Code No. 235/N/O/S

FACULTY OF ENGINEERING

B.E. 4/4 (Civil) I - Semester (Suppl.) Examination, May / June 2018

Subject : Structural Engineering Design and Detailing – II (Steel)

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A & answer any three questions from Part-B.

PART – A (25 Marks)

1 State the purpose of providing intermediate stiffners in plate girders. (2)
2 Draw neat sketch of segmental bearing and label the parts. (2)
3 State and explain the equation to check members subjected to biaxial bending. (2)
4 Give expression for economical depth of plate girder and to find thickness of web plate. (2)
5 List out the forces acting on gantry girder. (2)
6 Differentiate between plate girder and compound beam. (3)
7 Write about three types of web splicings with the help of neat sketches. (3)
8 Distinguish between deck and through type railway bridges. (3)
9 Derive an expression for the economical span of bridge. (3)
10 Write the design criteria for horizontal and vertical stiffener. (3)

PART- B (50 marks)

Unit-I

11 (a) A plate girder simply supported at ends has an effective span of 25m .It is subjected to a factored udl of 40KN/m including self weight. Design the cross section of girder carry out shear check and stiffeners need not be designed. Adopt Fe410 grade steel. Use limit state method. (15)

OR

(b) Design the cross section and intermediate stiffener for a plate girder of 20m span subjected to a factored udl of 35KN/m .Use Fe410 grade steel.

Unit-II

12 (a) Design the cross section of gantry girder for the following data: Effective span of gantry girder = 6m ,crane capacity 250KN ,weight of trolley and hook 50KN wheel base 3m ,minimum approach of hook 1m. Span of crane girder 12m and self weight of crane girder 150KN .Use Fe410 steel. And limit state method. (15)

OR

(b) Design a rocker bearing for total vertical load of 850KN including impact. Vertical load due to wind is 150KN, lateral load due to wind 75KN. Longitudinal force is 200KN. Adopt Fe410 grade steel and use limit state method.

Unit-III

13 (a) A deck type railway bridge has an effective span of 18m .Taking EUDL for moment =1820 KN/track and 2000KN/track for shear force .Design the girder for maximum BM carry out usual checks. Draw neat sketches showing design details. (20)

OR

(b) Design bottom chord member for a through type truss girder for a railway bridge. Given span of truss is 30m and it has 6 panels .EUDL for moment =2727KN/track and 3000KN/track. Draw neat sketches for the design details.

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Code No.246/N/O/S

FACULTY OF ENGINEERING

B.E. 4/4 (EEE) I Sem. (Suppl.) Examination, May / June 2018

Subject : Power System Operation & Control.

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1. Give the static load flow equations. (3)
2. What are the features of decoupled load flow methods ? (3)
3. State the condition for economic sharing between generators in a system where losses are neglected. (2)
4. Define Penalty Factor. (2)
5. Discuss about Flat Frequency Control. (3)
6. Explain the concept of control area. (3)
7. Comment on First swing stability. (2)
8. What are the advantages and limitations of Equal Area Criterion ? (3)
9. How are voltage in system and reactive power inter related ? (2)
10. List some FACTS devices useful for implementing voltage control. (2)

PART-'B'(50 Marks)

11. a) What are the assumptions of Decoupled load flow and Fast Decoupled load flow methods, (3)

    b) Assuming flat voltage start, calculate voltages at the PQ buses at the end of first iteration using Gauss Siedel Method for the following 4-bus system, whose Y_{BUS} is given. (7)

Bus	Pi,pu	Qi,pu	Vi,pu	Remarks
1	-	-	1.04+j0.0	Slack bus
2.	0.5	-0.2	-	PQ bus
3.	-1.0	0.5	-	PQ bus
4.	0.3	-0.1	-	PQ bus

Y_{BUS}	-j21.7	j5.0	j6.7	j10.0
	j5.0	-j21.7	j10.0	j6.7
	j6.7	j10.0	-j16.7	j0.0
	j10.0	j6.7	J0.0	-j16.7

12. a) List various equality and inequality constraints of the economic scheduling problem. (3)

    b) Incremental cost of two units in a plant are :

    $IC_1=0.8\ P_1 + 160$ Rs/MWh; $IC_2 =0.9\ P_2 + 120$ Rs/MWh.

    Where P_1 and P_2 are power output in MW. Assume that both the units are operating at all times. Total load varies from 50 to 250 MW and the minimum and maximum loads on each unit are 20 and 125MW respectively. Find the incremental cost and optimal allocation of loads between the units for various total loads and furnish the results in a graphical form. (7)

Contd…..

