



ANJUMAN-ISLAM'S

AKTC KALSEKAR TECHNICAL CAMPUS

INNOVATIVE TEACHING · EXUBERANT LEARNING

School of Architecture

School of Engineering & Technology

School of Pharmacy

Knowledge Resource & Relay Centre (KRRC)

AIKTC/KRRC/SoET/ACKN/QUES/2017-18/

Date: _____

School: SoET-CBSGS

Branch: ALL BRANCHES

SEM: II

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following [✓]Semester/[✓]Unit Test-I/Unit Test-II (Reg./ATKT) question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Applied Mathematics- II	FEC201		✓	02
2	Applied Physics- II	FEC202		✓	02
3	Applied Chemistry- II	FEC203			
4	Engineering Drawing	FEC204		✓	02
5	Structured Programming Approach	FEC205		✓	02
6	Comm. Skills- II	FEC206			

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

10

Duration – 3 Hours

Total Marks : 80

(1) N.B.:- Question no 1 is compulsory.

(2) Attempt any THREE questions out of remaining FIVE questions.

1)a) Evaluate $\int_0^{\infty} \frac{dx}{(a^2 + x^2)^5}$ (4)

b) Find the particular integral of $(D + 2)y = x^2$ (3)

c) Solve $(\sin x \cos y + e^{2x})dx + (\cos x \sin y + \tan y)dy = 0$ (3)

Express the following integral in polar co-ordinates: (4)

d) $I = \int_0^4 \int_y^{4+\sqrt{16-y^2}} f(x, y) dx dy$

e) Prove that $E = 1 + \Delta$ (3)

f) Evaluate $I = \int_0^{\pi/2} \int_0^{3(1-\cos t)} x^2 \sin t dx dt$ (3)

2 a) Solve $\frac{dy}{dx} - xy = y^2 e^{-\left(\frac{x^2}{2}\right) \log x}$. (6)

b) Change the order of integration and evaluate $I = \int_0^1 \int_1^{\sqrt{2-y^2}} \frac{y dy dx}{\sqrt{(2-x^2)(1-x^2 y^2)}}$ (6)

c) Evaluate $\int_0^{\pi} \frac{dx}{a + b \cos x}$ $a > 0, |b| < a$. Hence show that (8)

$$\int_0^{\pi} \frac{dx}{(5 + 4 \cos x)^2} = \frac{-4\pi}{27}$$

3 a) Evaluate $I = \int_0^{\log 2} \int_0^x \int_0^{x+\log y} e^{x+y+z} dx dy dz$ (6)

b) Find the area between the circles $x^2 + y^2 - 4ax = 0$ and $x^2 + y^2 - 2ax = 0$ (6)

c) Solve $x^2 \frac{d^2 y}{dx^2} - 3x \frac{dy}{dx} + 5y = \sin \log x$ (8)

4 a) Find the total length of the curve $x = a e^{\theta} \sin \theta$, $y = a e^{\theta} \cos \theta$ from (6)

$$\theta = 0 \text{ to } \theta = \frac{\pi}{2}$$

b) Solve $(D^2 - 3D + 2)y = \frac{1}{e^{(e-x)}} + \cos \left(\frac{1}{e^x} \right)$ (6)

c) Use Runge-Kutta method of fourth order , compute $y(0.2)$ given (8)
 $y' + y + xy^2 = 0, y(0) = 1$ by taking $h = 0.1$ correct to 4 decimal point.

5 a) State duplication formula and prove that $\int_{\frac{1}{4}}^{\frac{3}{4}} \sqrt{x} \sqrt{1-x} dx = \sqrt{2} \pi$ (6)

b) Using Taylor's series method, obtain the solution of the differential equation $y' = y - xy$, $y(0) = 1$ (6)

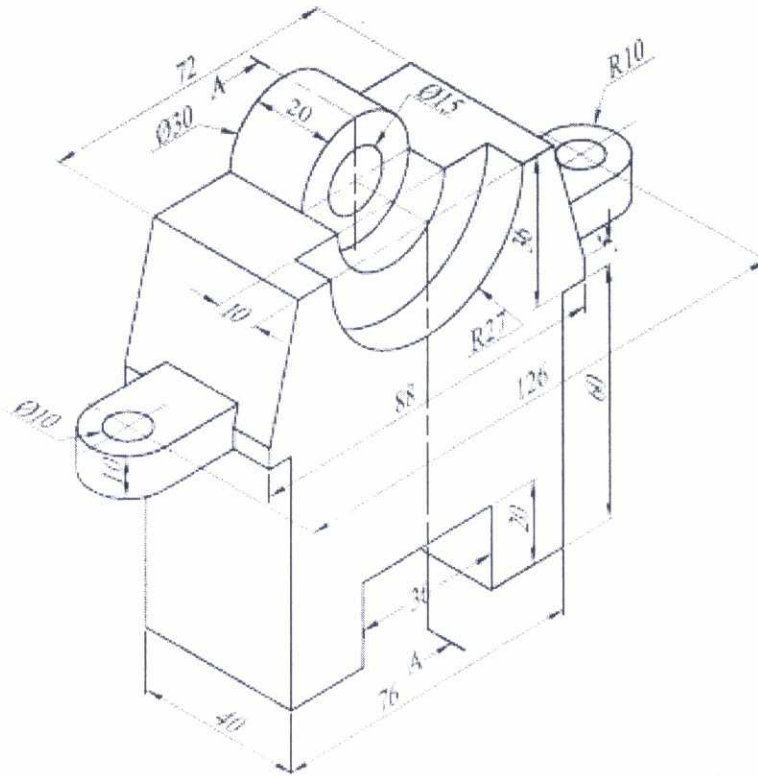
c) Find the volume bounded by the paraboloid $z = 4 - x^2 - \frac{y^2}{2}$ and the plane $z = 0$. (8)

