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J – 2703

Reg. No. : .....

Name : .....

**Second Semester B.Sc. Degree Examination, May 2020**

**First Degree Programme Under CBCSS**

**Physics**

**Core Course**

**PY 1241 : HEAT AND THERMODYNAMICS**

**(2018 Admission Onwards)**

Time : 3 Hours

Max. Marks : 80

**SECTION – A**

Answer **all** questions; each carries **1** mark.

1. Give the differential form of first law of thermodynamics.
2. Give one example each for isothermal and adiabatic process.
3. What is a quasistatic process?
4. State Clausius statement of second law of thermodynamics.
5. Write Clausius - Clapeyron equation and explain the symbols.
6. State Stefan's law.
7. Represent Carnot cycle on a TS diagram.
8. What is meant by Clausius theorem?
9. How is entropy related to available energy?
10. Give two examples for a second order phase – transition.

**(10 × 1 = 10 Marks)**

P.T.O.

## SECTION – B

Answer any **eight**; **each** carries **2** marks.

11. Obtain the relation for the work done in an adiabatic process.
12. What is a reversible process? What are the conditions to be satisfied for a process to be reversible?
13. State and explain Carnot's theorem.
14. Draw labelled diagram for the Diesel cycle.
15. Explain the third law of thermodynamics.
16. Give two applications of heat conduction in daily life.
17. Derive Mayer's relation from first law of thermodynamics.
18. Show that entropy remains constant in a reversible process.
19. Define thermal conductivity. Obtain its unit.
20. Explain the effect of pressure on the boiling point of a liquid.
21. What are the conditions for a system to be in thermodynamic equilibrium?
22. What are the advantages of a diesel engine?

(8 × 2 = 16 Marks)

## SECTION – C

Answer any **six**; **each** carries **4** marks.

23. A Carnot engine working between two temperatures has efficiency 0.2. When the temperature of the source is increased by 25°C, the efficiency increases to 0.25. Find the temperature of the source and sink.
24. A motor tyre has a pressure of 2 atmospheres at the room temperature of 27°C. If the tyre suddenly bursts, find the resulting temperature. ( $\gamma = 1.4$ )
25. Calculate the amount of work done in adiabatically compressing one mole of a perfect gas at normal pressure to 1/3 of its volume. The molecular specific heat of the gas at constant volume is  $3/2 R$ .

26. 2 mole of a gas at  $27^{\circ}\text{C}$  expands isothermally until its volume is doubled. Calculate the work done.
27. 1 Kg of water at  $0^{\circ}\text{C}$  is heated to  $100^{\circ}\text{C}$ . Compute the change in entropy (Specific heat capacity of water =  $4200 \text{ JKg}^{-1}\text{K}^{-1}$ )
28. Calculate the change in entropy when 5 Kg of water at  $100^{\circ}\text{C}$  is converted to steam at the same temperature.  $L = 2.268 \times 10^6 \text{ JKg}^{-1}$ .
29. Calculate the depression in the melting point of ice produced by 1 atmosphere increase of pressure. Given latent heat of ice  $3.36 \times 10^5 \text{ JKg}^{-1}$  and specific volume of 1 gm of ice and water at  $0^{\circ}\text{C}$  are  $1.091 \text{ cm}^3$  and  $1 \text{ cm}^3$  respectively.
30. The temperature of a perfect black body is 700 K and area of its radiating surface is  $2 \times 10^3 \text{ m}^2$ . Find the energy radiated in 30 minutes. ( $\sigma = 5.7 \times 10^{-8} \text{ Wm}^{-2}\text{K}^{-4}$ )
31. Calculate the surface temperature of the sun from the following data. Radius of the sun =  $6.96 \times 10^5 \text{ Km}$ ., Mean distance of the sun and earth =  $1.497 \times 10^8 \text{ Km}$ . Solar constant =  $1400 \text{ Jm}^{-2}\text{s}^{-1}$ , Stefan's constant =  $5.7 \times 10^{-8} \text{ Wm}^{-2}\text{K}^{-4}$ .

**(6 × 4 = 24 Marks)**

### SECTION – D

Answer any **two**; **each** question **15** marks.

32. Describe the working of an Otto engine. Derive an expression for its efficiency.
33. Explain first law of thermodynamics. Prove that (a)  $PV^{\gamma} = \text{constant}$  (b)  $TV^{\gamma-1} = \text{constant}$  in an adiabatic process.
34. Define entropy. What is its physical significance? Calculate the total change in entropy when 1 Kg of ice at  $0^{\circ}\text{C}$  is converted into steam at  $100^{\circ}\text{C}$ .
35. With the help of a diagram, explain the determination of the thermal conductivity of a poor conductor by Lee's disc method.

**(2 × 15 = 30 Marks)**

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J – 2704

Reg. No. : .....

Name : .....

**Second Semester B.Sc. Degree Examination, May 2020**

**First Degree Programme under CBCSS**

**Complementary Course for Physics**

**MM 1231.1: MATHEMATICS II – CALCULUS WITH APPLICATIONS  
IN PHYSICS – II**

**(2018 Admission Onwards)**

Time : 3 Hours

Max. Marks : 80

**SECTION – I**

Answer the **first ten** questions are compulsory. They carry 1 mark each.

1. Find the complex conjugate of the complex number  $z = (x + 5i)^{(3y+2ix)}$ .
2. Find the sum of the complex numbers  $1 + 2i$ ,  $-3 + 4i$  and  $2 - 6i$ .
3. Find the argument of the complex number  $z = 1 + \sqrt{3}i$ .
4. Evaluate  $\frac{d}{dx} \left( \sinh^{-1} \left( \frac{3}{x} \right) \right)$ .
5. Let  $f(x, y) = \tan^{-1} \left( \frac{y}{x} \right)$  Find  $\frac{\partial f}{\partial x}$ .
6. State Pappu's second theorem.
7. Find  $\int_0^1 \int_0^1 \int_0^1 dx dy dz$ .

P.T.O.

8. Find the Laplacian of the scalar field  $\varphi = xy^2z^3$ .
9. Define  $\nabla \cdot \mathbf{a}$  in spherical polar coordinates, where  $\mathbf{a}$  is a vector field.
10. The position vector of a particle at time  $t$  in Cartesian coordinates is given by  $\mathbf{r}(t) = 2t^2\mathbf{i} + (3t - 2)\mathbf{j} + (3t^2 - 1)\mathbf{k}$ . Find the velocity of the particle.

## SECTION II

Answer **any eight** questions among the questions **11 to 22**. These questions carry **2** marks each.

11. Evaluate  $\text{Im}(\cosh^2 z)$ .
12. Solve the hyperbolic equation  $\cosh x - 5\sinh x - 5 = 0$ .
13. Evaluate  $\int e^{2x} \sin 3x dx$ .
14. Show that the differential  $df = x^2 dy - (y^2 + xy) dx$  is not exact.
15. Find the total derivative of  $f(x, y) = x^2 + 3xy$  with respect to  $x$ , given that  $y = \sin^{-1} x$ .
16. Find the Taylor expansion, up to quadratic terms in  $x - 2$  and  $y - 3$  of  $f(x, y) = ye^{xy}$  about the point  $x = 2, y = 3$ .
17. Evaluate  $\int_1^3 \int_2^4 (40 - 2xy) dy dx$ .
18. A semi-circular uniform lamina is freely suspended from one of its corners. Show that its straight edge makes an angle of  $23.0^\circ$  with the vertical.
19. Evaluate the double integral  $\iint_R x^2 y dx dy$ , where  $R$  is the triangular area bounded by the lines  $x = 0, y = 0$  and  $x + y = 1$ .
20. Find  $\text{div } \mathbf{F}$  and  $\text{curl } \mathbf{F}$  of the vector field  $\mathbf{F}(x, y, z) = x^2\mathbf{i} - 2\mathbf{j} + yz\mathbf{k}$ .

