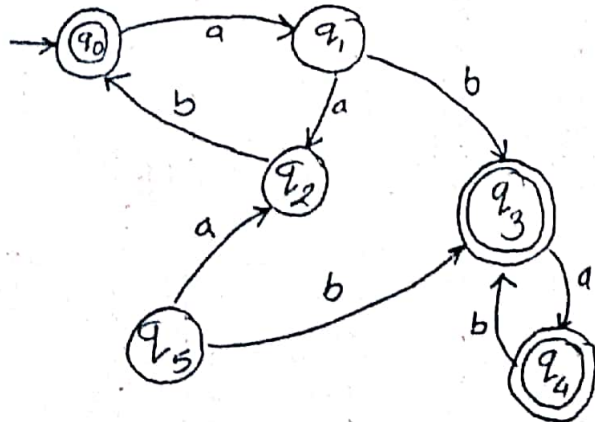
BEG377CO: Theory of Computation

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Necessary Tables are may be used.

Answer TEN questions.

1. Explain the principle of mathematical induction with a suitable example. Discuss any four set operations along with example. 4+4
2. Give the formal definition of DFA, NFA, and NFA with ϵ transitions. Design a DFA to accept the language $L = \{(ab)^i b^{2j} \mid i \geq 1, j \geq 1\}$. 3+5
3. Show that the classes of regular sets are closed under concatenation, union, difference, and complementation. 2+2+2+2
4. Minimize the given DFA by removing dead states and inaccessible states. 8



Contd. ...

(3)

5. Give the formal definition of Context Free Grammar. Simplify the following CFG by removing the unit productions and null productions: 2+3+3

(i) $S \rightarrow ABAC$	(ii) $S \rightarrow aA$
$A \rightarrow aA \mid a$	$A \rightarrow b \mid \epsilon$
$B \rightarrow bB \mid a$	
$C \rightarrow c$	
6. Discuss the moves of a Pushdown Automata (PDA). Design a PDA which accepts the given language $L = \{wcw^R \mid w \in \{a,b\}^*\}$. Test whether the PDA you developed accepts the string $w = aabcbaa$. 3+5
7. State and prove the pumping lemma for Context Free Languages. 8
8. Give the formal definition of a Turing machine. Design a Turing machine that accepts the language of all the strings of even length. 3+5
9. Differentiate between recursive and recursively enumerable languages. What do you mean by instantaneous description of a TM? 3+5
10. What do you mean by class P, class NP and NP hard? Discuss the Church's thesis. 5+3
11. Write short notes on any TWO: 5+5
 - (a) Computational Complexity
 - (b) Homomorphism
 - (c) Intractable Problem

(4)

- 10(a) What are the conditions of validity of chi square test of goodness of fit? What are the applications of chi square distribution? 2+2
- (b) The following is the distribution of the daily number of power failures reported in a Kathmandu valley on 300 days:

Number of power failure	No. of days
0	9
1	43
2	64
3	62
4	42
5	36
6	22
7	14
8	6
9	2

Test at the 0.05 level of significance whether the daily number of power failures in Kathmandu valley is a random variable having Poisson distribution with parameter $\lambda=3.2$. 6



PURBANCHAL UNIVERSITY

2018

B. E. (Computer)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG376CO: Multimedia Computing & Technology (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Necessary Tables are may be used.

Answer EIGHT questions.

- 1(a) Define multimedia system. What are the characteristics of multimedia system. 2+3
- (b) Explain different modes of data transmission in brief. 5
- 2(a) Explain MIDI hardware and list MIDI software along with brief description. 5+2
- (b) What are the techniques for speech transmission? 3
- 3(a) Explain the framework of interactive graphics system. 5
- (b) Explain different types of image format used in image representation. 5
- 4(a) Define computer based animation. Explain methods of controlling animation. 1+4
- (b) Explain the major steps of data compression in detail. 5
- 5(a) Describe reference model for multimedia synchronization. 5
- (b) What is extended architecture? Discuss principle of CD write-once. 2+3
- 6(a) Explain Open Document Architecture. 4
- (b) Explain quality of service and resource management with an appropriate figure. 6
7. Explain the concept of earliest deadline first algorithm. Compare and contrast it with rate monotonic algorithm. 4+6
8. What are the abstraction levels used in programming? Explain the advantages of object oriented approaches in brief. 5+5

(2)

9. Write short notes on any TWO:

✓ (a) Transport sub-system

✓ (b) Video conferencing and digital libraries

✓ (c) Hypertext, hypermedia and multimedia

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PURBANCHAL UNIVERSITY

2018

B. E. (Computer)/Sixth Semester/Final

Time: 03:00 hrs.

Full Marks: 80 /Pass Marks: 32

BEG37600: Multimedia Computing & Technology (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Necessary Tables are may be used.

Answer **EIGHT** questions.

- 1(a) Explain multimedia with its application in modern education. 4
- (b) Describe data stream characteristics of multimedia system. 6
2. Define MIDI with synthesizer device. Explain different speech general system. 5+5
3. Explain image with digital representation. Describe various image recognition steps with the help of suitable diagram. 4+6
- 4(a) Explain the important measures that define visual representation. 6
- (b) Explain the principle of CD-WO 4
5. Explain the importance of compression technique. What are different compression techniques used? Explain major steps of data compression. 2+2+6
6. Describe document architecture ODA. Compare hypertext, hypermedia and multimedia. Explain SGML. 2+6+2
- 7(a) Describe group communication architecture with suitable diagram. 5
- (b) Define QoS? Explain important issues needed to be considered with respect to QoS. 1+4
- 8(a) What is abstraction for programming? Explain different abstraction level. 1+5

Contd. ...

(2)

- (b) Explain video conferencing technique. 4
9. Define synchronization with inter and intra object synchronization. Explain MM synchronization with four layer reference model. 2+3+5
10. Write short notes on any TWO: 5+5
- (a) Information System
 - (b) Multimedia Operating System
 - (c) MPEG and DVI