6 a) A chain coiled up near the edge of a smooth table starts to fall over the edge. The velocity v when a length x has fallen is given by $xv \frac{dv}{dx} + v^2 = gx$ (6)

. Show that $v = 8\sqrt{x/3}$

b) Find the mass of a plate in the form of a cardioid $r = a(1 - \cos \theta)$ if the density at any point of the plate varies as its distance from the pole. (6)

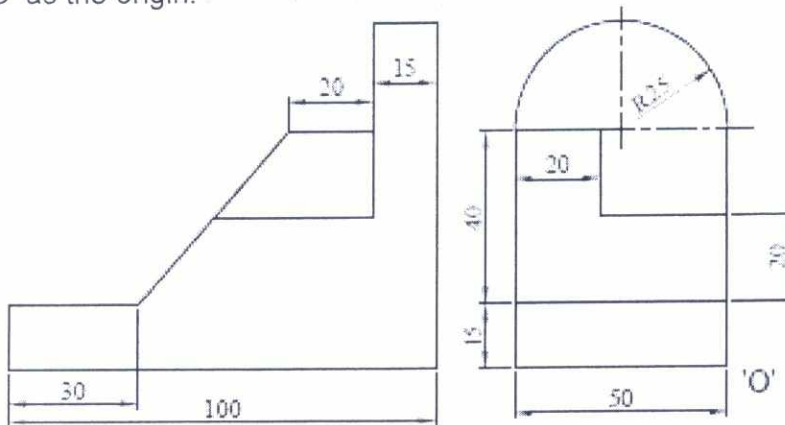
c) Evaluate $\int_{-3}^3 x^4 dx$, using (i) Trapezoidal Rule (ii) Simpson's (1/3)rd rule. Compare it with exact solution. (8)



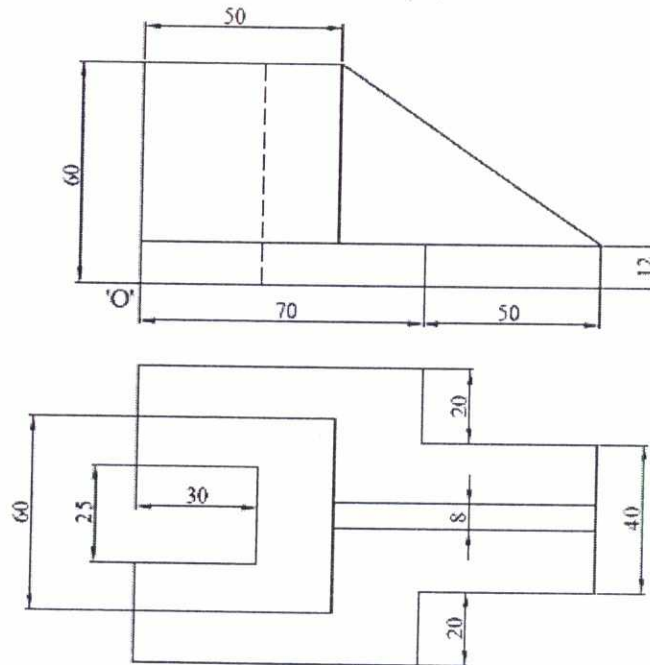
3. A pentagonal pyramid, side of the base 35 mm and axis 70 mm long, is lying on its base corner on H.P. One of its triangular surface is parallel to H.P. and perpendicular to V.P. The base edge containing that triangular surface is parallel to both H.P. and V.P. Draw projections of the solid, when its apex is nearer to the observer. 15

4. (a) A cylinder of base diameter 50 mm and height 70 mm has its axis inclined at 60° to VP and parallel to HP. Draw its projections when one of the point of base circular rim rests on VP. 6

- (b) Figure shows two views of an object. Draw the Isometric View taking 'O' as the origin. 9



5. A right circular cone with base diameter 50mm and axis 65mm long, rests on its base on HP. It is cut by an AIP inclined at 45° to HP and bisects the axis of cone. Draw the FV, Sec. TV and TSS. Also draw development of remaining portion of the cone. **15**
6. (a) A line AB 70 mm long has its end A on HP at 25 mm in front of VP. Its top view and front view measures 60 mm and 40 mm respectively. Draw the projections of the line, if the end point B lies in first quadrant. Also determine its inclinations with HP and VP. **9**
- (b) Figure shows two views of an object. Draw its Isometric View taking 'O' as the origin. **6**





Time: 2 Hours

Marks: 60

- N.B.** 1) Question no 1 is compulsory.
2) Attempt any three questions from the remaining questions.
3) Assume suitable data and symbols if required.
4) Figures on the right indicate full marks.

