

05/08_EM-II_FE_Sem II (R-19)_Inst Name

University of Mumbai

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EM-II_PART-B

4. *

| | |
|-----------|---|
| | The solution of DE $(e^x + 2xy^2 + y^3)dx + (2x^2y + 3xy^2)dy = 0$ is |
| Option A: | $e^x + x^2y^2 + xy^3 = k$ |
| Option B: | $e^x - x^2y^2 + xy^3 = k$ |
| Option C: | $e^x - x^2y^2 - xy^3 = k$ |
| Option D: | $e^{-x} + x^2y^2 + xy^3 = k$ |

Mark only one oval.

Option A:

Option B:

Option C:

Option D:

5. *

The perimeter of the curve $r = a(1 + \cos \theta)$ is

Mark only one oval.

a

2 a

8 a

4 a

6. *

| | The Particular Integral of $(D^3 - D^2)y = x$ is |
|-----------|---|
| Option A: | $P.I = \left(\frac{x^6}{6} + \frac{x^2}{2}\right)$ |
| Option B: | $P.I = -\left(\frac{x^6}{6} + \frac{x^2}{2}\right)$ |
| Option C: | $P.I = \left(\frac{x^6}{6} - \frac{x^2}{2}\right)$ |
| Option D: | $P.I = -\left(\frac{x^6}{6} - \frac{x^2}{2}\right)$ |

Mark only one oval.

Option A:

Option B:

Option C:

Option D:

7. *

| | |
|-----------|--|
| | The Double integral $I = \int_{-3}^2 \int_{2-y}^5 f(x, y) dx dy + \int_2^7 \int_{y-2}^5 f(x, y) dx dy$ into a single term will be given by |
| Option A: | $I = \int_0^5 \int_{2+x}^{2-x} f(x, y) dy dx$ |
| Option B: | $I = \int_0^5 \int_{2-x}^{2+x} f(x, y) dy dx$ |
| Option C: | $I = \int_0^5 \int_0^{2+x} f(x, y) dy dx$ |
| Option D: | $I = \int_0^5 \int_0^{2-x} f(x, y) dy dx$ |

Mark only one oval.

 Option A: Option B: Option C: Option D:

8. *

| | |
|-----------|--|
| | The value of integral $I = \int_0^{\pi/2} \sqrt{\tan \theta} d\theta$ is |
| Option A: | $\frac{\pi}{\sqrt{2}}$ |
| Option B: | $\pi\sqrt{2}$ |
| Option C: | $\sqrt{\pi}$ |
| Option D: | $\frac{\pi}{2}$ |

Mark only one oval.

 Option A: Option B: Option C: Option D:

9. *

| | |
|-----------|--|
| | The triple integral $\iiint_V z^2 dx dy dz$ is converted to cylindrical polar coordinates $\iiint_V g(r, \theta, z) dr d\theta dz$ over the volume bounded by the cylinder $x^2 + y^2 = a^2$ and the paraboloid $x^2 + y^2 = z$ and the plane $z = 0$, then the upper limit of z is |
| Option A: | 2 |
| Option B: | r^2 |
| Option C: | 1 |
| Option D: | $\frac{r^2}{2}$ |

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

10. *

| | |
|-----------|--|
| | Solve $\frac{dy}{dx} + 2y \tan x = \sin x$ is given by |
| Option A: | $y \sec^2 x = \sec x + c$ |
| Option B: | $y \cos^2 x = \cos x + c$ |
| Option C: | $y = \sec x + c$ |
| Option D: | $y \cos^2 x = \sec x + c$ |

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

11. *

| | The Particular Integral of $(D^2 - 1)y = x \sin 3x$ is |
|-----------|--|
| Option A: | $P I = -\frac{1}{10} \left(x \sin 3x - \frac{3}{5} \cos 3x \right)$ |
| Option B: | $P I = \frac{1}{10} \left(x \sin 3x - \frac{3}{5} \cos 3x \right)$ |
| Option C: | $P I = -\frac{1}{10} \left(x \sin 3x + \frac{3}{5} \cos 3x \right)$ |
| Option D: | $P I = \frac{1}{10} \left(x \sin 3x + \frac{3}{5} \cos 3x \right)$ |

Mark only one oval.

Option A:

Option B:

Option C:

Option D:

12. *

If $B(n, 2) = \frac{1}{42}$ and n is a positive integer, then $n =$

Mark only one oval.

