

SL.NO:1255

SUBJECT CODE:17ATEC18

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
AUTOMOBILE ENGINEERING

ELE-ALTERNATIVE FUELS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Examine about Greenhouse gas emissions?
- 2 Illustrate about Transesterification?
- 3 Determine Fuel cells?
- 4 Illustrate the chemical properties of hydrogen?
- 5 Define solid fuel?
- 6 Define Pretreatment of Biomass?
- 7 Define Cellulase?
- 8 Define sacrificial protein?
- 9 Tell about Sugarcane bagasse?
- 10 Identify why switch grass being considered as a source for biofuels?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Illustrate the overview of Biofuels?
OR
b. Illustrate in detail about Biodiesel Transesterification?
- 12 a. Illustrate about Degumming, Neutralization and bleaching process in the biodiesel production?
OR
b. Examine in details the development of Biofuels?
- 13 a. Determine in detail about hydrogen fuel?
OR
b. Illustrate about industrial application of Biohydrogen fuel?
- 14 a. Illustrate about the types of fuel cells?
OR
b. List out clearly process of Biological pretreatment of Biomass.
- 15 a. Recall and explain the Traditional view of Biomass.

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OR

b. List out the importance of Biomass.

16 a. Describe in details the action of cellulases?

OR

b. Describe the Submerged Fermentation Process?

17 a. Describe the cellulases in Lignocellulosic processing?

OR

b. Tell in detail about wheat straw – new approach to complete saccharification?

18 a. Recall about Sugarcane Bagasse – new approach to complete saccharification?

OR

b. Describe about physical and chemical characteristics of Bioethanol?

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Illustrate and explain in details the radical options for development of Biofuels?

OR

b. Identify and explain the various types of fuel used.

20 a. Describe the Enzymology of Cellulose degradation by Cellulases?

OR

b. Describe in details the about Wheat straw for Bioethanol production?

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SUB CODE: 17MABS11

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO MECHANICAL AND AUTO

NUMERICAL METHODS FOR MECHANICAL SCIENCES

(Candidates admitted under 2017 Regulations-SCBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 What is meant by diagonally dominant?
- 2 Write *Gauss elimination method* to solve $AX = B$.
- 3 When *Bessel's* formula is to be used?
- 4 Write the second order divided difference formula.
- 5 Write the basic principle for deriving *Simpson's* $\frac{1}{3}$ Rule.
- 6 What is the Truncation error in *Trapezoidal rule*?
- 7 Mention modified Euler algorithm to solve $\frac{dy}{dx} = f(x, y)$, $y(x_0) = y_0$ at $x = x_0 + h$
- 8 Write down Euler algorithm to the differential equation $\frac{dy}{dx} = f(x, y)$
- 9 Write *Bender-Schmidt scheme* to solve $\frac{\partial^2 u}{\partial x^2} = \frac{1}{\alpha^2} \frac{\partial u}{\partial t}$
- 10 What is point wise solution of a differential equation?

P.T.O

Answer Any FIVE questions
Part-B (5 x10 =50 Marks)

11 a.

Solve $e^x - 4x = 0$ by Newton's Method.

OR

b.

Find a real root of $x^3 - 9x + 1 = 0$ that lies between 2 and 3 by the Method of False position, correct to 3 decimal places.

12 a.

Solve the following system of equations by Gauss Jacobi method

$$10x - 2y + z = 12$$

$$x + 9y - z = 10$$

$$2x - y + 11z = 20$$

OR

b.

Using *Newton's Divided Difference Formula* to find the value of $\log_{10} 656$. Given

$\log_{10} 654 = 2.8156$, $\log_{10} 658 = 2.8182$, $\log_{10} 659 = 2.8189$, and $\log_{10} 661 = 2.8202$.

13 a.

From the following table values of x and $f(x)$, determine $y(42)$

x	20	25	30	35	40	45
$f(x)$	354	332	291	260	231	204

OR

b.

Apply *Lagrange's* formula inversely, to obtain the root of the equation $f(x) = 0$ given that

$f(0) = -4$, $f(1) = 1$, $f(3) = 29$ and $f(4) = 52$.

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- 14 a. Identify first and second derivatives of the function y at the point $x = 1.2$ using the following data.