13. a) Define control area and area control error. (3)
    b) Derive the load frequency model for an isolated power system. (7)

14. a) Explain the stability of system when there is a fault at midpoint of a single machine connected to infinite bus, and the power is restored after the fault is cleared, by using Equal Area Criterion. (5)
    b) A 50 Hz synchronous generator is connected to an infinite bus through a line. The pu reactances of generator and the line are j0.3 pu and j0.2 pu. respectively. The generator no load voltage is 1.1. pu. And that of the infinite bus is 1.0 pu. The intertia constant is 3.0 MW-sec/MVA. Determine the frequency of natural oscillations if the Generator is loaded to 75% of its maximum power. (5)

15. Explain with details and neat schematic, the function of : (10)
    (i) STATCOM
    (ii) TCSC

16. a) Explain how synchronous generator can be used for improving Voltage stability. (3)
    b) Explain the significance of Bmn coefficients. (3)

17. Write short notes on :
    a) Factors that effect transient stability.
    b) Jacobian matrix.

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Code No. 251/N/O/S

FACULTY OF ENGINEERING

B.E. 4/4 (EIE) I-Semester (Suppl) Examination, May/June 2018

Subject: Analytical Instrumentation

Time: 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part A and any five questions from Part B.

PART-A (25 Marks)

1	Explain various regions of electromagnetic radiation	3
2.	Define molar absorptivity	2
3.	What is the difference between calorimeter and spectrophotometer?	3
4.	Write applications of chromatography	2
5.	List any four applications of Mass Spectrometer	2
6.	Define P^H.	2
7.	What are the various detectors used in GC?	3
8.	Why high vacuum is essential for mass spectrometer?	3
9.	Explain how CO in air is estimated using IR gas analyzers?	2
10.	What is the principle of absorption instruments?	3

PART-B (50 Marks)

11.	a. Explain quadrapole mass spectrometer.	5
	b. Explain Thermal conductivity analyzer.	5
12.	a. Explain in detail sample injection system in liquid chromatography	5
	b. Discuss different types of water pollutants	5
13.	a. Explain the working of gratings.	5
	b. Write a short note on Absorption Instruments	5
14.	a. With the help of the mathematical equation, explain Beer Lambert's law	7
	b. What are the limitations of Beer Lambert's Law?	3
15.	Explain double beam spectrophotometer	10
16.	Discuss electrodes for P^H measurement	10
17.	Write a short note on a. NMR b. Chemically Sensitive semiconductor devices	10

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Code No. 261/N/O/S

FACULTY OF ENGINEERING

B.E. 4/4 (ECE) I – Semester (Suppl.) Examination, May / June 2018

Subject: Microwave Engineering

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A and any five questions from Part B.

PART – A (25 Marks)

1 Define group velocity and phase velocity. 2

2 Explain why TEM wave cannot propagate in a waveguide. 3

3 A circular wave guide has radius = 3cm and is used as a resonator for TM_{011} mode at 10 GHz by placing two perfectly conducting plates at its two ends. Determine minimum distance between two end plates. 3

4 What are microwaves? 2

5 Write a note on ferrite phase shifters. 2

6 Give some examples of reciprocal and non reciprocal devices. 3

7 Write properties of s parameters. 3

8 What is Gunn effect? 2

9 What is debunching? Why does it occur? 2

10 Sketch different types of planar transmission lines. 3

PART – B (5x10 = 50 Marks)

11 a) Derive the expression for time averaged poynting vector for TE mode of wave propagation between parallel plates. 7

b) Show that wave impedance of TE mode is $Z_{TE} = \frac{\eta}{\sqrt{1-\left(\frac{fc}{c}\right)^2}}$. 3

12 Derive the expressions for electric and magnetic field components for propagation of TE waves in a rectangular wave guide. 10

13 a) Define microwave junction. Explain the operation of H-plane T junction. 5

b) Derive the S matrix of H-plane Tee junction. 5

14 a) What are re-entrant cavities? 2

b) Derive the expression for efficiency of a two cavity klystron amplifier starting from basic principles. 8

15 a) What are slow wave structures. Explain how a helical TWT achieves amplification. 4

b) Differentiate between klystron and TWT. 6

16 a) What are transferred electron devices (TED's)? 3

b) Explain the domain formation is Gunn Oscillator. 7

17 Write notes on:

a) Phase shifters 3

b) Isolator and circulator 3

C) Magic Tee. 4

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Code No. 275/N/O/S

FACULTY OF ENGINEERING

B.E. 4/4 (Prod.) I - Semester (Suppl.) Examination, May / June 2018

Subject : Production Drawing Practice

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions. From Part – A and Part - B. If Missing Data, if any may suitably be assumed.