5

6

2

4

13. *

| | |
|-----------|---|
| | The area bounded by $y = x^2$ and $x = y^2$ is given by |
| Option A: | $\frac{1}{2}$ |
| Option B: | $\frac{1}{6}$ |
| Option C: | 1 |
| Option D: | $\frac{1}{3}$ |

Mark only one oval.

Option A:

Option B:

Option C:

Option D:

14. *

| | |
|-----------|---|
| | Find the value of $I = \int_5^6 (x - 5)^5 (6 - x)^6 dx$ |
| Option A: | $B\left(3, \frac{7}{2}\right)$ |
| Option B: | $B\left(3, \frac{5}{2}\right)$ |
| Option C: | B(5,6) |
| Option D: | B(6,7) |

Mark only one oval.

Option A:

Option B:

Option C:

Option D:

15. *

| | |
|-----------|--|
| | The length of the curve $y = \log \sec x$, from $x = 0$ to $x = \pi/3$ is |
| Option A: | $\sqrt{3}$ |
| Option B: | $\log(\sqrt{3})$ |
| Option C: | $\log(2 + \sqrt{3})$ |
| Option D: | $2\sqrt{3}$ |

Mark only one oval.

 Option A: Option B: Option C: Option D:

16. *

| | |
|-----------|--|
| | The Integrating factor of DE $(2x \log x - xy)dy + 2y dx = 0$ is |
| Option A: | $IF = \frac{1}{xy}$ |
| Option B: | $IF = \frac{1}{x}$ |
| Option C: | $IF = -\frac{1}{xy}$ |
| Option D: | $IF = -\frac{1}{x}$ |

Mark only one oval.

 Option A: Option B: Option C: Option D:

17. *

After changing from cartesian to spherical polar coordinates the integral $\iiint_v \frac{z}{x^2+y^2+z^2} dx dy dz$ reduces to $\iiint_v f(r, \theta, \varphi) dr d\theta d\varphi$, then $f(r, \theta, \varphi)$ is

Mark only one oval.

- $r \sin \theta$
- $r \cos \theta$
- $\sin \theta \cos \theta$
- $r \sin \theta \cos \theta$

18. *

| | |
|-----------|--|
| | The solution of $(D^4 + 8D^2 + 16)y = 0$ is given by |
| Option A: | $y = (c_1 + c_2x) \cos 2x + (c_3 + c_4x) \sin 2x$ |
| Option B: | $y = (c_1 + c_2x) + c_3x \cos 2x + c_4 \sin 2x$ |
| Option C: | $y = (c_1 + c_2) + c_3 \cos 2x + c_4 \sin 2x$ |
| Option D: | $y = (c_1 + c_2x) + c_3 \cos 2x + c_4 \sin 2x$ |

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

19. *

| | |
|-----------|---|
| | The value of $I = \int_0^a \int_y^a x \, dx \, dy$, if evaluating in polar coordinate is |
| Option A: | $\frac{a^3}{3}$ |
| Option B: | $\frac{a^3}{6}$ |
| Option C: | $\frac{a^2}{3}$ |
| Option D: | $\frac{a^2}{2}$ |

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

20. *

| | |
|-----------|---|
| | The Integrating factor of DE $\frac{dy}{dx} + (2x \tan^{-1}y - x^3)(1 + y^2) = 0$ is given by |
| Option A: | IF = $-e^{x^2}$ |
| Option B: | IF = $e^{x^2/2}$ |
| Option C: | IF = $-e^{x^2/2}$ |
| Option D: | IF = e^{x^2} |

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

21. *

If $I = \int_0^1 \int_0^{g(x)} \int_0^{f(x,y)} dz dy dx$ is evaluated over the volume bounded by $x+y+3z = 1$, $x=0$, $y=0$ and $z = 0$, then $3f(x,y) - g(x)$ is

Mark only one oval.