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

OR

- b. Identify the first two derivatives of y at $x = 54$ from the following data.

x	50	51	52	53	54
y	3.6840	3.7084	3.7325	3.7563	3.7798

- 15 a.

Use of *Romberg's method*, to compute $I = \int_0^1 \frac{dx}{1+x}$ correct to 4 decimal places. Hence find $\log_e 2$.

OR

- b. Solve $\frac{dy}{dx} + y - x^2 = 0$, $y(0.2) = 0.8213$, Find $y(0.3)$ correct to four decimal places by using *Modified Euler's method*.

- 16 a.

Use the Taylor series method, to find approximate values of y and z corresponding to $x = 0.1$, given that $y(0) = 2, z(0) = 1$ by solving $\frac{dy}{dx} = x + z$ and $\frac{dz}{dx} = x - y^2$.

OR

- b. Apply the *Runge-Kutta method*, tabulate the solution of the system $\frac{dy}{dx} = x + z, \frac{dz}{dx} = x - y$, $y(0) = 0, z(0) = 1, h = 0.1$. Find $y(0.1), z(0.1)$

- 17 a.

Solve the equation $y'' - xy = 0$ given $y(0) = -1, y(1) = 2$ by finite difference method taking $n=2$.

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OR

b.

Solve $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$, $0 \leq x \leq 1$, $t \geq 0$ with $u(x,0) = x(1-x)$, $0 < x < 1$ and $u(0,t) = 0 = u(1,t)$, $\forall t > 0$ using explicit method with $\Delta x = 0.2$ for three steps.

18 a.

Solve numerically $u_{tt} = 4u_{xx}$ with boundary conditions $u(0,t) = 0 = u(4,t)$, $u_t(x,0) = 0$ and $u(x,0) = x(4-x)$

OR

b.

Using the Simpson's rule, evaluate $\int_1^2 \int_1^2 \frac{1}{x+y} dx dy$ by dividing into two equal sub intervals.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.

Using *Gauss – Jordan* method to solve the following system.

$$\begin{aligned}x + 2y + z &= 3 \\2x + 3y + 3z &= 10 \\3x - y + 2z &= 13\end{aligned}$$

OR

b.

Given the data

x	0	1	2	3	4
y	2	3	12	35	78

Construct the cubic polynomial of x , using *Newton's Backward Interpolation formula*.

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20 a.

Identify the first, second and third derivatives of $f(x)$ at $x=1.5$ if

x	1.5	2.0	2.5	3.0	3.5	4.0
$f(x)$	3.375	7.000	13.625	24.000	38.875	59.000

OR

b.

Using *Modified Euler method*, Find $y(0.1)$, $y(0.2)$, given $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$.

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SUBJECT CODE:17ATEC12

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
AUTOMOBILE ENGINEERING

ELECTIVE-FUEL CELL TECHNOLOGY

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Tell about reformer.
- 2 Define Electro-oxidation of Methanol.
- 3 Define Catalyst Optimization.
- 4 Define tractive force.
- 5 List the three components of a Planetary gear sets.
- 6 Define energy management strategies.
- 7 List the advantages of HEVs.
- 8 Identify the membrane electrode assembly takes place in PEMFC.
- 9 Identify Gear ratio.
- 10 Illustrate the schematic representation of an automobile differential.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Examine Power transmission path in an Electric vehicle in detail.
OR
b. Examine Conventional brake system in detail.
- 12 a. Summarize various roadblocks to Fuel Cell Adoption.
OR
b. Discuss entropy production in fuel cells in detail.
- 13 a. Explain basic operation of fuel cell.
OR
b. Discuss the problems and challenges with fuel cells in detail.
- 14 a. Show the schematic diagram of Direct-methanol fuel cell and Explain.
OR
b. Demonstrate the following a) Catalyst Optimization b) Cross-over current c) Methanol cross-over

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15 a. Illustrate with a suitable diagram and explain the Components of a PEMFC.

OR

b. Demonstrate Electric vehicle system in detail.

16 a. Demonstrate on Hybrid electric vehicle history in detail.

OR

b. Illustrate Vehicle brakes in detail.

17 a. Demonstrate Clutches and Differential in detail.