21. For the function  $\phi = x^2y + yz$  at the point  $(1, 2, -1)$ , find its rate of change with distance in the direction  $a = i + 2j + 3k$ .
22. The position vector of a particle in plane polar coordinates is  $r(t) = p(t)\hat{e}_p$ . Find  $p$  expressions for the velocity and acceleration of the particle in these coordinates.

### SECTION III

Answer any **six** questions among the questions **23 to 31**. These questions carry **4** marks each.

23. By writing  $\frac{\pi}{12} = \frac{\pi}{3} - \frac{\pi}{4}$  and considering  $e^{\frac{ix}{12}}$ , evaluate  $\cot\left(\frac{\pi}{12}\right)$ .
24. Prove that  $\tanh^{-1}x = \frac{1}{2}\ln\left(\frac{1+x}{1-x}\right)$ ,  $-1 < x < 1$ .
25. Prove that  $z^n + \frac{1}{z^n} = 2\cos n\theta$  and  $z^n - \frac{1}{z^n} = 2i\sin n\theta$ , where  $z = e^{i\theta}$ .
26. The function  $f(x, y)$  satisfies the differential equation  $y\frac{\partial f}{\partial x} + x\frac{\partial f}{\partial y} = 0$ . By changing to new variables  $u = x^2 - y^2$  and  $v = 2xy$ , show that  $f$  is a function of  $x^2 - y^2$  only.
27. The temperature of a point  $(x, y)$  on a unit circle is given by  $T(x, y) = 1 + xy$ . Find the temperature of the two hottest points on the circle.
28. Identify the curved wedge bounded by the surface  $y^2 = 4ax$ ,  $x + z = a$  and  $z = 0$  and hence calculate its volume  $V$ .
29. Find the Jacobin  $\frac{\partial(x, y, z)}{\partial(u, v, w)}$  of the transformation  $u = xy, v = y, w = x + z$ .
30. Prove that  $\text{curl } a = \nabla \times (\nabla \times a) = \nabla(\nabla \cdot a) - \nabla^2 a$ .

31. For the twisted space curve given parametrically by  $x = au(3 - u^2)$ ,  $y = 3au^2$ ,  $z = au(3 + u^2)$ . Show that the radius of curvature at  $u$  is  $3a(1 + u^2)^2$ .

#### SECTION IV

Answer any **two** questions among the question 32 to 35. These questions carry 15 marks each.

32. (a) Use the Moivre's theorem with  $n = 4$  to prove that  $\cos 4\theta = 8\cos^4 \theta - 8\cos^2 \theta + 1$ , and deduce that  $\cos \frac{\pi}{8} = \left( \frac{2 + \sqrt{2}}{4} \right)^{\frac{1}{2}}$ .
- (b) By differentiating  $e^{(a+ib)x}$  and separating real and imaginary parts, find the derivatives of  $e^{ax} \cos bx$  and  $e^{ax} \sin bx$ .
33. (a) Find the stationary values of  $f(x, y) = 4x^2 + 4y^2 + x^4 - 6x^2 - y^2 + y^4$  and classify them as maxima, minima or saddle points.
- (b) Suppose that  $w = \sqrt{x^2 + y^2 + z^2}$ ,  $x = \cos \theta$ ,  $y = \sin \theta$ ,  $z = \tan \theta$ . Find  $\frac{dw}{d\theta}$  when  $\theta = \frac{\pi}{4}$ .
34. (a) Evaluate  $\int_{-\infty}^{\infty} e^{-x^2} dx$ .
- (b) A tetrahedron is bounded by the three coordinate surfaces and the plane  $\frac{x}{a} + \frac{y}{b} + \frac{z}{x} = 1$  and has density  $\rho(x, y, z) = \rho_0 \left( 1 + \frac{x}{a} \right)$ . Find the average value of the density.
35. (a) Express the vector field  $a = yzi - yj + xz^2k$  in cylindrical polar coordinates, and hence calculate its divergence.
- (b) Derive Frenet-Serret formulae.

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J – 2701

Reg. No. : .....

Name : .....

**Second Semester B.Sc. Degree Examination, May 2020**

**First Degree Programme Under CBCSS**

**Complementary Course for Mathematics**

**ST 1231.1 — PROBABILITY AND RANDOM VARIABLES**

**(2018 Admission Onwards)**

Time : 3 Hours

Max. Marks : 80

Instructions : Scientific Calculators and Mathematical/Statistical tables are permitted to use.

**SECTION – A**

Answer **all** questions. **Each** question carries **1** mark.

1. Define the sample space of a random experiment and give an example.
2. In a population of  $N$  balls, there are  $M$  white balls and remaining are black balls. What is the probability that the group so selected will contain exactly  $m$  white balls, if  $n$  balls are selected from the population?
3. Let  $A$  and  $B$  be any two events defined on a sample space then prove that  $P(A \cap B^c) = P(A) - P(A \cap B)$  where  $A^c$  is the complement of  $A$ .
4. If five cards are selected from a pack of 52 cards, find the probability of getting at least three spade cards.

P.T.O.

5. If the probability mass function of a discrete random variable is given by  $f(x) = \frac{1}{2^x}$  where  $x = 1, 2, 3, \dots$  find moment generating function of  $X$ .

6. Let  $X$  be a random variable with distribution function  $F(x) = 1 - e^{-\theta x}$ ; where  $x \geq 0$ ;  $\theta \geq 0$  find probability density function of  $X$ .

7. If  $x$  is a random variable with following probability mass function

$x:$	-1	0	1	2
$p(x):$	3/8	1/8	1/8	3/8

Find  $E(X^2)$ .

8. If  $X$  is a random variable then what is the value of  $E[X(X - 1)] - E(X)E(X - 1)$  where  $E(X)$  is the expectation of  $X$ .

9. If  $M_x(t) = \frac{2}{2 - e^t}$  is the moment generating function of  $X$ , find the moment generating function of  $2X + 1$ .

10. Define conditional expectation of a random variable  $X$  given  $Y$ .

**(10 × 1 = 10 Marks)**

### SECTION – B

Answer any **eight** questions. **Each** question carries **2** marks.

11. Explain concept Statistical regularity.

12. Three unbiased coins are tossed together find the probability distribution of number of heads and sketch the graph of the function.

13. State and prove addition theorem on probability.

14. Let  $P(A) = 0.4$  and  $P(A \cup B) = 0.6$  for what values of  $P(B)$  are  $A$  and  $B$  independent events?
15. If  $A$  and  $B$  are any two independent events verify the independence of  $A^c$  and  $B^c$ .
16. A random variable  $X$  has the probability density function  $f(x) = \begin{cases} 1/4 & -2 < x < 2 \\ 0 & \text{otherwise} \end{cases}$ . Find (i) distribution function of  $X$  (ii)  $P(|x| > 1)$ .
17. For a random variable  $X$ , probability mass function is given by  $f(x) = \begin{cases} \frac{x}{k}, & x = 1,2,3,4,5 \\ 0, & \text{otherwise} \end{cases}$ . Find  $K$  and hence obtain  $P(X \geq 2)$ . What is the distribution of  $Y = (X - 3)^2$ .
18. A random variable  $X$  has the following probability density function  $f(x) = \begin{cases} x, & 0 \leq x \leq 1 \\ 2-x, & 1 \leq x \leq 2 \end{cases}$ . Find the probability distribution function of  $X$ .
19. If  $M_x(t) = \left(\frac{2}{3} + \frac{1}{3}e^t\right)^4$  is the moment generating function of  $X$ , what is  $E(X)$ ?
20. If  $\Phi_x(t)$  is the characteristic function of  $X$  derive the characteristic function of  $Y = aX + b$  where  $a$  and  $b$  are constants.
21. Let  $X$  be a non negative continuous random variable with probability density function  $f(x)$  then obtain the probability density function of  $Y = X^2$
22. If  $f(x, y) = K(x + 2y)$ ,  $x = 0,1,2$ ;  $y = 1,2,3$  is the joint probability function of  $X$  and  $Y$  then obtain the value of  $K$ . Also find  $E(XY)$ .