$2x - y$

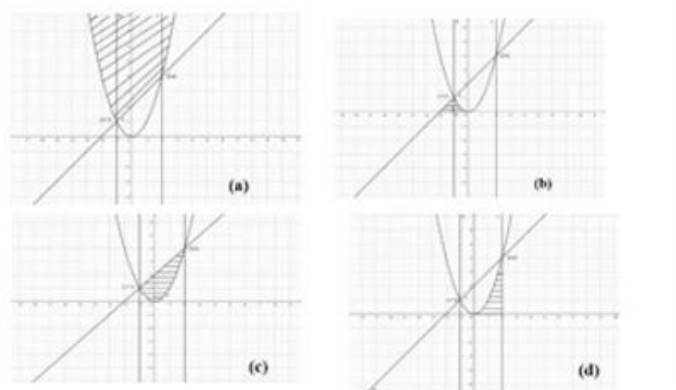
$4x - y$

$-y$

2

22. *

The region of integration for $I = \int_{-1}^2 \int_{x^2}^{x+2} f(x,y) dy dx$ is given by



Mark only one oval.

a

b

c

d

23. *

| | |
|-----------|--|
| | The Particular Integral of $(D + 1)y = e^{e^x}$ is |
| Option A: | $P I = -e^{-x} e^{e^x}$ |
| Option B: | $P I = e^{-x} e^{e^x}$ |
| Option C: | $P I = -e^x e^{e^x}$ |
| Option D: | $P I = e^x e^{e^x}$ |

Mark only one oval.

Option A:

Option B:

Option C:

Option D:

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EM-II_PART-B

3. Q1

| (20 Marks Each) | Solve any Four out of Six | 5 marks each |
|-----------------|--|--------------|
| A | Solve $(3x^2y^4 + 2xy) dx + (2x^3y^3 - x^2) dy = 0$ | |
| B | Solve $(D^4 - 1)y = e^x + \cos x \cos 3x$ | |
| C | Change the order of integration and evaluate $I = \int_0^a \int_y^{\sqrt{ay}} \frac{x}{x^2+y^2} dx dy$ | |
| D | Evaluate $I = \iiint z^2 dx dy dz$, over the volume common to the sphere $x^2 + y^2 + z^2 = 1$ and the cylinder $x^2 + y^2 = x$ | |
| E | Find the area between the parabola $y = x^2 - 6x + 3$ and the line $y = 2x - 9$ | |
| F | Prove that $\int_0^\infty \frac{e^x - e^{-ax}}{x \sec x} dx = \frac{1}{2} \log \left(\frac{a^2+1}{2} \right)$, $a > 0$ | |

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4. Q2

| (20 Marks Each) | Solve any Four out of Six | 5 marks each |
|-----------------|---|--------------|
| A | Solve $\cos x \frac{dy}{dx} + y \sin x = \sqrt{y \sec x}$ | |
| B | Using Method of Variation of Parameters solve $(D^2 + 1)y = \sec x \tan x$ | |
| C | Solve $(D - 2)^2 y = 8(e^{2x} + \sin 2x + x^2)$ | |
| D | Evaluate $I = \int_0^1 \int_0^{1-y} \int_0^{1-x-y} x^2 yz \, dz dy dx$ | |
| E | Evaluate $I = \int_R \int (3x + 4y^2) dx dy$ where R is the region in the upper half of the area bounded by the circles $x^2 + y^2 = 1$, $x^2 + y^2 = 4$ | |
| F | Show that $\int_0^{2\pi} \sin^2 \theta (1 + \cos \theta)^4 \, d\theta = \frac{21\pi}{8}$ | |

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Sub_PART-A

3. *

Grating element of a diffraction grating is defined as the _____

Mark only one oval.

- sum of slit width and opaque space width
- difference of slit width and opaque space width
- square of the slit width
- opaque space width

4. *

| | |
|-----------|---|
| | A parallel beam of monochromatic light of wavelength 5000\AA is normally incident on a single slit. If the angle at which the first order minima observed is 30° , What is the width of the slit? |
| Option A: | $2.6 \times 10^{-3}\text{m}$ |
| Option B: | $2 \times 10^{-4}\text{cm}$ |
| Option C: | $3.5 \times 10^4\text{m}$ |
| Option D: | $1 \times 10^{-4}\text{cm}$ |

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

5. *

Deduce the missing orders in a diffraction pattern through grating if the slit widths are 0.14mm and they are 0.7mm apart.

Mark only one oval.

- 3rd, 6th, 9th etc. order spectra
- 2th, 4th, 6th etc. order spectra
- 6th, 12th, 18th etc. order spectra
- 4th, 8th, 12th etc. order spectra

6. *

In holography, which of the following optical phenomena are involved?

Mark only one oval.

- interference, refraction
- interference, diffraction
- reflection, diffraction
- polarization, diffraction

7. *

In Graded index fibre, the refractive index of the core _____ from the axis of the fibre.