OR

b. Demonstrate the typical Front wheel drive in detail.

18 a. Show the vehicle supervisory controller in detail.

OR

b. Demonstrate Energy Management Strategies.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Examine the electric machine and the internal combustion engine.

OR

b. Discuss the environmental impact of SOFC and MCFC.

20 a. Describe the Dynamics of Vehicle motion in detail.

OR

b. Demonstrate the Energy Storage System Control in detail.

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SL.NO:1225

SUBJECT CODE:17ATEC10

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
AUTOMOBILE ENGINEERING

ELECTIVE - ALTERNATIVE ENERGY
SOURCES FOR AUTOMOBILES

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Name the characteristics of a Biogas.
- 2 List out the performance of hydrogen in SI engine.
- 3 Define carbonyl emission.
- 4 List out the antiknock characteristics of alcohol and gasoline.
- 5 List out the pollutants for CNG used in SI engine.
- 6 Recall the properties of LPG used in automobiles.
- 7 Name the desirable properties of SVO.
- 8 Define cloud point.
- 9 Record an electric vehicle?
- 10 Show the advantages and disadvantages of solar powered vehicle.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain reasons for looking for alternative fuels for IC engine.
OR
b. Explain alcohol as an alternate fuel for SI engines.
- 12 a. Explain the advantages and disadvantages of using vegetable oil.
OR
b. Illustrate with neat sketch explain surface ignition alcohol engine.
- 13 a. Explain the effects of alcohol blended fuels on the emission and field performance of two stroke.
OR
b. Generalize the advantages and disadvantages of using alcohol as alternative fuel and explain it.
- 14 a. Describe the techniques of using alcohol in diesel engine.

OR

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b. Explain the production process of hydrogen fuel in detail.

15 a. Discuss the performance and emission characteristics of CNG as engine fuel.

OR

b. Discuss the performance and emission characteristics of LPG as engine fuel.

16 a. What is SVO? Explain its advantages and disadvantages.

OR

b. Discuss the performance and emission characteristics of Jatrope oil as engine fuel.

17 a. Explain the transesterification of vegetable oil.

OR

b. Discuss the various methods used for production of straight vegetable oil.

18 a. Illustrate with neat sketch, explain sodium sulphur battery in hybrid vehicles.

OR

b. Describe the components of a CNG conversion kit for mono-fuel operation.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Discuss in detail about the characteristics of CNG and LPG fuels

OR

b. Discuss the combustion and emission characteristics of ethanol fuel.

20 a. Discuss SVO as an alternate fuel and list out the advantages and disadvantages.

OR

b. Classify the types of battery used in electric drive vehicle, illustrate with neat sketches,

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VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
HUMANITIES & SCIENCES

ENGINEERING MATHEMATICS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1

Obtain the characteristic equation of $\begin{pmatrix} 2 & -3 & 1 \\ 3 & 1 & 3 \\ -5 & 2 & -4 \end{pmatrix}$

2

Define orthogonal matrices.

3

Define evolute.

4

Find the centre of curvature of the curve $y = x^2$ at the origin.

5

If $u = x^2y^3$ where $x = \log t$ and $y = e^t$ Find $\frac{du}{dt}$

6

Examine the maximum and minimum values of $3x^2 - y^2 + x^3$

7

Integrate $\int_0^1 \int_1^2 x(x+y) dy dx$.

8

Integrate $\int_0^{\pi/2} \int_0^{\pi/2} \sin(\theta + \phi) d\theta d\phi$

9

Prove that $\nabla(r^n) = nr^{n-2} \vec{r}$

10

State Stoke's theorem

(p.t.o)

Answer Any FIVE questions
Part-B (5 x10 =50 Marks)

11 a.

Find the Eigen values and Eigenvectors of the matrix $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{pmatrix}$.

OR

b.

Obtain the Eigen values and Eigenvector of the matrix $\begin{pmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{pmatrix}$

12 a.

Obtain the equation to the circle of curvature of the curve $xy = c^2$ at (c, c) .

OR

b.

Prove that the radius of curvature at any point of the cycloid $x = a(\theta + \sin \theta); y = a(1 - \cos \theta)$ is $4a \cos \frac{\theta}{2}$

13 a.