Q.1) Attempt any five

- a) Why are Newton's rings circular & why is the centre of interference pattern dark? (3)
- b) If the number of lines on the grating surface is increased, what will happen to its resolving power? Explain with necessary formula. (3)
- c) Compare stimulated emission with spontaneous emission. (3)
- d) Proton is 1836 times heavier than that of electron. If the kinetic energy of the proton is 8.19×10^{-14} J find the de-Broglie wavelength associated with that of proton. (3)
- e) The critical field of niobium is 10^5 A/m at 8 K and 2×10^5 A/m at 0K. Calculate critical temperature of the element. (3)
- f) How is an electron microscope different from optical microscope. (3)
- g) How will you measure of frequency of AC signal using cathode ray oscilloscope? (3)

Q.2) a) What is antireflection coating? Derive amplitude and phase condition for it.

The diameter of a bright ring in Newton's rings experiment was observed to decrease from 2.3 cm to 2.0 cm when air was replaced by liquid in the gap between curved surface of plano convex lens and glass plate. Determine the RI of the liquid. (8)

- b) What is index profile in optical fibre? How will you classify optical fibres based on it? The numerical aperture of an optical fibre is 0.2 when surrounded by air. Determine the RI of its core given the RI of cladding as 1.59. Also find the acceptance angle when it is in a medium of RI 1.33. (7)

- Q.3) a)** Draw energy level diagram of Nd-YAG laser. Explain the working of it by mentioning the active centres, metastable states, type of pumping, the wavelengths emitted out in this laser. Why is the diameter of a tube made elliptical? (8)

b) Show that in wedge shape film the fringe width $\beta = \lambda/2\mu\theta$ where θ is the angle of wedge.

White light falls normally on a soap film of thickness 4×10^{-5} cm and of refractive index 1.33.

Which wavelength in the visible region will be reflected most strongly? (7)

Q.4 a) Calculate the angular separation between the first order minima on either side of central maxima when slit is 6×10^{-4} cm wide and $\lambda = 6000 \text{ \AA}$. (5)

b) Explain single slit electron diffraction experiment to verify uncertainty principle. (5)

c) Explain the terms critical temperature, critical magnetic field and critical current in superconductivity. (5)

Q.5 a) A diffraction grating which has 4000 lines per cm is used at normal incidence. Calculate the dispersive power of the grating in the third order spectrum in the wavelength region 5000 A.U. (5)

b) What do you mean by a particle in a box? What are its boundary conditions? Show that the energy of an electron in the box varies as the square of natural number. (5)

c) With Schematic diagram of Scanning Electron Microscope, explain its principle and working. (5)

Q.6 a) The position and momentum of 0.5 KeV electron are simultaneously determined. If its position is located within 0.2nm, what is the percentage uncertainty in its momentum? (5)

b) Explain the working of CRO with block diagram. (5)

c) What are the nanomaterials? Explain any two methods of preparation of nanomaterials. (5)

5

FE-sem-IT - CBSAS

5/12/18

Time : 3 Hrs

Marks: 80

Please check whether you have got the right question paper.

N.B:

- 1. Question No.1 is compulsory
- 2. Answer any three out of remaining five questions

- Q. 1 a. What is an algorithm? Explain properties of an algorithm. 04
- b. What are different data types in C? 04
- c. Compare break and continue. 04
- d. Explain any two functions from math.h 04
- e. Define pointers in C? Explain the terms: address operator and pointer variables. 04
- Q. 2 a. Write a program to find largest and smallest element in an array. 10
- b. What is Recursion? Write a program to display n terms in Fibonacci series using recursion. 10
- Q. 3 a. Write user defined function to reverse a given string. 05
- b. Write a program to print following pattern. 05
- ```

 1
 1 2
 1 2 3
 1 2 3 4

```
- c. Explain the concept of call by value and call by reference with example. 10
- Q. 4 a. What is use of storage classes? Explain different storage classes in C. 10
- b. Write a program to calculate sum of n terms in following series. 10
- $$1 + x/3! - x^2/5! + x^3/7! - x^4/9! + \dots$$
- Q. 5 a. Write a program to take nxn matrix as input and display addition of column elements of matrix. 10
- b. Write the output of following program segment 06
- |                                                                                         |                                                                                          |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| <p>A. main()</p> <pre> {   int i;   int z=8;   i=!z&gt;10;   printf("i=%d",i); } </pre> | <p>B. main()</p> <pre> {   int x=9,y=2;   float c;   c=x/y;   printf("\n%f",c); } </pre> |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
- c. Explain the ternary operator in C. 04

- Q. 6 a. Compare structure and union. Write a program to create structure for storing 10 students details such as name, roll number and marks. Display the student details in ascending order of marks. 10
- b. Explain file handling in C with respect to the various modes for opening files, read and write operation. 10

\*\*\*\*\*