Mark only one oval.

- sharply increases
- abruptly changes
- gradually increases
- gradually decreases

8. *

| | |
|-----------|--|
| | In an optical fibre, the core material has refractive index 1.6 and refractive index of clad material is 1.3. What is the value of critical angle? |
| Option A: | 50.6° |
| Option B: | 54.3° |
| Option C: | 65.5° |
| Option D: | 53.4° |

Mark only one oval.

Option A:

Option B:

Option C:

Option D:

9. *

The numerical aperture of an optical fibre is 0.5 and refractive index of the core is 1.54. Find the refractive index of cladding.

Mark only one oval.

1.457

2.623

1.007

1.892

10. *

| | |
|-----------|---|
| | For a solenoidal vector point function, which one of the following is true? |
| Option A: | $\nabla \times \mathbf{V} = \mathbf{0}$ |
| Option B: | $\nabla \times \mathbf{V} = \frac{\rho}{\epsilon_0}$ |
| Option C: | $\nabla \cdot \mathbf{V} = \frac{\rho}{\epsilon_0}$ |
| Option D: | $\nabla \cdot \mathbf{V} = 0$ |

Mark only one oval.

Option A:

Option B:

Option C:

Option D:

11. *

In Gauss law of magnetism, $\nabla \cdot \mathbf{B} = 0$ signifies that

Mark only one oval.

there is no dipole in magnetism

there is no monopole in magnetism

there is no monopole in electrostatics

there is no dipole in electrostatics

12. *

| | |
|-----------|---|
| | If $\vec{D} = \rho_0 z \hat{k}$, the value of Charge density will be |
| Option A: | $\rho = 2\rho_0$ |
| Option B: | $\rho = \rho_0^2$ |
| Option C: | $\rho = \rho_0$ |
| Option D: | $\rho = \rho_0 z$ |

Mark only one oval.

Option A:

Option B:

Option C:

Option D:

13. *

The length of a rod in a moving frame will be _____ to the observer in a rest frame.

Mark only one oval.

unchanged

dilated

contracted

doubled

14. *

| | |
|-----------|---|
| | At what speed the mass of an object will be three times of its value at rest. |
| Option A: | $v = 2.83 \times 10^8 \text{ m/sec}$ |
| Option B: | $v = 1.67 \times 10^8 \text{ cm/sec}$ |
| Option C: | $v = 3.92 \times 10^7 \text{ m/sec}$ |
| Option D: | $v = 0.67 \times 10^{-8} \text{ m/sec}$ |

Mark only one oval.

Option A:

Option B:

Option C:

Option D:

15. *

Which of the following is not an example for bottom-up approach of synthesizing nanomaterials?

Mark only one oval.

Sol-gel

Molecular self-assembly

Ball milling

chemical vapour deposition

16. *

AFM works under the principle of

Mark only one oval.

- Boltzmann distribution law
- Pyroelectric effect
- Hook's law
- magnetostriction effect

17. *

Compared to bulk material, nanomaterial has

Mark only one oval.

- high volume/surface ratio
- high surface/volume ratio
- high size/volume ratio
- high density/volume ratio

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Sub_PART-B

3. Q1

| | Solve any Three out of Four | (5 marks each) |
|---|---|----------------|
| A | A plane transmission grating having 5500 lines per cm is used to obtain a spectrum of light from sodium light in the second order. Find the angular separation between the two sodium lines whose wavelengths are 5890\AA and 5896\AA respectively. | |
| B | Explain pumping and population inversion in laser action. Describe how those are taking place in He-Ne laser with neat labelled diagram. | |
| C | i) What is curl of a vector field? Express it in Cartesian coordinate system. ii) Determine the 'curl' of a vector field $\vec{A} = \hat{i}(2x^2 + y^2) + \hat{j}(xy - y^2)$ at the point (1,2,2) | |
| D | i) Why electron microscope is considered better than optical microscope in characterization of nanomaterials? ii) Describe the working of a Scanning Electron Microscope (SEM) with diagram. | |