(8 × 2 = 16 Marks)

SECTION – C

Answer any six questions. Each question carries 4 marks.

23. If  $P(A) = 0.5$ ,  $P(B) = 0.4$  and  $P(A \cap B) = 0.3$  then find the following probabilities  
(i) at least one of the two events (ii) exactly one of the two events (iii) none of the events occur (iv)  $P(A/B^c)$ .
24. Prove that  $P(A \cup B/C) = P(A/C) + P(B/C) - P(A \cap B/C)$ .
25. State and prove Bayes' theorem.
26. Prove that  $E(aX + bY) = aE(X) + bE(Y)$  where a and b are constants.
27. Let X has the moment generating function  $M_x(t) = (1 - t)^{-2}$  for  $|t| < 1$  then what is the mean and variance of x?
28. Show that  $(E(XY))^2 \leq E(X^2)E(Y^2)$ .
29. Two random variables have joint probability mass function  $P(X = 0, Y = 0) = 2/9$ ,  $P(X = 0, Y = 1) = 1/9$ ,  $P(X = 1, Y = 0) = 1/9$ , and  $P(X = 1, Y = 1) = 5/9$ . Find the value of  $E(X + Y)$ . Also examine independence of random variables X and Y.
30. The joint probability mass function of (X, Y) is given by  $f(x, y) = \frac{1}{16}$  for  $(x, y) = (-3, -5), (-1, -1), (1, 1)$  and  $(3, 5)$ . Find the covariance between X and Y.
31. If  $V(X)$  is the variance of a random variable then show that it can be represented as  $V(X) = E(V(X/Y)) + V(E(X/Y))$  where  $E(X/Y)$  and  $V(X/Y)$  are conditional mean and conditional variance of X given Y.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. Each question carries **15** marks.

32. (i) Explain the concept of pair wise independence and mutual independence between  $n$  events. Give examples.
- (ii) In a factory total items are produced by 4 machines in the proportion 4:7:8:6 and of their output, respectively 8%, 3%, 4% and 5% are defective items. An item is selected at random then find the chance that
- (a) it is a non defective
- (b) It is produced by the third machine if the selected was a defective.
33. (i) A box contains  $2^n$  tickets of which  $\binom{n}{i}$  tickets bear the number  $i = 0, 1, 2, \dots, n$ . A group of  $m$  tickets are drawn, what is the expectation of the sum of their numbers.
- (ii) If  $X$  is a random variable with probability mass function  $f(x) = \frac{1}{n}$ ,  $x = 1, 2, \dots, n$  then find mean, variance and moment generating function of  $X$ .
34. (i) A random variable  $X$  has the cumulative distribution
- $$F(x) = \begin{cases} 0 & \text{if } x \leq 0 \\ \frac{1}{2}x & \text{if } 0 < x < 1 \\ x - 1/2 & \text{if } 1 \leq x < 3/2 \\ 1 & \text{if } x \geq 3/2 \end{cases}$$
- Find probability density function of  $X$ .
- Also obtain  $P(X > 1/2)$ ,  $P(X \leq 5/4)$  and  $P(X = 5/4)$ . Sketch the graph of both distribution and density function of  $x$ .
- (ii) Let  $X$  and  $Y$  are jointly distributed with probability density function  $f(x, y) = \begin{cases} e^{-(x+y)} & \text{if } 0 < x < \infty, 0 < y < \infty \\ 0 & \text{otherwise} \end{cases}$ . Show that  $X$  and  $Y$  are independent random variables.

35. (i) Let  $X$  and  $Y$  are two random variables having joint probability mass function

$$f(x, y) = \frac{1}{72}(2x + 3y), \quad x = 0, 1, 2; \quad y = 1, 2, 3$$

Find (a) marginal probability mass functions of  $X$  and  $Y$

(b) conditional distribution of  $X$  given  $Y = 1$ ,

(c) conditional mean of  $X$  given  $Y = 1$ .

- (ii) Let  $X$  and  $Y$  have the joint probability density function  $f(x, y) = k, x, y, 0 < x < y < 1$ , find  $k$  and marginal probability density functions of  $X$  and  $Y$ .

**(2 × 15 = 30 Marks)**

(Pages : 4)

J – 2702

Reg. No. : .....

Name : .....

**Second Semester B.Sc. Degree Examination, May 2020**

**First Degree Programme under CBCSS**

**Complementary course for Mathematics**

**PY 1231.1 : THERMAL PHYSICS AND STATISTICAL MECHANICS**

**(2018 Admission Onwards)**

Time : 3 Hours

Max. Marks : 80

**SECTION – A**

Very short answer type questions. (One word to Maximum 2 sentences). Answer all. Each carries one 1 mark.

1. State Weidmann Franz law.
2. In a toss of 4 coins a macro state with 2 Heads has \_\_\_\_\_ number of microstates.
3. There are three furnaces, Furnace A with blue flame, Furnace B with yellow flame and Furnace C with red flame which has the highest temperature \_\_\_\_\_
4. State postulate of 'equal a priori probabilities'.
5. The efficiency of Carnot engine working between steam point and ice point is \_\_\_\_\_
6. The expression for work done in isothermal process is \_\_\_\_\_

P.T.O.

7. Which states of matter (solid, liquid or gas) has the highest entropy
8. State Wien's displacement law?
9. Why it is cooler at the top of the mountain than at the sea level.
10. If  $dU = -dW$  in a thermodynamic process, then process is:

**(10 × 1 = 10 Marks)**

### SECTION – B

Short answer type question. Answer any **eight** questions. Each carry **2** marks. (Not to exceed one paragraph).

11. Explain Plank's radiation law
12. Differentiate between thermal conductivity and thermometric conductivity.
13. Distinguish between isothermal and adiabatic process.
14. When a tyre bursts, the air coming out is cooler Than the surrounding air. Why
15. State Kelvin and Clausius statement of second Jaw of thermodynamics.
16. Discuss the relation between entropy and disorder.
17. What do you mean by "ultra violet catastrophe"
18. Rate of formation of ice in lakes decreases with increase in the thickness of ice layer. Why?
19. Explain phase-space and ensemble.
20. Explain the concept of macro states and micro state.
21. Briefly explain Maxwell Boltzmann distribution.
22. Nine particles have speeds of 5.00, 8.00, 12.0, 12.0, 12.0,14.0, 14.0, 17.0, and 20.0 m/s.
  - (a) Find the particles average speed
  - (b) r.m.s. speed.

**(8 × 2 = 16 Marks)**

## SECTION – C

Short essay questions. (not to exceed 120 words). Answer any **six**. Each carries 4 marks.

23. Explain how the temperature of sun can be measured by knowing solar constant.
24. State and explain the principle of increase of entropy.
25. (a) Find the populations of the first and second excited states *relative* to the ground state for atomic hydrogen at room temperature, assuming that hydrogen obeys Maxwell—Boltzmann statistics.  
(b) Find the populations of the first and second excited states relative to the ground state for hydrogen heated to 20,000 K in a star. Given that Energy  $n$ th level  $E_n = 13.6/n^2$  eV and the degeneracy  $g_n = 2n^2$ .
26. Calculate rms speed, most probable speed and average speed of oxygen molecule at 27 °C. Molar mass of oxygen is 32  $u$ .
27. Calculate the increase in entropy of 1 kg of ice when it is converted into steam. Given that specific heat of water is 1 kcal /kg°C, latent heat of ice is 80 kcal /Kg and latent heat of steam is 540 kcal/kg.
28. A petrol engine using ideal air as working substance has its compression ratio raised from 5 to 6. Find the % increase in efficiency.
29. Two identical samples of monatomic gases are allowed to expand to twice their initial volume. One sample expands isothermally, while the other sample expands adiabatically. In which sample is the pressure higher? Explain.
30. A Carnot engine has an efficiency of 0.4 when its cold reservoir is at 300K. Find the change in its hot reservoir temperature so that efficiency becomes 0.65.
31. A house has wooden siding 1.0cm thick, with total surface area of 275 m<sup>2</sup>. Suppose it is 19 °C inside and 1 °C outside.
  - (a) What is the rate of energy loss through the walls?
  - (b) What is the daily heating cost with energy at \$ 0.10 per kWh? Thermal conductivity for wood 0.12 W/°C.m<sup>2</sup>

**(6 × 4 = 24 Marks)**

## SECTION D

Long essay questions. Answer any **two**. Each carries **15** marks.