Find the maximum and minimum values of the function $x^3 y^2 (1 - x - y)$

OR

b.

(i) If $u = \sin^{-1} \frac{x}{y} + \tan^{-1} \frac{x}{y}$, then find the value of $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$

(ii) Find $\frac{du}{dt}$ as a total derivative and verify the result by the direct substitution of $u = x^2 + y^2 + z^2$ when $x = e^{2t}, y = e^{2t} \cos 3t$, and $z = e^{2t} \sin 3t$

14 a.

Integrate $\int_0^a \int_0^{\sqrt{a^2-x^2}} \int_0^{\sqrt{a^2-x^2-y^2}} \frac{dz dy dx}{\sqrt{a^2-x^2-y^2-z^2}}$

OR

(p.t.o)

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- b. Obtain the area enclosed by the parabola $y^2 = 4ax$, x -axis and the latus rectum of the parabola.

15 a.

If $\vec{F} = x^2\vec{i} + xy\vec{j}$ evaluate $\int \vec{F} \cdot d\vec{r}$ from $(0, 0)$ to $(1, 1)$ along the line $y=x$

OR

b.

Obtain the values of a and b so that the surfaces $ax^3 - by^2z = (a+3)x^2$ and $4x^2y - z^3 = 11$ may cut orthogonally at $(2, -1, -3)$

16 a.

Find the volume bounded by the cylinder $x^2 + y^2 = 4$ and the planes $y + z = 4$ and $z = 0$.

OR

b.

For the given curve $x = a \cos \theta, y = b \sin \theta$ Find ρ at $\left(\frac{a}{\sqrt{2}}, \frac{b}{\sqrt{2}}\right)$

17 a.

Obtain the equation to the circle of curvature of the curve $xy = c^2$ at (c, c) .

OR

b.

Prove that the radius of curvature at any point of the cycloid

$$x = a(\theta + \sin \theta); y = a(1 - \cos \theta) \text{ is } 4a \cos \frac{\theta}{2}$$

18 a.

Prove that $\nabla^2 (r^n) = n(n+1)r^{n-2}$ where $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$ and $r = |\vec{r}|$

OR

(p.t.o)

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- b. For the curve $x^3 + y^3 = 2$ find the co-ordinates of the centre of curvature at the point (1, 1)

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.

Diagonalise the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ and hence find A^5

OR

- b. Obtain the equation of the evolute of the curve $x^{2/3} + y^{2/3} = a^{2/3}$

20 a.

Determine the value of $\int_0^1 \int_0^{\sqrt{x^2}} (x^2 + y^2) dy dx$

OR

- b. Change the order of integration in $\int_0^a \int_y^a \frac{x^2}{\sqrt{x^2 + y^2}} dx dy$ and then evaluate it.

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SL.NO:1137

SUBJECT CODE:17ATCC03

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
AUTOMOBILE ENGINEERING

AUTOMOTIVE CHASSIS

Time : Three Hours

Maximum Marks:100 Marks

Answer ALL questions
Part-A (10 x 2 =20 Marks)

- 1 Identify the various forces and moment that act on a vehicle frame.
- 2 What is meant by centre point steering?
- 3 Discuss about types of final drive.
- 4 Define Toe in and toe out and write its importance.
- 5 List the advantages of radial tyre over bias ply tyre
- 6 Name the helper springs.
- 7 Record the advantages of MacPherson strut suspension.
- 8 Describe the advantages & disadvantages of a coil spring.
- 9 Recall the parameters influencing servo brake.
- 10 Differentiate brakes and retarders.

Answer Any FIVE questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain any one frame testing method followed in automobile industries.
OR
b. Demonstrate semi-floating axle.
- 12 a. Generalize the construction & Working of Hydro-elastic suspension system
OR
b. Illustrate with the help of neat sketch the construction and working principle Telescopic type of shock absorbers.
- 13 a. Demonstrate about hydraulic brake system with neat sketch.
OR
b. Discuss the servo braking system with neat diagram.
- 14 a. Evaluate the various type of Wheel geometrics with neat Sketch.

OR

(P.T.O)

b. Compare the merits and demerits of disc brakes compared to drum brakes.

15 a. List the various requirements of a good chassis and frame.