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4. Q2

| | Solve any Three out of Four (5 marks each) |
|---|---|
| A | Define resolving power of a grating? Show that the resolving power depends on the number of slits in the grating and the order of the spectrum. |
| B | A step index fiber is made with a core of index 1.52, a diameter of $29\mu\text{m}$ and a fractional difference index of 0.0007. It is operated at a wavelength of $1.3\mu\text{m}$. Find the fiber 'V' number and the number of modes the fiber will support. |
| C | State and derive the Maxwell's equation which describes how the electric field circulates around time varying magnetic field. (In differential form) |
| D | i) Distinguish between inertial frame of reference and non-inertial frame of reference. ii) An event occurs at $x=150\text{m}$, $y=20\text{m}$, $z=10\text{m}$ and $t=1 \times 10^{-4}\text{ s}$ in a frame S. Find the co-ordinates of this event in a frame S' which is moving with a velocity $2.5 \times 10^8\text{ m/s}$ with respect to the frame S along the common XX' axes using Galilean transformation. |

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EC-II_PART-A

3. *

Green route of Adipic acid synthesis illustrates which of the following principle of Green Chemistry?

Mark only one oval.

- Use of renewable feedstock.
- Avoid chemical derivatization.
- Avoid use of auxiliary substances.
- Degradation of the product after the use.

4. *

Spectroscopy, in which the interaction of U.V. light with the molecules is studied, is known as ____.

Mark only one oval.

- Vibrational spectroscopy
- Vibrational rotational spectroscopy
- Electronic spectroscopy
- Microwave spectroscopy

5. *

The net calorific value (NCV) of the coal having following percentage composition by weight is _____.

C = 68%, H = 12%, O = 8%, N = 6%, S = 4%, Ash = 2%

Mark only one oval.

- 9739.50 kcal/kg
- 9379 kcal/kg
- 8457.54 kcal/kg
- 8745.04 kcal/kg

6. *

Which of the following is the percentage atom economy with respect to CH_3OH for the reaction? $\text{CH}_3\text{Cl} + \text{KOH (aq.)} \rightarrow \text{CH}_3\text{OH} + \text{KCl}$

Mark only one oval.

30.04%

39.92%

50.04%

60.08%

7. *

Which of the following is the standard EMF of the following galvanic cell?

(-) $\text{Ni (s)} / \text{Ni}^{2+} (1\text{M, aq.}) // \text{Cu}^{2+} (1\text{M, aq.}) / \text{Cu (s)} (+)$

[Given: $E^\circ \text{Ni} = -0.257\text{V}$ and $E^\circ \text{Cu} = 0.337\text{V}$]

Mark only one oval.

0.08V

0.167V

0.594V

0.761V

8. *

Which of the following is not true about catalytic reactions?

Mark only one oval.

They can reduce time required for completion of the reaction

They can reduce percentage atom economy of the desired product.

They can reduce number of steps in the multistep synthesis.

They can reduce energy requirement of the reaction.

9. *

Which of the following is the nature of metal oxide film produced by the alkali metals?

Mark only one oval.

- Porous
- Unstable
- Volatile
- Stable

10. *

Rate of metallic corrosion will be relatively higher in which of the following case?

Mark only one oval.

- When surface area of anode is greater than surface area of cathode.
- When surface area of cathode is greater than surface area of anode.
- When surface area of anode is equal to surface area of cathode.
- It is independent of anodic and cathodic areas.

11. *

In green route, Ibuprofen is synthesized from which of the following starting molecule?

Mark only one oval.

- L- Tryptophan
- D-Glucose
- Isobutyl benzene
- Aniline

12. *

2.5 g of coal sample was kjeldhalized and evolved NH_3 was absorbed in 50 ml of 0.5N H_2SO_4 . To neutralize excess of acid 15 ml of 0.5N NaOH was required. Which of the following is the percentage of the nitrogen in the sample of coal?

Mark only one oval.

- 2.4%
- 4.9 %
- 9.8 %
- 19.6 %

13. *

When a drop of water is placed over the surface of the pure metal then according to differential aeration theory of corrosion, _____.

Mark only one oval.

- The area below the drop of water receives protection.
- The area below the drop of water behaves as anode.
- The area below the drop of water behaves as cathode.
- The area below the drop of water remains unaffected.

14. *

Which of the following is assigned zero value on the octane scale?

Mark only one oval.

- 1-methyl naphthalene
- n-heptane
- cetane
- iso-octane

15. *

According to sacrificial anode method, the metallic object to be protected from corrosion should be connected to the metal having _____.

Mark only one oval.

- Reduction potential higher than the object.
- Reduction potential same as the object.
- Reduction potential lower than the object.
- Independent of reduction potential of the object.