32. Obtain the relation connecting pressure and volume in an adiabatic process. Derive an expression for work done in adiabatic process?
33. Define entropy? What is its physical meaning? Explain T-S diagram? Find an expression for efficiency of reversible Carnot engine with help of T-S diagram?
34. What is perfect black body? Draw curves for the distribution of energy in the spectrum of a black body for three different temperatures, Explain important results obtained from these curves?
35. Describe an experiment with necessary theory to determine the thermal conductivity of a poor conductor by Lee's disc method.

**(2 × 15 = 30 Marks)**

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J – 2499

Reg. No. : .....

Name : .....

**Second Semester B.A./B.Sc./B.Com. Degree Examination, May 2020**

**First Degree Programme Under CBCSS**

**Language Course – English**

**Common For B.A./B.Sc. (EN 1212.1), B.Com (EN 1211.2) and  
Career Related 2(a) (EN 1211.3)**

**MODERN ENGLISH GRAMMAR AND USAGE**

**(2013 Admission to 2018 Admission)**

Time : 3 Hours

Max. Marks : 80

I. Answer all questions, each in a word or sentence

1. Choose the correct form of the verb:

We \_\_\_\_\_ (Packed/is packing) for our trip to Europe.

2. Choose the correct form of the verb:

She \_\_\_\_\_ (woke/ Wakes) up early on her trip last week.

3. Identify the preposition phrase:

Is she really going out with that tall, gorgeous guy?

4. Identify the noun clause in the sentence:

Whoever thought of the idea is a genius.

P.T.O.

5. Add the correct question tag:

You haven't seen this film, \_\_\_\_\_

6. Correct the sentence:

Gas in Alaska is the most cheapest gas in all the world.

7. Change the voice: He had written three books before 1867.

8. Correct the sentence:

We're not sure he is enough experienced for the position.

9. Choose the correct option and complete the sentence:

The customer was extremely upset. \_\_\_\_\_

- (a) He demanded refunding his money.
- (b) He demanded that we refunded his money.
- (c) He demanded we refund his money.

10. Identify the adjective in the sentence:

The organisation invested in a lot of state-of-the-art technology.

**(10 × 1 = 10 Marks)**

- II. Answer **any eight** questions, **each** in a short paragraph exceeding **50** words:

11. Combine and rewrite the sentences, beginning with **As**

- (a) Sarath couldn't write the exam. He was taken ill.
- (b) I am a copy editor. I correct many mistakes.

12. Rewrite the sentences, beginning each new sentence as instructed:

- (a) We got lost in the jungle because we didn't have a map. (If we had...)
- (b) The plane had hardly left the airport when the accident happened (No sooner...)

13. Rearrange the words to form meaningful sentences:

- (a) effect / we / in/ did/ much/ sales/ last/ not/ year/ improvement.
- (b) should/ you/ have/ coming/seen/ this.

14. Correct the sentences:

- (a) "Can we prepone the meeting to 2 pm? I need to leave a little early".
- (b) "Which year did you pass out from college?"

15. Read the answers and frame appropriate questions:

- (a) You will be treated as a friend.
- (b) They will stay with their relatives when they go to Delhi.

16. Change the following sentences into affirmatives.

- (a) They need not know what this is for.
- (b) No other poet is as great as Wordsworth.

17. Provide appropriate question tags

- (a) They live in Mumbai.
- (b) Reenu must stay.

18. Identify the complement in the given sentences:
- (a) My uniform is torn and dirty.
  - (b) We find them very pleasant.
19. Identify the adverbial phrase in the given sentences:
- (a) The great horse raced like the wind.
  - (b) The tenor sang with great feeling.
20. Fill in the blanks with the correct article
- (a) I want \_\_\_\_\_ apple from the basket.
  - (b) \_\_\_\_\_ village by the sea is my dream retirement spot.
21. Supply the correct modals.
- (a) You \_\_\_\_\_ have informed the insurance company immediately after the accident. Now it's too late.
  - (b) You \_\_\_\_\_ have driven if you had been drinking!
22. Change into indirect speech:
- (a) Ibrahim : James works from home.
  - (b) Vandana : I've got to go, I am getting late.

**(8 × 2 = 16 Marks)**

III. Answer any six of the following as directed.

23. Complete the sentences with a suitable word from the list given below:

(who, what, how, which, whom, where)

- (a) Sushmita is the one \_\_\_\_\_ is taking over my job next month.
- (b) I couldn't imagine \_\_\_\_\_ I would be able to find the courage to leave.
- (c) I've got a week to finish this \_\_\_\_\_ is just about enough time.
- (d) He really can't work out \_\_\_\_\_ he has to go to get the information he needs.

24. Insert the correct articles wherever appropriate in the following sentences. If there is no article put a (X) sign.

- (a) Are you coming to party next Saturday?
- (b) I bought new TV set yesterday.
- (c) I am crazy about reading history books.
- (d) Do you want to go to restaurant where we first met?

25. Correct the following sentences.

- (a) If we will be late, they will be angry.
- (b) My father is thinking that I should stop smoking.
- (c) I fell asleep while I watched TV.
- (d) I have lived in Canada since 10 months.

26. Fill in the blanks with the correct prepositions.

- (a) Don't waste so much money \_\_\_\_\_ new clothes.
- (b) I have to hurry. I want to be \_\_\_\_\_ time for the new presentation.
- (c) All trains arriving from London are \_\_\_\_\_ time.
- (d) The guard told us to keep \_\_\_\_\_ the lawn. It has been freshly cut.

27. Rewrite the sentences in the correct order.

- (a) society / is / discipline / of/ foundation / the very
- (b) great importance /one of the / essentials of life / it is/in all spheres/ and is of/ of life
- (c) it life/ become / without / miserable / at home / will
- (d) for/ is / our / progress / it / a must / country's

28. Use the correct forms of verbs and fill in the blanks.

- (a) The police \_\_\_\_\_ (leave) no stone unturned to trace the culprits.
- (b) The terrified people \_\_\_\_\_ (flee) to the mountains.
- (c) I \_\_\_\_\_ (visit) the Taj Mahal last month.
- (d) Your friends \_\_\_\_\_ (wait) for you for over an hour.

29. Use reflexive pronouns to complete the sentences.

- (a) Aneesh decided to reward \_\_\_\_\_ with a dinner out.
- (b) Seema pours a cup of tea for \_\_\_\_\_ every morning.
- (c) Eighty year old Indira made her supper \_\_\_\_\_
- (d) We \_\_\_\_\_ were forced to pilot the boat to safety.

30. Rewrite the passage correcting all the errors.

Damu starts his job at a carpet-weaving factory. He had made new friends there and enjoying their company. Carpet-weaving intrigue him, yet when he started on the job he finds it very difficult. For weeks he was struggling with the job. He felt that he have made a mistake when he chose to work there. If he was determined to learn the art of carpet-weaving.

31. Identify the parts of speech in the underlined parts:

(noun of gender, pre-modifier, transitive verb, uncountable noun)

- (a) There has been a lot of research into the causes of the spread of the Corona Virus.
- (b) France is popular with her neighbours at the moment.
- (c) Lee bought dozens of cakes from the bakery to gift his wife.
- (d) We have enjoyed some extremely varied and consistently excellent performances at this theatre.