OR

b. Evaluate the propeller shaft and its function with neat sketch.

16 a. (i) Discuss the non-slip differential with diagram (ii) Explain the working principle of constant velocity joint.

OR

b. (i) Explain Hotchkiss drive with neat diagram (ii) Discuss the construction and working of multi-axle with neat sketches

17 a. Explain about the construction and working of semi-floating, three-quarter floating and fully floating axles with neat sketches

OR

b. Illustrate the construction details about single leaf spring.

18 a. Explain any two types of independent suspension systems in rear axle. (ii) Discuss the construction of rubber suspension system

OR

b. Explain the mechanical braking system with its limitations.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Describe the working of a recirculating ball type steering gear unit in automobiles

OR

b. Construct the constant velocity universal joint, Illustrated with neat diagram.

20 a. Classify the different types of rubber springs in detail

OR

b. Explain the construction and working of air suspension system with neat sketch?

SL.NO:1121

SUBJECT CODE:17ATSE05

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
AUTOMOBILE ENGINEERING

ELECTIVE-AUTOMOTIVE ELECTRICAL AND ELECTRONICS SYSTEMS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Illustrate the layout of starting system.
- 2 Define cold rating.
- 3 Define commutator.
- 4 Recall the advantages of an alternator over a D.C generator.
- 5 Define ECU coding.
- 6 Recall the need of checking the oxygen level of exhaust gases.
- 7 Tell about recharging of a battery.
- 8 Express about field coil in starting motor.
- 9 Tell what blocks electromagnetic waves.
- 10 Tell where is throttle position sensor located.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Distinguish alternator with DC generator.

OR

b. Demonstrate specific gravity test of battery electrolyte .
- 12 a. Explain sulphation of battery.

OR

b. Explain commutator and brushes of starter motor.
- 13 a. Illustrate about the need of starting motor and draw a neat sketch of starting system.

OR

b. Categorize the types of starting motor. Explain any one with neat sketch.
- 14 a. Demonstrate in detail about halogen light.

OR

b. Illustrate about alternator tests in detail.
- 15 a. Explain about alternator trouble shooting.

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OR

b. Explain the Working of trafficator in detail.

16 a. Explain anti theft alarm system.

OR

b. Discuss in detail about the actuators used in automobiles.

17 a. Explain the working of solenoid sensor.

OR

b. Illustrate with a neat sketch explain the working of Hall effect sensor.

18 a. Describe in detail about polarized relay.

OR

b. Explain the following terms: (i).Battery life (ii) Battery efficiency.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Discuss in detail about the chemical reaction in a lead acid battery during the charging and discharging.

OR

b. Illustrate with a neat sketch explain the construction and working principle over running clutch drive.

20 a. Demonstrate in detail about wind shield Wiper.

OR

b. Construct and working of Crank shaft position sensor in detail.

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SL.NO:1119

SUBJECT CODE:17PHBS05

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO ALL
SMART MATERIALS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Demonstrate, how the Metallic glasses can be used for transformer core materials?
- 2 Explain briefly about transformation temperature in SMA.
- 3 Distinguish between Type I and Type II Superconductors.
- 4 Interpret unit cell.
- 5 Demonstrate top-down and bottom-up approach for producing nanoparticles.
- 6 Interpret any two techniques for the synthesis of nanophase materials.
- 7 Explain briefly about top-down approach.
- 8 Describe coercivity and retentivity.
- 9 Explain briefly about soft magnetic materials.
- 10 Identify the reason, why the superconductor exhibits the property of diamagnetism?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Categorize metallic glasses? Give examples. Mention the properties of metallic glasses.

OR

 - b. Draw the unit cells of SC, BCC, FCC and HCP structures
- 12 a. Examine the effects of temperature, magnetic field and current on the superconductivity.

OR

 - b. Schedule the following for SC, BCC, FCC and HCP structures
- 13 a. Explain the properties of diamagnetic materials with neat diagram.

OR

 - b. Explain two characteristics of SMA with neat diagrams.
- 14 a. Explain the properties of Ni-Ti alloy.

p.t.o

OR

- b. Express the outline of magnetic and electrical properties of metallic glasses. Mention any two applications of metallic glasses.