PART – A (25 Marks)

1 Give the significance of open tolerance chart given in a drawing.

2 Give conventional representation for bearing on a shaft.

3 What is meant by interchangeability and selective assembly?

4 Mention three uses of geometric tolerances.

5 Define the term deviation, upper deviation and fundamental deviation.

6 Indicate roughness symbol and roughness values for a roughness grade of N4 to N6.

7 Find the limits of the following holes 50H6 and 100H11.

8 What is the range of surface roughness (Ra) is microns that could be achieved in the

(a) Reaming (b) Milling (c) Grinding

9 Name the type of fit for the following with their application in industry

(a) H8/c8 (b) H7/m6

10 What is meant by direction of lay? Sketch symbols related to common direction of lay.

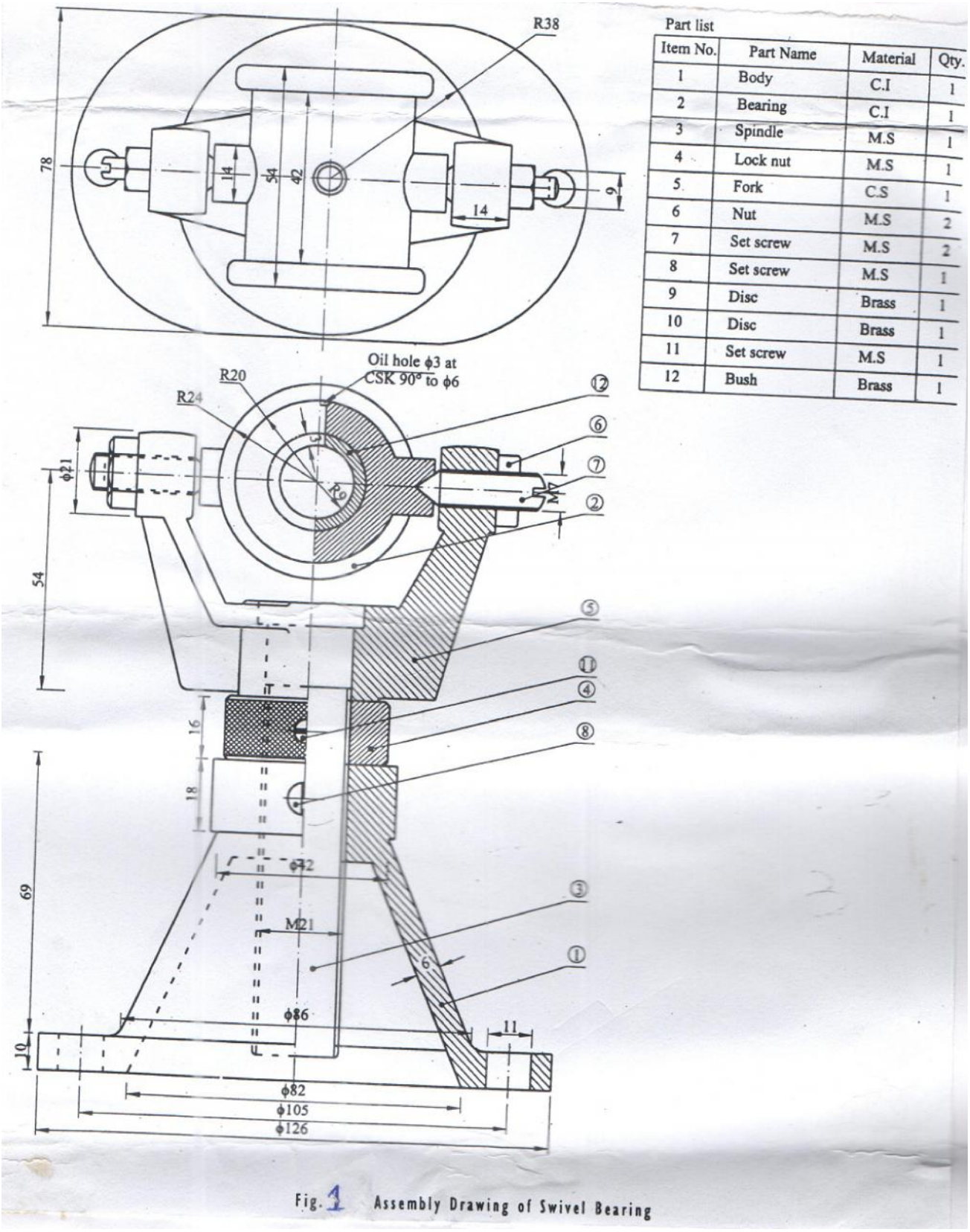
PART – B (50 Marks)

11 From the Swivel Bearing assembly drawing shown in figure 1.

(a) Give fits between the following components: Alpha numeric values and resulting tolerance.
(i) Bearing (2) and Bush (12)
(ii) Spindle (3) and Fork (5) (10)

(b) Draw the following components drawing and give necessary dimensional and geometric tolerance, surface roughness values and surface treatments.
(i) Body (1)
(ii) Bearing (2)
(iii) Spindle (3)
(iv) Lock nut (4)
(v) Fork (5) (25)