(6 × 4 = 24 Marks)

IV. Answer **any two** of the following.

32. Expand the proverb "Simple Living, High Thinking" in about two to three pages.
33. Write a short essay on "Friendship and Social Media" in about two to three pages.
34. Write a précis of the following passage:

In a big modern factory each worker contributes so little to the finished article that he does not think of it as the fruit of his own labours. Workers who repeat the same operation day after day can take no ire or pride in their work. Their chief pleasure in life is outside the factory. Their work is dull and they spend their time with one eye on the clock. In spite of various attempts to brighten the lives of the workers, the average man in a factory is rather to be pitied than envied. The dullness of his life is one of the drawbacks of mass production.

Some people believe that man is becoming the slave of the machine. Certainly machines are playing an ever-increasing part in our lives. Let us hope that they will never become more important than the men they were intended to serve. Charlie Chaplin, in his film "Modern Times", drew attention to this danger. In the film he got a job in a factory that employed mass production method. He had to stand by a machine with a spanner in his hand. An endless belt passed in front of him carrying slowly an endless line of articles. As each one passed he tightened one nut on one bolt with his spanner. His work was one with one turn of the wrist repeated throughout the day. Very soon his mind became affected and the film shows the amusing things which he did as a result of his mental disorder. Although it is very funny, the film had a serious side. It showed that the kind of work which many people do, far from giving them pride and pleasure, is more likely to fit them for the lunatic asylum.

We must all hope that means will be found to retain the advantages arising out of mass production, while at the same time giving the worker some of the pride and pleasure of the old craftsman.

35. Arrange the sentences in the proper order. Sentence one and ten are in their correct order.

Though largely forgotten now, African presence in India, in itself, was not unusual. In the 1230s, queen Raziya of the Delhi Sultanate was accused of being closer than acceptable to Yakut, an African confidant. There existed for

decades in the 15th century a near-sovereign state in Jaunpur (U.P.) founded by an African. Their reputations were so fierce that "let there be but one of them on a ship and it will be avoided by ... pirates". It was a pretext used to justify her murder. Harems in the Deccan featured *habshi* women – so called after their origins in Abyssinia – and at least two sultans had black begums as consorts. This fact is unknown, perhaps, to many present-day residents of Uttar Pradesh. In the 14th century, the traveller Ibn Batuta recorded how they were "guarantors of safety" for ships that plied the Arabian Sea. Even in Bengal, a coup in 1487 by a group of warriors like Malik Ambar led to a short-lived ruling dynasty. Ambar, however, remains the greatest of the *habshis* who made history in India.

(2 × 15 = 30 Marks)

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Reg. No. : .....

Name : .....

**Second Semester B.A./B.Sc./B.Com. Degree Examination, May 2020**

**First Degree Programme under CBCSS**

**Language Course – English**

**(Common for B.A./B.Sc. (EN 1212.1), B.Com. (EN 1211.2) and Career  
Related 2 (a) (EN 1211.3))**

**ENGLISH GRAMMAR, USAGE AND WRITING**

**(2019 Admission)**

Time : 3 Hours

Max. Marks : 80

I. Answer all questions. Each in a word or sentence.

1. Add the correct question tag:

Kashi is a well behaved boy.

2. Choose the correct form of the verb:

"It does not do to \_\_\_\_\_ (dwelt) on dreams Harry, and forget to live in the present"

3. State whether the underlined is the subject or predicate of the sentence:

The defensive tackle of the mid fielder missed the opponent as he ran by him.

4. Rewrite the sentence using : Otherwise

If lectures are boring, students will not want to attend.

5. Change into a declaratory sentence:

The mother told the children, 'Take milk twice a day to improve your health.'  
(Use advise)

6. Correct the sentence by adding a missing article.

As Harry squelched along deserted corridor he came across somebody who looked just as preoccupied as he was.

7. Change the voice :

The company requires staff to watch a safety video every year.

8. Correct the sentences.

The train left before he arrived.

9. Reorder the sentence to form a meaningful one.

Before/long/choose/them /our/and/we/we/joys/sorrows/experience.

10. Fill in the blanks using a suitable verb:

The police \_\_\_\_\_ (smell) a rat in the witness accounts.

**(10 × 1 = 10 Marks)**

11. Answer any **eight** questions, each in short paragraph exceeding **50** words.

12. Convert the sentences into its plural form:

(a) The baby cries; but its mother is missing.

(b) I look up, and a leaf falls from a branch and lands on my forehead.

13. Rearrange the words to form meaningful sentences:

(a) minutes/sofa/past/hiding/I/the/for/the/ten/have/under/been/

(b) here/many/I/room/legs/in/the/from/down/upside/see/can/

13. Rewrite the sentences, beginning each new sentence as instructed taking care not to change the meaning.
- (a) Unless the rain stops, the game will not resume.  
(Begin: If..)
  - (b) A lot of people are capable of leading a team.  
(Rewrite using "capability")
14. Provide appropriate question tags
- (a) She couldn't let such a good job offer go.
  - (b) He'd better hurry up.
15. Convert into simple sentences
- (a) We believe that he is innocent.
  - (b) I have no money that I can lend you.
16. Change the following negative sentences into affirmative sentences without changing their meaning
- (a) You are not steady.
  - (b) I am not impressed with your project proposal.
17. Read the answers and frame appropriate questions:
- (a) I came home early to watch the match.
  - (b) Gauri decorated the hall.
18. Identify the adverbs in the given sentences:
- (a) She was so frightened, she could hardly speak.
  - (b) I was late for a very important appointment.

19. Fill the blanks with suitable adjectives/adverbs.

(a) I like reading \_\_\_\_\_ fiction.

(b) They \_\_\_\_\_ worked for their award.

20. Change into comparative degree.

(a) John is as tall as Mike.

(b) Hercules was the strongest man in the world.

21. Punctuate the sentences:

(a) On its twenty fifth anniversary the movie club of our city screened many movies Casablanca Life is Beautiful Schindler's List.

(b) The teacher asked so tell me who has read the novel Rebecca by Daphne du Maurier.

22. Convert to indirect speech:

(a) "I am not buying anything today" Bhuvi told the salesperson.

(b) "The train is late by an hour" informed Ritam.

**(8 × 2 = 16 Marks)**

III. Answer any **six** of the following as directed.

23. Complete the sentences with the correct preposition

(a) After payment, you'll receive the product \_\_\_\_\_ 10 business days.

(b) I have no experience, so I'm \_\_\_\_\_ a disadvantage when it comes to this job interview.

(c) My grandparents lived in that same house \_\_\_\_\_ ages.

- (d) He's Tamilian? For some reason I was \_\_\_\_\_ the impression that he was a Kannadiga.
- (e) Where's Mashumita? She should have gotten here \_\_\_\_\_ now.
- (f) We've put a lot of effort \_\_\_\_\_ this project.
- (g) We drove \_\_\_\_\_ the coastline of India.
- (h) The scientist made an amazing discovery \_\_\_\_\_ accident.

24. Insert the correct determiners wherever appropriate.

- (a) Rescue efforts resumed in Beichuan, after entire city was evacuated
- (b) He is an expert on languages, but he knows about mathematics.
- (c) I usually get to work on foot and then come home on bus
- (d) Hari had so going around him that he looked confused and distracted.

25. Fill in the blanks with the suitable modals.

- (a) It's very cloudy today. Do you think it \_\_\_\_\_ rain later?
- (b) They \_\_\_\_\_ to have filled the car with petrol before they set off.
- (c) This is impossible, it \_\_\_\_\_ be a mistake!
- (d) Why are you wasting time? You \_\_\_\_\_ have finished your work already.

26. Rewrite the jumbled words into meaningful sentences.

- (a) that/ believe/ to/ seem/ people/ many old/ good/ disrupted/ has/ computers/ of/ advert/ the/ habits/ reading/ fashioned.
- (b) statement/ true/ completely/ not/ is/ it/ above/ the/ to/ truth/ same/ be/ may/ there/ while.