- 15 a. Describe the following (i) unit cell (ii) coordination number (iii) nearest neighbour distance (iv) packing factor

OR

- b. Explain the advantages, disadvantages and applications of ball milling method.

- 16 a. Explain Carbon Nano Tubes? How are they classified? Explain.

OR

- b. Explain in detail about any one of the methods of fabrication of CNT.

- 17 a. Differentiate the properties of dia, para and ferromagnetic materials

OR

- b. Discuss the properties of superconductors.

- 18 a. Describe about Type – I super conductor. Write down its characteristics.

OR

- b. Discuss Isotope Effect and Meissner effect.

Answer ALL questions**PART-C (2 x 15 = 30)**

- 19 a. Categorize hard and soft magnetic materials? Mention their applications.

OR

- b. Generalize the properties of metallic glasses.

- 20 a. Illustrate sol-gel method of preparing nanophase materials and mention its advantages.

OR

- b. Illustrate hysteresis on the basis of domain theory.

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E.DEGREE EXAMINATIONS- FEB - 2022
COMMON TO ALL
PHYSICAL SCIENCES

(Candidates admitted under 2017 Regulations-SCBCS)

Time : 1 1/2 Hours

Maximum Marks:50 Marks

PART A - ENGINEERING PHYSICS

Answer **ALL** questions

Part-A (5 x 2 =10 Marks)

- 1 Tell about population inversion.
- 2 Schedule any two applications of laser in industrial field.
- 3 Report about step index fiber.
- 4 Tell about the characteristics of graded index multimode fiber.
- 5 Interpret about X-ray Fluoroscopy.

Answer **Any FIVE** questions

Part-B (2 x12 =24 Marks)

- 6 a. Predict the applications of laser in communication, military and chemical fields.
OR
- b. Recognize the following terms: population inversion, pumping process and laser action.
- 7 a. Express the various types of fibers based on refractive index profile.
OR
- b. Express the characteristics of penetrant.

Answer **ALL** questions

PART-C (1 x 16 = 16)

- 8 a. Demonstrate the construction and working of semiconductor laser with necessary diagram.
OR
- b. Illustrate the working of X-ray radiography.

PART A - ENGINEERING CHEMISTRY
(Candidates admitted under 2017 Regulations-SCBCS)

Time : 1 1/2 Hours

Maximum Marks:50 Marks

Answer **ALL** questions
Part-A (5 x 2 =10 Marks)

- 1 Brief the terms electrolytic and electrochemical cell.
- 2 What is helmholtz's electrical double layer?
- 3 Show the structure of EDTA and Ca-EDTA complex.
- 4 Mention the causes of boiler corrosion
- 5 Write a note on solar energy

Answer **Any FIVE** questions
Part-B (2 x12 =24 Marks)

- 6 a. Explain standard electrode potential in detail.
OR
b. Calculate the emf of the cell $\text{Mg}/\text{Mg}^{2+} // \text{Cd}^{2+} (\text{aq}) / \text{Cd}(\text{s})$ at 25°C where, $[\text{Cd}^{2+}] = 0.7\text{M}$, $[\text{Mg}^{2+}] = 1.0\text{M}$ and $E^{\circ}_{\text{cell}} = 1.97 \text{ V}$.
- 7 a. Discuss in detail dry corrosion with mechanism.
OR
b. Describe producer gas in detail.

Answer **ALL** questions
PART-C (1 x 16 = 16)

- 8 a. Explain the working principle of $\text{H}_2\text{-O}_2$ fuel cell with reactions.
OR
b. Elaborate the non-conventional energy sources.

S.No.1118

SL.NO:1115

SUBJECT CODE:17ATEC04

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
AUTOMOBILE ENGINEERING

ELECTIVE - SPECIAL TYPES OF VEHICLES

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Name one of the most common causes of U-joint and slip joint problems and Describe it can be rectified?
- 2 List out the functions of chassis frame.
- 3 List out the selection criteria for prime movers.
- 4 Define brush cutter machine.
- 5 Describe run a scraper.
- 6 List out the advantages of using trenchers.
- 7 List any four farm equipments.
- 8 List out the farm tools and equipment.
- 9 Recall kinematics of bulldozer operational linkages.
- 10 List out the classification of brakes.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain in detail power train control.
OR
b. Compare between frame and chassis. Explain it.
- 12 a. Compare between single axle and multi axle. Explain it.
OR
b. Tell about loaders? Explain the different types of loaders.
- 13 a. Explain the construction details of Backhoe loaders
OR
b. Explain the construction details of steerable drive axles of dumpers.
- 14 a. Explain step by step method of operation of scrappers in detail.
OR

(p.t.o)

b. Discuss in detail about the single bucket Loaders.