(c) Prepare the process sheet for the component Spindle (3) with detailed tool work orientation sketches. (15)



Part list

Item No.	Part Name	Material	Qty.
1	Body	C.I	1
2	Bearing	C.I	1
3	Spindle	M.S	1
4	Lock nut	M.S	1
5	Fork	C.S	1
6	Nut	M.S	2
7	Set screw	M.S	2
8	Set screw	M.S	1
9	Disc	Brass	1
10	Disc	Brass	1
11	Set screw	M.S	1
12	Bush	Brass	1

Fig. 1 Assembly Drawing of Swivel Bearing

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Code No. 277/N/O/S

FACULTY OF ENGINEERING

BE. 4/4 (A.E) I – Semester (Suppl.) Examination, May / June 2018

Subject: Automotive pollution and Control

Time: 3 Hours **Max. Marks: 75**

Note: Answer all Questions from Part A and any Five Questions from Part B

PART – A (25 Marks)

1 Explain how human health effects by automobile pollution
2 What are emissions formed in SI / CI engines
3 Write a short notes on green house effect
4 What do you meant by evaporation loss
5 What are the methods used to measure Noise pollution
6 What is secondary air injection
7 Define a catalyst. What for it is used
8 Name some emission standards used in india?
9 What is meant by E.G.R?
10 What for orsat apparatus used?

PART – B (5x 10 = 50 Marks)

11. With an appropriate illustration explain the effect of engine speed, combustion time and cetane number on nitric oxide formation in diesel engine.

12. a) Draw the equilibrium and kinetic curves of nitric oxides formation in S.I engine
b) How carbon monoxide emission could be reduced in S.I engines

13. List the Various types of smoke meters. Explain any one. How the smoke intensity can be measured with neat sketch

14 Explain the construction, working and limitations of chemiluminescent detector what for it is used?

15 a) Explain about pollution control in 2- Stroke engine
b) What is gas chromatograph explain in detail

16 a) With a neat sketch explain the working of orsat apparatus
b) “Noise pollution – and its control” write a short note

17 Explain any three of the following
a) Chassis dynamometer
b) Catalytic convertor
c) Types of emissions & their control
d) NDIR

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Code No.528/N/O/S

FACULTY OF ENGINEERING

B.E. 4/4 (I.T.) I Sem. (New) (Suppl) Examination, May / June 2018

Subject : Middleware Technologies..

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART-A (25 Marks)

1.	Compare CGI versus Servlets.	3
2.	Define Service Specific middle give examples.	2
3.	Illustrate the Life Cycle of Entity Bean.	2
4.	List out the services of EJB Container.	3
5.	List out the Barriers to Effective EAI?	3
6.	What is the role of an interface in CORBA?	2
7.	List the COM data types.	2
8.	Briefly explain what Intermediate Language (IL) code in .Net is.	3
9.	Explain the different types of control structures in python.	3
10.	Explain MTV development pattern in Django Framework.	2

PART- B (50 Marks)

11.	A) Create a PERL-CGI form that inputs user name and outputs Hello followed by username.	5
	B) Explain the Java session API with an example program.	5
12.	Explain the EJB architecture in Detail.	10
13.	A) Explain the SAIM principles.	5
	B) List and explain any five CORBA alternatives.	5
14.	A) Compare and contrast COM and CORBA.	5
	B) Explain the architecture of .NET framework.	5
15.	Explain Python Framework – Django in detail	10
16.	A) Write about the Requirements for Effective EAI methodology?	5
	B) Write about Django Template System.	5
17.	Write short notes on the following	
	A) Explain how Cookies are used to manage sessions in Perl.	5
	B) Explain the difference between Entity Bean and Session Bean	5

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Code No. 308 / O

FACULTY OF INFORMATICS

B.E. 4/4 (IT) I-Semester (Old) Examination, May / June 2018

Subject : Middleware Technologies

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Define the term client / server with its building block.	3
2	Write short notes on SOAP.	3
3	Explain briefly struts frameworks.	3
4	What are the key features of the EJB technology?	3
5	What is MVC model 2 approach?	3
6	What are the servlet life cycle methods?	2
7	Write steps to establish connection with JDBC.	2
8	What is the role of an interface in CORBA?	2
9	What is remoting in **.**net?	2
10	How objects are created in DCOM?	2

PART – B (50 Marks)

11	Explain the messaging and queuing middleware.		10
12	a)	What is struts Framework? Explain the flow of execution of a struts application.	6
	b)	Write a servlet program for login validation.	4
13	a)	What are the necessary components of the EJB architecture?	5
	b)	Explain difference between session bean and entity bean.	5
14	Explain the CORBA architecture in detail.		10
15	a)	Describe about proxy and stub in COM.	4
	b)	Compare and contrast COM and CORBA.	6
16	Explain **.**net remoting with example.		10
17	Write short notes on the following :		
	a)	Roles of EJB	3
	b)	CORBA object model	3
	c)	Marshalling and Demarshalling	4