- (c) actually/ computers/ have/ of/ advert/ the/ people/ to/ accessible/ more/ books/ made.
- (d) button/ a/ of/ click/ at/ the/ available/ to/ people/ before/ information/ books/ about /for/ libraries/ visit/ to/ needed/ people/ while.

27. Rewrite the following passage underlining the determinatives, quantifiers and possessives in it:

It was at least two weeks ago that Abhishek and Aditya witnessed the robbery. Most people were at the temple festival. Their houses were thus empty. Several cars were parked nearby. The road was dark, only few lights shone. Abhishek and Aditya were waiting for an auto to take both of them back home. A bike stopped some distance away from them.

28. Fill in the blanks using articles: Write (X) in case of no article:

- (a) Young unpublished author couldn't really hope for anything much after being turned down twelve times.
- (b) But Sorcerer's Stone hit shelves on July 26, 1997, to immediate success.
- (c) Overnight, Rowling was catapulted from her small apartment in Edinburgh to worldwide recognition.
- (d) With the success, came fame, which exposed Rowling to new chaos that she hadn't been prepared for.

29. Rewrite the passage correcting all the errors.

The city of Teotihuacán, which laid about 50 kilometres northeast of modern-day Mexico City, begun its growth by 200 – 100 B.C. At its height, between about A.D. 150 and 700, it probably has a population of more than 125,000 peoples and covered at least 20 square kilometres. It has over 2,000 apartment complexes, a great market, the large number of industrial workshops, an administrative centre, a number of massive religious edifices, and a regular grid pattern of streets and buildings. Clearly, many planning and central control were involved in the expansion and ordering of this great metropolis. Moreover, the city has economic and perhaps religious contacts with most parts of Mesoamerica.

30. Prepare a questionnaire to assess how students view their college life.
31. Write a dialogue between a professor and a student on how to improve his/her grades in the coming examination.

**(6 × 4 = 24 Marks)**

IV. Answer any **two** of the following.

32. Expand the proverb "Every cloud has a silver lining" in about two to three pages.
33. Write a short essay on "Social Consciousness in an Increasingly Selfish Universe".
34. Write a report on the recently concluded Literary Fest in your college.
35. Based on the outline given below, construct a story:

Travelling by train — crowded — mother and two children — child crying — no place to sit — you ask passengers to give up seat — refuse — find the ticket examiner — people without tickets hurriedly get out — women and children get seat — thank you — you feel proud.

**(2 × 15 = 30 Marks)**

(Pages : 3)

5  
J – 2513

Reg. No. : .....

Name : .....

**Second Semester B.A./B.Sc. Degree Examination, May 2020**

**First Degree Programme under CBCSS**

**Language Course – III**

**EN 1211.1 — ENVIRONMENTAL STUDIES**

**(2015-2018 Admission)**

Time : 3 Hours

Max. Marks : 80

1. Answer **all** questions, each in a word or sentence :

1. What is Sustainable development?

2. What is Hydrosphere?

3. What according to Wordsworth, is nature's holy plan?

4. Expand WCED.

5. Why is Britain reluctant to join the campaign to reduce emission?

6. What is Asbestos?

7. What is Biomedical waste?

8. What is ozone?

9. What is the quintessential Indian social unit?

10. Why does Assimov advocate the need to stop living by the code of the past?

**(10 × 1 = 10 Marks)**

P.T.O.

II. Answer **any eight** each in a **short paragraph** not exceeding **50** words.

11. The four dynamic constituents of environment.
12. Write a note on Plachimada issue.
13. Explain the theme of the poem 'Lines written in Early Spring'.
14. What is ex-situ conservation?
15. What is Ganga action plan?
16. What is Municipal Solid Waste (MSW)?
17. How is the poem 'The Poplar Field' related to ecology and aesthetics?
18. Dangers of radioactive waste.
19. Write a short note on Global Warming.
20. What does Chief Seattle say about rivers?
21. Chipko Andolan.
22. Women and child welfare.

(8 × 2 = 16 Marks)

III. Answer **any six**, each in a **paragraph** not exceeding **100** words.

23. Discuss the major environmental issues.
24. How are strategic minerals important to a nation's economy?
25. Explain the two major types of ecological succession.
26. What are the causes of water pollution?
27. Rain water harvesting.

28. Explain Pyrolysis and Gasification.
29. What are the family welfare programmes initiated by the Government of India?
30. Development and Environment.
31. India as a megadiversity nation.

**(6 × 4 = 24 Marks)**

IV. Answer **any two** in about **300 words**.

32. The role of youth in the conservation of nature.
33. Effective Solid waste management.
34. What are the issues related to environmental ethics and their solutions?
35. Environment and human health.

**(2 × 15 = 30 Marks)**

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(Pages : 3)

J – 2520

Reg. No. : .....

Name : .....

**Second Semester B.A./B.Sc. Degree Examination, May 2020**

**First Degree Programme Under CBCSS**

**Language Course — English**

**EN 1211.1 – ABILITY ENHANCEMENT COMPULSORY COURSE :  
ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT**

**(2019 Admission)**

Time : 3 Hours

Max. Marks : 80

- I. Answer all questions, each in a word or two.
  1. Expand CPR.
  2. Who is in-charge of a relief camp?
  3. When did the Bhopal gas tragedy occur?
  4. Which ministry is the nodal ministry for drought management in India?
  5. Why does Saku write the essay?
  6. What is deforestation?
  7. What did the residents in the temple premises say about bats?
  8. How were the children in Carson's 'Silent Spring' affected by the sickness?
  9. Who culled the deer fawns?
  10. Name the two eminent sages mentioned in our mythology.

**(10 × 1 = 10 Marks)**

P.T.O.

II. Answer **any eight**, each in a paragraph not exceeding **50** words.

11. What are Resources?
12. The meaning of the word 'Sacchidananda'.
13. What happened to the birds in Carson's *The Silent Spring*?
14. How did the wife manage to get rat poison?
15. What is Resilience of an ecosystem?
16. How are governments acting to prevent plastic pollution?
17. How does the poet describe the arrival of death in Chernobyl?
18. Why is it important to dispose e-waste properly?
19. Who issues flood forecasts and how?
20. What was the reason for leakage in the Bhopal UCC plant?
21. What did Arif write down in his book?
22. What kinds of food items are required at a relief camp?

**(8 × 2 = 16 Marks)**

III. Answer **any six**, in a paragraph not exceeding **100** words.

23. What are procedures to be followed while closing a relief camp?
24. What are the likely ways a person behaves while experiencing personal disasters?
25. What are the procedures to be followed in the event of a bomb threat call?
26. What is the function of the District Level Disaster Management Committee?
27. What happened when Saku presented his essay before the class?

28. What are the dangers posed by plastic pollution?
29. What is Social-Ecological system?
30. Describe the vegetation in the land owned by the narrator in "The Inheritors of the Earth".
31. What is the prophecy that Carson makes at the end?

**(6 × 4 = 24 Marks)**

IV. Answer **any two** of the following in not less than **300** words.

32. Describe the functions and responsibilities of centre and state governments during a disaster.
33. Critically examine the various ecological concerns presented by Chief Seattle in his speech.
34. Write down the various aspects of conservation.
35. Narrate how as a student, you will prepare your community to face an emergency situation.

**(2 × 15 = 30 Marks)**

(Pages : 3)

J – 2515

Reg. No. : .....

Name : .....

**Second Semester B.A./B.Sc. Degree Examination, May 2020**

**First Degree Programme Under CBCSS**

**Language Course (Additional Language II) – Hindi**

**HN 1211.1 FICTION, SHORT STORY AND NOVEL**

**(2017 Admission Onwards)**

Time : 3 Hours

Max. Marks : 80

**PART – A**

- I. एक या दो वाक्यों में उत्तर लिखिए।
1. प्रेमचन्द का जन्म कब हुआ?
2. 'परदा' कहानी का केंद्र पात्र कौन है?
3. अज्ञेय के नाटक का नाम लिखिए।
4. 'पीली छतरी वाली लड़की' का रचनाकार कौन है?
5. मृदुला गर्ग की कहानी का नाम लिखिए।
6. 'दूध का दाम' कहानी का केंद्र पात्र कौन है?
7. 'आना इस देश' किसका उपन्यास है?
8. अबीर की पत्नी कौन है?