15 a. Explain the methods of excavation in detail.

OR

b. Illustrate with a neat sketch explain the load lifting attachments.

16 a. Explain the design parameters of combat vehicle in detail.

OR

b. Illustrate with a neat sketch and explain the working principle of land cleaning machine.

17 a. Explain the working and construction of spreading truck machine in detail.

OR

b. Explain the working process of sugarcane harvester in detail.

18 a. Define the purpose of the gas in a hydro pneumatic suspension system? Explain in detail.

OR

b. Discuss the various aspects on loader bucket in detail.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Discuss in detail about types of multi-axle vehicles layout and their features using simple sketches.

OR

b. Explain the constructional features and application of (i) Bulldozers (ii) Excavators.

20 a. Explain the following: (i) Tractor power take off unit (ii) Any one special implement.

OR

b. Explain in detail the following: (i) Power steering system. (ii) Kinematics for loader.

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SL.NO:1100

SUBJECT CODE:17ATSE02

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
AUTOMOBILE ENGINEERING
ELECTIVE-AUTOMOTIVE POLLUTION CONTROL

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 State the Advantages of gas fuel.
- 2 Describe the greenhouse effect.
- 3 Define breathing.
- 4 List out the types of smoke in gasoline engine.
- 5 Define the afterburner.
- 6 Discuss the effects of HC in human life.
- 7 Mention about district tube.
- 8 Define the excess manifold reactor.
- 9 State the different cycles used in emission control.
- 10 Mention the Euro IV norms.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Describe the transient operational effects on pollution. Illustrate it.
OR
b. Show the graph for crank angle Vs H C. Explain in detail.
- 12 a. Illustrate the Evaporative Loss Control Device.
OR
b. Define smoke unit, Illustrate about the smoke ppm in detail.
- 13 a. Classify different method used to suppress smoke.
OR
b. Show the formation of HC in CI engine.
- 14 a. Illustrate the effect of design variables in CI engine.
OR
b. Examine the gas analyzer use to measuring CO in exhaust gas.
- 15 a. Illustrate about catalytic converter and its working.

p.t.o

2

OR

b. List the uses of microprocessor for control emission. Illustrate it..

16 a. Illustrate in details about exhaust gas recirculation.

OR

b. Model the positive open crankcase ventilation system.

17 a. Draw a neat sketch for chemiluminescent analyzers. Illustrate it.

OR

b. List out exhaust emission. Explain anyone in detail.

18 a. List out engine emission and explain it in detail.

OR

b. Summarize the effect of operating variables in S I Engine.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Analyze the mechanism of HC and CO formation in 4-stroke & 2- stroke SI engine.

OR

b. Illustrate in details about Diesel DE-NO_x catalysts.

20 a. Define smoke and Illustrate different factors which affect smoke formation in CI engines.

OR

b. Draw the construction of Gas chromatography. Show its working procedure.

SL.NO:1100

SL.NO:1087

SUBJECT CODE:17ATCC15

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
AUTOMOBILE ENGINEERING

TWO AND THREE WHEELER TECHNOLOGY

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 What is the function of fuel injection pump?
- 2 What is cold plug?
- 3 What is the purpose of ignition system in a petrol engine?
- 4 Define backbone type frame.
- 5 What are the requirements of the Automotive wheel?
- 6 Define wheel cylinder.
- 7 What are the causes for wheel wobble?
- 8 What are the important components of delivery van?
- 9 Name the various materials used in the manufacturing of tyres.
- 10 What do you mean by preventive maintenance?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. With help of suitable sketches explain the operational techniques of any one company moped.
OR
b. With neat sketch differentiate symmetrical and unsymmetrical port timing.
- 12 a. Explain briefly about the types of scavenging pump.
OR
b. Explain in detail the merits and demerits of various scavenging processes.
- 13 a. With neat sketch explain magneto coil ignition system.
OR
b. Explain briefly about the construction and working principle of kick start mechanism.
- 14 a. Explain the following i. Capacitive Discharge Ignition. ii. Transistorised Assisted Ignition system.
OR
b. Explain in detail the working of hydraulic shock absorber with neat sketch.

p.t.o

2

15 a. With neat sketch explain the working of centrifugal clutch.