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Code No. 461/CBCS

FACULTY OF ENGINEERING

B.E. (Civil) IV - Semester (CBCS) (Main) Examination, May/June 2018

Subject : Numerical Methods

Time : 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (20 Marks)

1 Define Algebraic and Transcendental equations. (2)

2 Using Bisection method, find the root of $\cos x = 0$. (2)

3 State Newton's forward interpolation formula. (2)

4 Apply Newton's Backward difference formula to the data below, to obtain a polynomial of degree 4 in . (2)

x	1	2	3	4	5
y	1	-1	1	-1	1

5 Use Trapezoidal rule to evaluate $\int_0^1 x^3\,dx$ considering five subintervals. (2)

6 Write the iterative formula of Euler's method for solving $\frac{dy}{dx} = f(x, y)$ with $y(x_o) = y_o$. (2)

7 Evaluate $\int_0^6 \frac{1}{1+x^2}\,dx$ by using Simpson's 1/3 rule. (2)

8 Write Milne's predictor –corrector formulae to find y_1 for $\frac{dy}{dx} = f(x, y)$ with $y(x_o) = y_o$. (2)

9 Classify the equation $(x+1)\frac{\partial^2 y}{\partial x^2} - 2(x+2)\frac{\partial^2 u}{\partial x \partial y} + (x+3)\frac{\partial^2 u}{\partial y^2} = 0$. (2)

10 Write the finite difference form of $\frac{\partial^2 u}{\partial x^2}$. (2)

PART-B (50 Marks)

11 (a) Apply Newton Raphson Method to find an approximate root of the equation $x^3 - 3x - 5 = 0$ which is near to 2. (5)

(b) Apply Guass elimination method to solve the equations
2x+2y+z=12, 3x + 2y + 2z = 8, 5x + 10y – 8z = 10 (5)

12 Apply Jacobi's iteration method to solve the equations
20x + y – 2z = 17, 3x + 29y – z = -18, 2x – 3y + 20z = 25 (10)

..2

13 (a) Using Given's method, reduce the following matrix to the tri-diagonal form

$$A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 4 & 2 \\ 3 & 2 & 3 \end{bmatrix}$$ (5)

(b) Use Lagrange's interpolation formula to find the value of y when x = 10 if the following values of x and y are given. (5)

x	5	6	9	11
y	12	13	14	16

14. (a) Use Romberg's method to compute $\int_0^1 \frac{1}{1+x^2}\,dx$ correct of four decimal Place. (5)

(b) Using Guassian two point formula compute $\int_{-2}^{2} e^{\frac{-x}{2}}\,dx$. (5)

15. (a) For the following values of x and y, find the first derivative at x = 0. (5)

x	0	1	2	3	4	5
y	4	8	15	7	6	2

(b) Apply Simpson's rule to evaluate $\int_0^1 \int_0^1 e^{x+y}\,dx\,dy$, taking two sub intervals. (5)

16. (a) Using Runge – Kutta method of order 4 compute y(0.2) for the equation $\frac{dy}{dx} = 3x + \frac{y}{2}, \quad y(0) = 1,$ take h = 0.2. (5)

(b) Using Picard's method of successive approximations, obtain a solution up to the fifth approximation of the equation $\frac{dy}{dx} = y + x$ such that y = 1 when x=0. (5)

17. Solve the Laplace equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0,$ inside the square bounded by the line x = 0, x = 4, y = 0, y = 4 given that u(x, y) = x^2 y^2 on the boundary by finite difference approximations. (10)

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Code No. 468 / CBCS

FACULTY OF ENGINEERING

B.E. (EE / Inst. / M / P/ AE) IV - Semester (CBCS)(Main) Examination, May / June 2018

Subject : Engineering Mathematics - IV

Time : 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (20 Marks)

1 Find the Fourier sine transform of the function

$$f(x)=\begin{cases}\cos x & , \quad 0<x<a \\ 0 & , \quad x>a\end{cases}$$

2 If F{F(x)}=f(s) then evaluate F{F(ax)} where a > 0.

3 Evaluate $Z\{a^n \cos n\theta\}$.

4 Find f_o, f_1, if $Z\{f_n\}=F(z)=\dfrac{1}{(z-2)(z-3)}$.

5 Find an approximate value of $(127)^{1/3}$ using Newton-Raphson method.

6 Show that $\nabla E = \delta E^{1/2} = \Delta$.

7 Fit a straight line of the form y = a + bx to the following data.

x	-2	-1	1	3	4
y	1	5	13	21	25

8 If $\bar{X}=20, \quad \bar{Y}=15, \quad \pm_x=4, \quad \pm_y=3$ and r = 0.7 then find the equations of two regression lines.