**P.T.O.**

9. कृष्णा अग्रिहोत्री का जन्म कहाँ हुआ?

10. अबीर किस देश में रहता है?

(10 × 1 = 10 Marks)

## PART – B

II. किन्हीं आठ प्रश्नों के उत्तर करीब 50 शब्दों में लिखिए।

11. 'दूध का दाम' का प्रतीकात्मक अर्थ क्या है?

12. 'परदा' कहानी का मुख्य उद्देश्य क्या है?

13. कैप्टन दयाल कौन है?

14. उपन्यासकार प्रेमचन्द का परिचय दीजिए।

15. हरी बिन्दी की नायिका क्या-क्या करती है?

16. 'नेलकटर' किसका प्रतीक है?

17. अज्ञेय की कहानियों का परिचय दीजिए।

18. "उसे मैं ने बहुत खोजा; बल्कि आज तक। कई वर्षों बाद भी। लेकिन वह कभी नहीं मिला। वह पता नहीं कहाँ खो गया था।" कथावाचक किसे खोजने की बात कहते हैं?

19. "लोग कहते हैं, दूध का दाम कोई नहीं चुका सकता और मुझे दूध का यह दाम मिल रहा है।" – सन्दर्भ व्यक्त कीजिए।

20. सुरैय्या कौन है?

21. सुरैय्या और अबीर के मिलन में डॉ. गीत की भूमिका क्या है?

22. 'आना इस देश' उपन्यास के शीर्षक की सार्थकता क्या है?

(8 × 2 = 16 Marks)

### PART – C

- III. किन्हीं छः प्रश्नों के उत्तर करीब 120 शब्दों में लिखिए।
23. मंगल का चरित्र-चित्रण कीजिए।
24. 'परदा' कहानी के शीर्षक की सार्थकता पर प्रकाश डालिए।
25. हीली बोन् अपने प्रिय बतखों की हत्या क्यों करती है?
26. 'नेलकटर' कहानी का उद्देश्य क्या है?
27. महिला-स्वतंत्रता का चित्रण 'हरि बिन्दी' में हुआ है। विचार कीजिए।
28. रचनाकार अज्ञेय और हिन्दी साहित्य।
29. 'आना इस देश' के भाषा और शिल्प पर विचार कीजिए।
30. अबीर का चरित्र-चित्रण कीजिए।
31. सुरैय्या के मानसिक एवं शारीरिक यातनाओं पर विचार कीजिए।

(6 × 4 = 24 Marks)

### PART – D

- IV. किन्हीं दो प्रश्नों के उत्तर करीब 250 शब्दों में लिखिए।
32. 'प्रेमचन्द आज भी प्रासंगिक एवं समकालीन है।' पठित कहानी के आधार पर इस कथन पर विचार कीजिए।
33. भारतीय जीवन के दोहरे चरित्र के सच को 'परदा' कहानी में उद्घाटित किया गया है। इस कथन का मूल्यांकन कीजिए।
34. 'आना इस देश' में चित्रित समस्याओं पर प्रकाश डालिए।
35. उपन्यास के तत्वों के आधार पर 'आना इस देश' के कथानक की समीक्षा कीजिए।

(2 × 15 = 30 Marks)

(Pages : 4)

J – 2700

Reg. No. : .....

Name : .....

**Second Semester B.Sc. Degree Examination, May 2020**

**First Degree Programme under CBCSS**

**Mathematics**

**Foundation Course – II**

**MM 1221 : FOUNDATIONS OF MATHEMATICS**

**(2018 Admission onwards)**

Time : 3 Hours

Max. Marks : 80

**SECTION – I**

All the **first ten** questions are compulsory. They carry 1 mark each.

1. Define conjunction.
2. What is a biconditional statement?
3. Define contradiction.
4. Give an example of a tautology.
5. Prove that empty set is a subset of any set  $A$ .
6. Find the curve represented by the parametric equation  $x = t^2, y = t^3$ .
7. Write the arc length formula for parametric curves.
8. Define a parabola.
9. Find the distance  $d$  between the points  $(2, 3, -1)$  and  $(4, -1, 3)$ .
10. Define orthogonal projection of  $v$  on  $e$ .

P.T.O.

## SECTION – II

Answer **any eight** questions from among the questions 11 to 22. These questions carry **2** marks each.

11. Find the antecedent and consequent in the following statement. "You can work here only if you have a college degree."
12. Determine the truth value of the statement  $\forall x \exists y \ni x + y = 3$ . Justify.
13. Prove that  $|x| \geq 0, \forall x$ .
14. Prove that  $AU(U/A) = U$ .
15. Define injective and surjective function. Give example for each.
16. If  $f(x) = \sin x$  is a function defined on  $\mathbf{R}$ . Find  $f([0, \pi])$  and  $f([0, 8\pi])$ .
17. Sketch the curve whose parametric equation is  $x = \cos t, y = \sin t$ .
18. Find parametric equations for a circle of radius 2, centered at (3, 5).
19. Find the rectangular coordinates of the point  $P$  whose polar coordinates are  $(r, \theta) = (6, 2\pi/3)$ .
20. Find the unit vector that has the same direction as  $v = 2i + 2j - k$ .
21. Find the angle between the vector  $u = i - 2j + 2k$  and  $v = -3i + 6j + 2k$ .
22. Let  $u = \langle 1, 2, -2 \rangle$  and  $v = \langle 3, 0, 1 \rangle$ . Find
  - (a)  $u \times v$
  - (b)  $v \times u$ .

### SECTION – III

Answer **any six** questions from among the questions 23 to 31. These questions carry **4 marks each**.

23. Prove that “If  $7m$  is an odd number then  $m$  is an odd number”.
24. Which of the following statements are true? Justify
  - (a) If  $m^2 > 0$  then  $m > 0$
  - (b) If  $m > 0$  then  $m^2 > 0$ .
25. Prove that  $[(p \wedge \sim q) \Rightarrow c] \Leftrightarrow (p \Rightarrow q)$  is a tautology.
26. Find polar coordinates of the point  $P$  whose rectangular coordinates are  $(-2, -2\sqrt{3})$ .
27. Sketch the graph of  $r = \theta (\theta \geq 0)$  in polar coordinates by plotting points.
28. State symmetry test.
29. State any four rules of vector arithmetic.
30. Find the direction cosines of the vector  $v = 2i - 4j + 4k$ , and approximate the direction angles to the nearest degree.
31. Find the angle between a diagonal of a cube and one of its edges.

### SECTION – IV

Answer **any two** questions from among the questions 32 to 35. These questions carry **15 marks each**.

32. Explain in detail any five proof techniques.
33. (a) Prove that the subset of a countable set is countable.  
(b) Prove that the set of all real numbers is uncountable.

34. In a disastrous first flight, an experimental paper airplane follows the trajectory of the particle having parametric equation  $x = t - 3 \sin t$ ,  $y = 4 - 3 \cos t$  ( $t \geq 0$ ); but crashes into a wall at time  $t = 10$ .
- (a) At what times was the airplane flying horizontally?
- (b) At what times was it flying vertically?
35. (a) Find the distance  $D$  between the point  $(1, -4, -3)$  and the plane  $2x - 3y + 6z = -1$ .
- (b) Describe the surface  $4x^2 + 4y^2 + z^2 + 8y - 4z = -4$ .
- (c) Find equations of the paraboloid  $z = x^2 + y^2$  in cylindrical and spherical coordinates.
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Reg. No. : .....

Name : .....