16. *

A sample of hydrocarbon contains C = 80% and H = 20% by weight. The weight of the oxygen required for complete combustion of 1 Kg of the above hydrocarbon is _____.

Mark only one oval.

- 2.13 kg
- 3.73 kg
- 5.86 kg
- 16.21 kg

17. *

Caustic embrittlement in the boiler is the example of which type of corrosion?

Mark only one oval.

- Intergranular corrosion
- Pitting corrosion
- Galvanic corrosion
- Stress corrosion

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EC-II_PART-B

3. Q1

| | Solve <u>any Three</u> out of Five Questions | 5 marks each |
|---|--|--------------|
| A | Write conventional and green synthesis of Indigo dye. Which principle of the green chemistry is supported by the green route? | |
| B | Explain protection of metallic object by impressed current method. | |
| C | A gaseous sample of the fuel has following composition by volume. CH ₄ = 13% C ₂ H ₆ = 27% C ₃ H ₈ = 35% C ₄ H ₁₀ = 10% O ₂ = 4% N ₂ = 6% CO = 5% Calculate volume of air required by 5 m ³ of this fuel for its complete combustion. | |
| D | Differentiate between: Galvanizing and Tinning. | |
| E | Calculate EMF of the following Galvanic cell. [Given: E° Ag = 0.799V and E° Cr = - 0.740 V] (-) Cr (s) / Cr ³⁺ (0.1M, aq.) // Ag ⁺ (0.01M, aq.) / Ag (s) (+) | |

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4. Q2

| | Solve <u>any Three</u> out of Five Questions | 5 marks each |
|---|--|---------------------|
| A | Write a short note on Galvanic Corrosion. | |
| B | Write general reaction and explain synthesis of biodiesel. What are its advantages? | |
| C | 4 g of coal was heated at 110 degree Celsius for an hour when it left behind the mass of 3.75 g. This when heated at 950 degree Celsius for 7 minutes gave mass of 3.35 g. This upon further heating at 750 degree Celsius in air for an hour left behind residue of constant mass of 0.150g. Calculate the results of proximate analysis. | |
| D | What are the characteristics of ideal fuel? | |
| E | What is absorption spectroscopy? Explain different types of absorption spectroscopy explaining nature of interactions with molecules. | |

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Engineering
Graphics

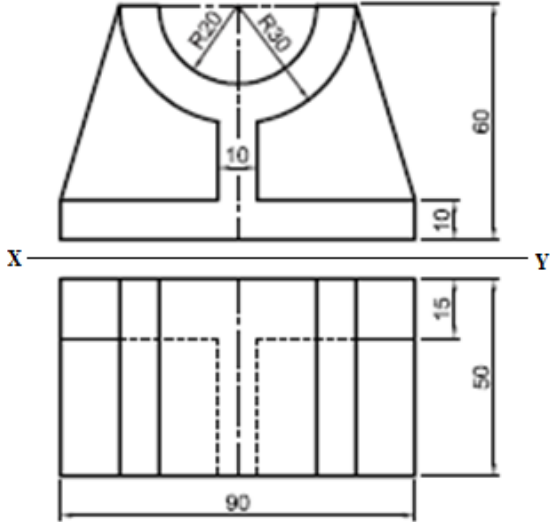
NB : (1) Use First Angle method of projection only.
 (2) Use your Judgment for any unspecified dimension.
 (3) Retain all construction lines.
 (4) Figures to the right indicate full marks.
 (5) All dimensions are in mm.
 (6) Show necessary dimensions
 (7) Draw the diagrams a little darker so that drawings have clarity while scanning.

3. Q1

| Q1 | Answer any ONE Question out of TWO | Marks |
|----|---|-------|
| a | A straight line PQ has its end P 20 mm above the H.P. and 10 mm in front of the V.P. and the end Q is in 3 rd quadrant, 40 mm and 50 mm away from HP and VP respectively. Draw projections of PQ if the FV is 70 mm and find the inclination of PQ with HP and VP. | 10 |
| b | Draw a path traced out by an end of a piece of thread when unwound to a length of 100 mm from a circle of diameter 40 mm, the thread being kept tight during unwound. Name the curve traced. | 10 |