9 Calculate the standard deviation of the marks of 10 students given below
Marks : 160, 160, 161, 162, 163, 163, 163, 164, 164, 170

10 Find the mean of uniform distribution.

PART – B (50 Marks)

11 (a) State and prove convolution theorem for Fourier transform. (5)

(b) Find the Fourier cosine transform of $f(x)=\dfrac{1}{1+x^2}$. (5)

12 (a) Evaluate $Z^{-1}\left\{\dfrac{z^2-z}{(z+1)(z+2)(z+3)}\right\}$. (5)

(b) Using Z-transform, solve the difference equation
$y_{n+3} - 6y_{n+2} + 11y_{n+1} - 6y_n = 0$, $y_o = 0$, $y_1 = 1$, $y_2 = 2$. (5)

13 (a) Using Gauss-Seidel method, solve the system of equations (5)
$5x_1 + 2x_2 + x_3 = 26, \quad x_1 + 5x_2 + x_3 = 16, \quad 2x_1 + 2x_2 + 6x_3 = 24$

(b) Construct the forward difference table and using it find the corresponding interpolating polynomial which fits the following data. (5)

x	1	2	3	4	5
f(x)	- 6	- 4	12	54	134

..2

14 (a) Using the method of least squares, fit a curve of the form $y = a x^b$ to the following data. (5)

x	1	2	3	4
y	2.5	20	67.5	160

(b) Find the coefficient of correlation between X and Y from the data (5)

X	9	8	7	6	5	4	3	2	1
Y	15	16	14	13	11	12	10	8	9

15 (a) Suppose X is a random variable which follows a normal distribution with mean 40 and standard deviation 4. Then find (5)
(i) $P(X \leq 34)$ (ii) $P(34 \leq X \leq 42)$ (iii) $P(X \geq 42)$.
(Take $P(0 \leq z \leq 1.5) = 0.4332$, $P(0 \leq z \leq 0.5) = 0.1915$)

b) The theory predicts the proportion of beans in the four groups A, B, C and D should be 9:3:3:1. In a experiment among 1600 beans, the numbers in the four groups are 882, 313, 287 and 118. Does the experimental result support the theory ? (5)
(i $\chi^2_{0.05}$ at 3 degrees of freedom is 7.815).

16. a) Evaluate (i) $Z\left\{\frac{1}{n!}\right\}$ (ii) Z{coshnθ}. (5)

b) If $y' = 3x + y, y(0) = 1$ then evaluate y(0.1) by using Runge-Kutta fourth order methods. (5)

17. a) Evaluate f(9) using Newton's divided difference interpolation formula from the following data. (5)

x	1	2	4	7
f(x)	2	15	77	350

b) Find the finite Fourier sine and cosine transforms of (5)
$f(x) = 4x, 0 < x < 4$

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Code No. 477 / CBCS

FACULTY OF ENGINEERING

B.E. (ECE) IV – Semester (CBCS) (Main) Examination, May / June 2018

Subject : Applied Mathematics

Time : 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (20 Marks)

1 Show that the set W = {(x, y, z) / 2x + 3y + 4z =0} is a subspace of the vector space $\mathbf{R}^3(\mathbf{R})$.

2 If the linear transformation T : $\mathbf{R}^2 \rightarrow \mathbf{R}^2$ is defined by T (1, 1) = (3, 4), T(2, 3) = (4, 5), then determine T(a, b).

3 Find an approximate root of the equation $x^3 - 62 = 0$ by using Newton-Raphson method.

4 Evaluate $\Delta^3(ab\,x)$ (Take h = 1).

5 If $y'=2y+3e^x$, y(0)=1, then find an approximate solution y(x) by using Taylor series method.

6 Find $\frac{dy}{dx}$ at x = 1 from the following data

x	1	2	3	4
y	1	14	39	76

7 Using the method of least squares fit a curve of the form $y = a + bx^2$ to the following data

x	-1	0	2	3
y	8	3	23	48

8 The coefficient of rank correlation between X and Y was 0.8. If the sum of the squares of the difference in ranks was 33, then find the value of number of the items (n) in the data.

9 Define feasible solution and optimal solution.

10 Define slack variable and give an example.

PART – B (50 Marks)

11 (a) Find the Rank and Nullity of the linear transformation T : $\mathbf{R}^3 \rightarrow \mathbf{R}^3$ defined by T(x, y, z) = (3x, x – y, 2x + y + z).