**Second Semester B.A./B.Sc. Degree Examination, May 2020**

**First Degree Programme under CBCSS**

**Malayalam Language**

**Language Course V – Additional Language**

**ML 1211.1 : ഗദ്യസാഹിത്യം**

**(2018 admission onwards)**

**Time : 3 Hours**

**Max. Marks : 80**

- I. ഒരു വാക്കിലോ രണ്ടു വാക്യത്തിലോ ഉത്തരം എഴുതുക.
1. 'സുന്ദരികളും സുന്ദരന്മാരും' എന്ന നോവൽ എഴുതിയതാര് ?
  2. സി.വി. രാമൻ പിള്ള എഴുതിയ ഒരു ചരിത്ര നോവലിന്റെ പേരെഴുതുക.
  3. 'അപ്സരന്റെ രക്തം' എന്ന നോവലിന്റെ കർത്താവാണ് ?
  4. 'തിരസ്കാരം' എന്ന നിരൂപണ ഗ്രന്ഥം എഴുതിയതാര് ?
  5. എം.ടി. വാസുദേവൻ നായരുടെ രണ്ട് നോവലുകളുടെ പേര് എഴുതുക.
  6. കൃഷ്ണ ചെയ്യ പട്ടി വാല്യം തടക്കി നിൽക്കും പോലെ നിന്നതാര് ?

**P.T.O.**

7. കമല എന്ന പെൺകുട്ടിക്ക് അവളുടെ പതിനാലാം പിറന്നാളിന് അച്ഛൻ നൽകിയ സമ്മാനം എന്ത്?
8. "മരയ്ക്കാരെ നിങ്ങൾക്കു ഞാൻ പതിനഞ്ചു രൂപിക കടംവീട്ടാനുണ്ട് അല്ല, പതിനഞ്ച് രൂപികയും നാലണയും" - ആരുടെ വാക്കുകളാണിത്?
9. 'ലന്തൻബത്തേരിയിലെ ലുത്തിനിയകൾ' എന്ന നോവൽ എഴുതിയതാര്?
10. 'ഖസാക്കിന്റെ ഇതിഹാസം' എഴുതിയതാര്?

(10 x 1 = 10 Marks)

II. ഒരു ഖണ്ഡികയിൽ കവിയാതെ എട്ടു ചോദ്യത്തിന് ഉത്തരം എഴുതുക.

11. വിടാത്ത കടങ്ങൾ പടച്ചവന്റെ സൂക്ഷിപ്പുകളാണ്, അത് അങ്ങനെ തന്നെ ഇരിക്കട്ടെ. സന്ദർഭം എഴുതി ആശയം വ്യക്തമാക്കുക.
12. അപരിചിതന്റെ സംഭാഷണം ഒരു കൊലക്കയറിനെപ്പോലെ വെള്ളായിയപ്പന്റെ കഴുത്തിൽ ചുറ്റി മുറുകി - എപ്പോൾ? വിശദമാക്കുക.
13. കാല്പനികത എന്നല്ല കാല്പനികതകൾ എന്നാണ് പറയേണ്ടത് എന്ന് ലവ്ജോ പറയുവാൻ കാരണമെന്ത്?
14. മലയാള ഗദ്യത്തിന്റെ വളർച്ചയിൽ ദിനപത്രത്തിന്റെ പങ്കിനെപ്പറ്റി ഇ.എം.എസിന്റെ അഭിപ്രായം എന്ത്?
15. "എന്തേതല്ലാത്ത മുതൽ റെയിൽ സ്റ്റേഷനിൽ നിന്നു എനിക്ക് കിട്ടിയാൽ ഞാൻ ആ മുതൽ ആരുടെ പക്കൽ ഏൽപ്പിക്കണം?" - സന്ദർഭം എഴുതി വിശദമാക്കുക.
16. ഉരുപ്പാനെ ഭ്രാന്തനെന്നു വിളിക്കാൻ കാരണമെന്ത്?
17. ചെറിയച്ചന്റെ മരണത്തെക്കാൾ വീട്ടിലുള്ളവർക്ക് സങ്കടം ഉളവാക്കിയ സംഭവമായിരുന്നു അത്. - ഏത്?

18. വാർത്താസ്രോടനങ്ങൾ ഇക്കാലത്ത് നടക്കുന്നതെങ്ങനെ ?
19. സാഹിത്യത്തെ സി.വി. സമ്പന്നമാക്കിയത് എങ്ങനെയാണെന്ന് കെ.പി. അപ്പൻ അഭിപ്രായപ്പെടുന്നത് ?
20. ആദ്യകാല കഥകളുടെ എല്ലാ പ്രത്യേകതകളും ഉൾക്കൊള്ളുന്ന കഥയാണ് ആമാന്റെ കൃതി. വിശദമാക്കുക.
21. ഫുട്ബോളുമായുള്ള ഗീവർഗീസച്ചന്റെ ബന്ധം അപഗ്രഥിക്കുക.
22. ക്യാൻസറിനോട് പട പൊരുതി വിജയം നേടിയ നൗഷാദിനെപ്പറ്റി എഴുതുക.

(8 × 2 = 16 Marks)

III. 120 വാക്കിൽ കവിയാതെ ആറു ചോദ്യത്തിന് ഉത്തരം എഴുതുക.

23. ഫലിതം കാഴ്ചപ്പാടിന്റെ മഹത്വത്തിൽ നിന്ന് ജനിക്കുന്ന ചിരിയല്ല എന്നു പറയാൻ കാരണം എന്ത്?
24. ഉമ്മാച്ചുവിലെ തറവാട് ഭാഗിക്കാൻ ഇടയായ സാഹചര്യം എഴുതുക.
25. ആദ്യകാല കഥകളുടെ വിഷയം സ്വഭാവം വിശകലനം ചെയ്യുക.
26. പെൺകുട്ടികളോടുള്ള സമൂഹത്തിന്റെ സമീപനം അനാവരണം ചെയ്യുന്ന കഥയാണ് കൃഷ്ണഗാഥ - വിശദീകരിക്കുക.
27. ഹിഗ്ലിറ്റയിൽ അവതരിപ്പിക്കുന്ന സാമൂഹ്യ പ്രശ്നങ്ങൾ എന്തെല്ലാം?
28. സരസ്വതിയമ്മയുടെ ജീവിതവിക്ഷണം 'പെൺബുദ്ധി' എന്ന കഥയിൽ ആവിഷ്കൃതമാകുന്നത് എങ്ങനെ ?
29. മാധ്യമങ്ങൾ നമ്മുടെ മനസ്സിനെ എങ്ങനെയാണെല്ലാം സ്വാധീനിക്കുന്നു ? വിശദീകരിക്കുക.
30. മലയാളഭാഷ ഏതുവിധത്തിൽ നിലനിർത്തണമെന്നാണ് ഇ.എം.എസ്. അഭിപ്രായപ്പെടുന്നത് ?
31. 'തല്പം' എന്ന കഥയുടെ സമകാലപ്രസക്തി എന്ത് ?

(6 × 4 = 24 Marks)

- IV. മൂന്നു പുറത്തിൽ കവിയാതെ രണ്ടു ചോദ്യത്തിന് ഉത്തരം എഴുതുക.
32. എം.ടി. കഥകളുടെ പൊതുസ്വഭാവം പ്രകടിപ്പിക്കുന്ന ഒരു കഥയാണ് കർക്കിടകം. ചർച്ച ചെയ്യുക.
33. മലയാള നോവൽ സാഹിത്യത്തിലെ അതിശക്തമായ ഒരു സ്ത്രീ കഥാപാത്രമാണ് ഉമ്മാച്ചു. നിരൂപിക്കുക.
34. ഹിഗ്ലിറ്റയിലെ ജീവിതദർശനം എന്ത്? ചർച്ച ചെയ്യുക.
35. മലയാള പ്രതിഭയുടെ മൗനം കെ.പി. അപ്പൻ അവതരിപ്പിച്ചിരിക്കുന്നത് എങ്ങനെയാണ് പരിശോധിക്കുക.

(2 × 15 = 30 Marks)