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4. Q2

| | | |
|----|---|----|
| Q2 | Answer any TWO Question out of THREE | |
| a | A hexagonal prism of base edge 30 mm and axis 60 mm rests on an edge of its base in the H.P. Its axis is parallel to V.P. and inclined at 45° to the H.P. Draw its projections | 15 |
| b | <p>Figure shows two views of an object. Draw Isometric view of the object using natural scale</p>  | 15 |
| c | A pentagonal pyramid of base side 30 mm and axis 60 mm rests on one of the corners of base on the H.P with the Apex being 50 mm above HP. Draw projections of the pyramid when the plane containing the axis is inclined 45 degrees to VP, apex being near to VP. | 15 |

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5. Q3

Pictorial view of an object is given below and Draw:

1. Sectional FV (Section A-A) (8 marks)
2. TV (5 marks)
3. Right Hand Side view (5 marks)

Insert minimum 10 important dimensions (2 marks)

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CP_PART-B

3. *

In an identifier following symbol is allowed

Mark only one oval.

*(asterisk)

|(pipeline)

-(hyphen)

_(underscore)

4. *

Given `int a=7, b=2; float c;`

`c=a/b;`

What will be the output of the following sentence?

`printf("\n%f",c)`

Mark only one oval.

3.000000

3.500000

3.0

3.5

5. *

In C programming, which of the following operators have the highest precedence

Mark only one oval.

Relational

Arithmetic

Bitwise

Logical

6. *

A light-sensitive device that transforms printed text or images into digital form is

Mark only one oval.

- keyboard
- scanner
- plotter
- OMR

7. *

```
# include<stdio.h>
int a;
int main()
{
if (a);
else
printf("Else");
return 0;
}
```

Which statement is correct?

Mark only one oval.

- if block is executed
- else block is executed
- It is unpredictable as a is not initialized
- Error:misplaced else

8. *

Which one is most appropriate statement?

Mark only one oval.

- break and continue can be used in for, while, do-while loop body and switch body.
- break and continue can be used in for, while, do-while loop body and but only break can be used in switch body.
- continue can be used in for, while, do-while loop body
- break can be used in for, while, do-while loop body

9. *

What will be the output of below program?

```
#include<stdio.h>
int main()
{
int a=3;
if(a= =2); a=0;
if(a==3) a++;
else a+=2;
printf("a = %d", a);
return 0;
}
```

Mark only one oval.

- a = 4
- Compile error
- a = 0
- a = 2

10. *

do-while loop ends when test expression returns

Mark only one oval.

- One
- Non zero
- 1
- Zero

11. *

If a 3-dimensional array is a parameter, then which statement is correct (Assume declaration is: `int arr[5][3][2];`)

Mark only one oval.

- `func(*arr)`
- `func(arr)`
- `func(**arr)`
- `func(arr[5][3][2])`

12. *

Pick the correct statement in context with an array

Mark only one oval.

- Elements in an array cannot be sorted
- Index of the first element of an array is one
- Easier to store the elements of the same data type
- can store objects of mixed data type.

13. *

Choose correct option for C code

```
#include<stdio.h>
struct test
{int a;
char ch;
float f;
};
main()
{
struct test t[ ] = {(1, 'A', 1.2), (2, 'B', 1.3), (3, 'C', 1.4)};
}
```

Mark only one oval.

- No compile-time error, generates an array of structure with Three elements
- No compile-time error, generates an array of structure with Nine elements
- Compile-time error, illegal declaration of a multidimensional array
- Compile-time error, illegal assignment to members of structure

14. *

----- is a step by step method to solve a problem in a finite time

Mark only one oval.

- Algorithm
- Structure
- Compilation
- Activity

15. *

(10 && 5) test expression gives result ----- after execution

Mark only one oval.

1

0

15

50

16. *

The result of printf statement is if following code is given:

```
float pi;
```

```
pi = 3.141592;
```

```
printf(“%4.2f”, pi);
```

Mark only one oval.

03.1415

3.15

3.14

3.141592

17. *

----- is format specifier to read and print sequence of characters

Mark only one oval.