(b) Find the matrix of linear transformation T : $\mathbf{R}^2 \rightarrow \mathbf{R}^2$ defined by T(x, y) = (2x – 3y, x+y) with respect to the basis B = {(1, 2), (2, 3)}

12 (a) Solve the following system of equation by Gauss elimination method

$x_1 + x_2 + x_3 = 13$, $2x_1 - x_2 + x_3 = 3$, $3x_1 + x_2 - 2x_3 = 2$

(b) Construct the divided difference table and the corresponding interpolating polynomial for the following data.

x	-1	0	1	3	4
f(x)	-19	-9	-5	33	91

..2

13 If $y' = x + y + xy$, $y(0)=1$ then find $y(0.8)$ by using Milne's predictor – corrector method. Calculate the required initial values by using Euler's method. Also perform two iterations of the corrector.

14 (a) Find the regression line of y on x for the following data:

x	10	12	13	12	16	15
y	40	38	43	45	37	43

(b) Find the rank correlation coefficient for the following data which shows ranks in X and Y.

Rank in X	1	2	3	4	5	6
Rank in Y	6	1	3	5	4	2

15 Solve the following linear programming problem by simplex method.

Maximize $Z = 2x_1 + 4x_2 + x_3$

Subject to $x_1 + 2x_2 \leq 4$

$2x_1 + x_2 \leq 3$

$x_2 + 4x_3 \leq 3$

$x_1 \geq 0, x_2 \geq 0, x_3 \geq 0$

16 (a) Find an approximate root of $x^3 + 9x - 19 = 0$ by using bisection method.

(b) Show that the set $S = \{(1, 2, 1), (2, 1, 0), (1, -1, 2)\}$ is a basis of the vector space $\mathbf{R}^3(\mathbf{R})$.

17 (a) If $y' = xy - x^2$, $y(2) = 4$ then evaluate $y(2.2)$ by using Runge-Kutta method of order Four (Take $h = 0.2$).

(b) Show that the correlation coefficient and two regression coefficients have same sign.

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Code No.491/CBCS

FACULTY OF ENGINEERING

B.E. IV – Semester (CSE) (CBCS) (Main) Examination, May / June 2018

Subject : Mathematics and Statistics.

Time : 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (20 Marks)

1. Find an approximate value of $(218)^{1/3}$ using Newton-Raphson method.
2. Evaluate $\Delta^2(x^2 + 3x + 2)$ (Take h = 1).
3. Find the finite Fourier sine transform of f(x) = 3x, 0 < x < 6.
4. If $F_S\{f(x)\}=F_S(s)$ then evaluate $F_S(fx)\ cosax\}$.
5. Find the greatest common divisor of 272, 1479 and express it as a linear combination of these two numbers.
6. Find the remainder when 1! + 2! + 3! + . . . 30 ! is divided by 8.
7. A continuous random variable X has the probability density function

   f(x) = A + B x, $0 \le x \le 1$. If the mean of the distribution is $\frac{1}{2}$ then find A and B.

8. Define exponential distribution and find its mean.
9. Using the method of least squares, fit a straight line of the form y=a+bx to the following date.

x	-1	1	2	5
y	-8	-2	1	10

10. Find the angle between the two regression lines.

PART-'B'(50 Marks)

11. a) Using Newton's divided difference formula, find the polynomial f(x) which fits the following data.

x	-1	0	3	6	7
f(x)	3	-6	39	822	1611

b) Solve the system of equations by Gauss elimination method.
10x + 2y + z = 9
2x + 20y – 2z = -44
-2x + 3y + 10z = 22

..2

12. a) Find the Fourier sine transform of $f(x)=e^{-|x|}$. Hence show that $\int_0^\infty \frac{x.\sin mx}{1+x^2}\,dx = \frac{\pi e^{-m}}{2}$, m > 0.

b) Find the Fourier transform of $f(x)=\begin{cases}1, & |x|<1\\ 0, & |x|>1\end{cases}$

Hence evaluate $\int_0^\infty \frac{\sin x}{x}\,dx$

13. a) Solve the linear congruence $8x \equiv 20 \pmod{28}$.

b) If $(n-1)! + 1 \equiv 0 \pmod{n}$ then show that n is a prime number.

14. a) A die is thrown 312 times and the results of these throws are given below.

Number appeared on the die	1	2	3	4	5	6
Frequency	46	38	35	65	63	65

Test whether the die is biased or not.
(χ^2 at 5% level of significance for 5 degree of freedom is 11.09)

b) Suppose that X is a random variable which follows a normal distribution with mean 45 and the standard deviation 5 then find
(i) $P(41 \le X \le 50)$ (ii) $P(X \ge 55)$ and (iii) $P(X \le 30)$
[$P(0 \le z \le 0.8) = 0.2881$, $P(0 \le z \le 1) = 0.3413$
$P(0 \le z \le 2) = 0.4772$, $P(0 \le z \le 3) = 0.4986$]

15. a) Using the method of least squares fit a curve $y = a + bx + c x^2$ to the following data.

x	0	1	2	3	4
y	1	0	3	10	21

b) Evaluate the coefficient of correlation for the following data.

x	1	2	3	4	5	6	7	8	9
y	9	8	10	12	11	13	14	16	15

16. a) If $y' = x^2 + y^2$, y(0) = 1 then evaluate y(0.2) by using Runge-Kutta fourth order method.

b) Find the Fourier cosine transform of $f(x)=\frac{1}{1+x^2}$.

17. a) Solve the system of congruences $x \equiv 1 \pmod 3$, $x \equiv 2 \pmod 5$, $x \equiv 3 \pmod 7$.

b) If $y' = 1 + xy$, y(0)=1, then find an approximation to the solution y(x) by using Taylor series method.

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Code No.497/CBCS

FACULTY OF INFORMATICS

B.E. (I.T.) IV - Semester (CBCS) (Main) Examination, May / June 2018

Subject : Signals and Systems.

Time : 3 Hours **Max. Marks: 7**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART-A (20 Marks)

1. Define unit impulse and unit step signals. 2M
2. Show that u(t) is a power signal. 2M
3. Examine whether the signal x(t) = $2\cos(4\pi t) - 3\sin(3\pi t)$ is periodic or not. If periodic, find its time period. 2M
4. Write the conditions for existence of Fourier series. 2M
5. Find the Laplace Transform of u(t). 2M
6. Find initial & final values of the signal x(t) if 2M

$$X(S) = \frac{(2S+3)}{S(S^2+2S+5)}$$

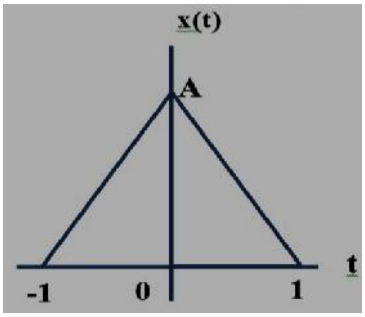
7. Define a band limited signal. 2M
8. How to overcome aliasing effect? 2M
9. Explain Convolution property of Z-Transform. 2M
10. Find DTFT of 2^{-n}. u(n). 2M

PART-B (50 Marks)

11.

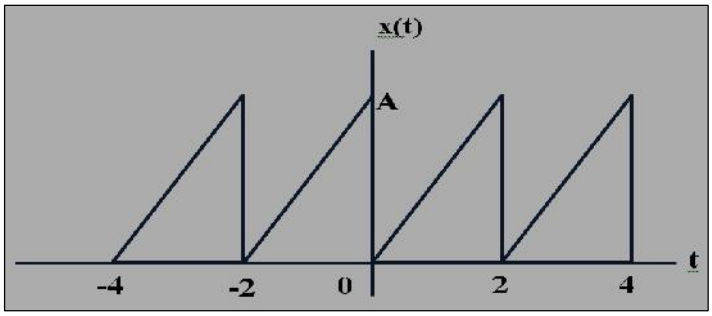
a. For the signal x(t) shown in the figure. Sketch the following 6M

i. x(t+1)
ii. x(t/2–1)
iii. x(2 – t)
iv. x(2t)



b. Define Impulse response of an LTI system h(t) & show that y(t) = x(t) * h(t). 4M

12. Find the cosine & trigonometric Fourier Series for the signal x(t) shown in figure and sketch magnitude, phase spectra. 10M



Contd…..2

13. Find the zero-input & zero-state response of a LTI system described by linear differential equation

$$\frac{d^2}{dt^2}y(t) + 5\frac{d}{dt}y(t)5 + 6y(t) = \frac{d}{dt}x(t) + x(t)$$

for the initial conditions y(0) =2, $\bar{y}$ (0)=1 and the input x(t)=e^{-4t}.u(t) 10M

14. a) State and Explain Sampling theorem for band limited signals. 6M

b) Find the Nyquist Rate and Nyquist Interval for the signal

x(t) = sinc(100πt) + 2 sinc(50πt) 4M

15. a) Find Z-Transform of the following 6M

i. n.cos($\frac{®}{2}$n). u(n) ii. 2^n. u(n) + 3^n.u(-n-1)

b) Find inverse Z-Transform by power series method. 4M

$$X(Z) = \frac{Z}{2Z^2 - 3Z + 1} \qquad |Z| > 1$$

16. a) Explain any three properties of Fourier Transforms with suitable examples. 6M

b) Find canonic direct realization and its transpose of LTI system with Transfer function

$$H(Z) = \frac{Z+3}{Z^2+7Z+10}$$ 4M

13. Write Short notes on

a. BIBO stability criteria 3M

b. Anti-aliasing filter. 3M

c. Parseval's Theorem. 4M

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