%s

%c

%d

%p

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KCCEMSR SLOT 6

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1. Email *

2. Q1

| | Solve any three out of five | 5 marks each |
|---|---|---------------------|
| A | What do you mean by recursion? Write a program that will add first n natural numbers using recursion. | |
| B | Write a program to print the following pattern 1 10 101 1010 10101 | |
| C | Discuss what is the need of the break statement in the switch case? Write a program to read weekday number (Sunday-1, Monday-2...) and print weekday name using switch | |
| D | Explain different primitive data types in C. What is the difference between declaring a variable and initializing/defining a variable? | |
| E | Write a program for the following problem statement using nested structure: A company needs to maintain data about its employees. Details to be maintained are Employee name, Department, Date of joining and Salary. (Note: use structure for a date like 14 August 2021). | |

Files submitted:

3. Q2

| | Solve any three out of five | 5 marks each |
|---|---|---------------------|
| A | Describe any two library functions of string.h file with example. | |
| B | Write an algorithm and draw a flowchart whether the entered number is an Armstrong or not | |
| C | Compare structure and union. | |
| D | Write a program in to accept an array A with n elements and separate different arrays B and C in such a way that B contains odd numbers and C contains even numbers, i.e. if array A contains A- {3, 2, 4, 2, 5, 7, 8} then B- {3, 5, 7} and C- {2,4,2,8} | |
| E | Write a program that should give output as follows: $10 \& 15 = 10$ $10 15 = 15$ $10 \wedge 15 = 5$ $\sim 10 = -11$ $10 \ll 2 = 40$ $10 \gg 2 = 2$ | |

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3. Q1

| | Solve any Two Questions out of Three | 5 marks each |
|---|---|---------------------|
| A | As the class representative of third year computer branch, you wish to organize a debate competition on the occasion of world environment day. Write a letter to the Principal of your college, seeking permission to use the auditorium for the event. | |
| B | Despite the drawbacks of grapevine communication, why do you think it is still very prevalent in most organizations? | |
| C | Differentiate between 'Warning' and 'Caution'. Illustrate with appropriate examples. | |

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4. Q2

| | Solve any Two Questions out of Three | 5 marks each |
|---|--|---------------------|
| A | Write a set of instructions on how to generate a link in Google Meet. | |
| B | You had placed an order for 100 copies of a book for your college library. On delivery, you find that Chapter 3 is missing from 20 of the books. On behalf of the college, write a claim letter requesting replacement of the defective copies of the books. | |
| C | Write a short note on the well-known adage 'One cannot not communicate'. | |
| | | |

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PCE_PART-A

3. *

Which among the following is a channel of communication?

Mark only one oval.

- Optic fiber cables
- Spoken words on telephone
- Paragraphs in an email
- Depiction of a landscape in a painting

4. *

Which of the following is a primary objective of communication in an organization?

Mark only one oval.

- Giving salary and incentives to employees
- Giving recognition to deserving employees
- Assigning responsibilities to employees
- Giving feedback on employee performance

5. *

One-to-one feedback to the employees is an example of

Mark only one oval.

- Upward communication
- Horizontal communication
- Informal communication
- Downward communication

6. *

The ringing of a bell in educational institutions is an example of

Mark only one oval.

- Gustatory communication
- Auditory communication
- Olfactory communication
- Tactile communication

7. *

According to Aristotle human nature, habit and reason are important forces that should be cultivated in education to produce good and virtuous citizens. He proposed repetition as a tool to develop good habits, unlike Socrates who emphasized the need to include questioning to bring out ideas in the listeners. Based on the above extract, select the best option that differentiates the approach of Aristotle and Socrates

Mark only one oval.

- Aristotle believed in rote-learning, Socrates in thinking
- Aristotle emphasized human nature, Socrates on science
- Aristotle believed in repetition, Socrates in questioning
- Aristotle emphasized reasoning, Socrates on creativity

8. *

“Clearly you did not understand the purpose behind the project report” compromises on the principle of

Mark only one oval.

- Correctness
- Concreteness
- Completeness
- Consideration

9. *

'I sat here as I wanted to hear the singer perform without any distractions.' The underlined words in the sentence are examples of

Mark only one oval.

- Homophones
- Homonyms
- Synonyms
- Antonyms

10. *

A 'percussion drum kit' belongs to the class of

Mark only one oval.

- An apparatus
- An instrument
- An engine
- A machine

11. *

From the options given below, identify the sentence which is correct

Mark only one oval.

- Many common foods contain large amounts of sugar like ketchup and hamburger buns.
- Many common food, such as ketchup and hamburger buns contain large amount of sugar.
- Many common foods, such as ketchup and hamburger buns, contain large amounts of sugar.
- Many common foods contains large amounts of sugar such as ketchup and hamburger buns.

12. *

The ranking of a person in an organization leads to

Mark only one oval.

- Psychological barrier
- Cultural barrier
- Physical barrier
- Status barrier

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