OR

b. With neat sketches discuss about different types of frame.

16 a. Briefly explain about panel meters and controls on handle bar.

OR

b. Explain about the tube and tubeless tyre with a neat sketch.

17 a. With neat sketch explain the construction and working of air braking system.

OR

b. Describe the construction details of various cross ply tyres.

18 a. Draw the layout of three wheeler and mark its parts along with their functions.

OR

b. Compare the performance characteristics of any four scooters of same category by different manufacturers.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Explain in detail about the construction and working principle of four stroke engine.

OR

b. With the aid of neat sketch explain valve timing and port timing of four stroke petrol engine.

20 a. With neat sketch explain electronic ignition system.

OR

b. Explain in detail about pneumatic braking system.

SL.NO:1087

SL.NO:1079

SUBJECT CODE:17ATSE04

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
AUTOMOBILE ENGINEERING

ELECTIVE-VEHICLE MAINTENANCE

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Illustrate a typical trip sheet of vehicle.
- 2 List out the various methods of cleaning.
- 3 How is the toe-in of wheels checked and adjusted?
- 4 Why a thermostat is required in a vehicle cooling system?
- 5 What are the various cleaning methods to be adopted for the cleaning of major engine components?
- 6 What are the types of pliers?
- 7 What is the importance of the maintenance of propeller shaft?
- 8 What are the different tests conducted to check the DC generator?
- 9 What grade of Lubricating oil is used for Engine?
- 10 What happens if the fan belt gets loose?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain scheduled and breakdown maintenance of an automobile.
OR
b. Discuss briefly the scheduled maintenance and to prepare a maintenance checklist.
- 12 a. Describe in detail on Service station and Garage with required layout.
OR
b. What are the safety precautions to be considered in the maintenance of an automobile?
- 13 a. What is the procedure for testing connecting rod for bend and twist? How valve clearance is adjusted in a four cylinder engine?
OR
b. Describe a detailed note on tools and special instruments employed in Maintenance of Engine.
- 14 a. Discuss in detail on general maintenance procedure carried out on engine components.

p.t.o

OR

- b. Explain the different methods used for wheel balance. Describe the wheel alignment for a tubeless tyre.

- 15 a. Explain the causes and remedial actions for any four steering system failures.

OR

- b. Enumerate a detailed note on overhauling of suspension system and wheel and tyres.

- 16 a.

Explain the procedure to conduct cadmium test and hydrometer test on automotive batteries.

OR

- b. Explain in detail on various testing methods to be carried out in a lead acid battery with required neat sketches.

- 17 a. Enumerate in detailed note on sealed beam head lamp and electrical horn circuit with neat sketch.

OR

- b. What are the important precautionary means we have to take in lubrication system?

- 18 a. Explain in detail on causes and remedial actions on engine trouble failures.

OR

- b. Elaborate a detailed note on chassis lubrication.

Answer ALL questions**PART-C (2 x 15 = 30)**

- 19 a. List out the most common problems that will affect the ignition system of a petrol engine and explain the maintenance procedure for the ignition system.

OR

- b. Explain scheduled maintenance along with its documents, and general servicing that are carried out during first servicing of a car.

- 20 a. What is meant by double declutching? Explain clutch free play how it is to be adjusted.

OR

- b. What is meant by calibration of fuel injection pump? Explain calibration of FIP and tuning of engine for optimum fuel supply.

SL.NO:1070

SUBJECT CODE:17ATSE03

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
AUTOMOTIVE ENGINEERING

ELECTIVE - AUTOMOTIVE CHASSIS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Recall the functions of each frame with simple sketch
- 2 What is the function of a bumper?
- 3 Name two basic types of constant velocity joints.
- 4 Define Toe in and toe out and write its importance.
- 5 List the advantages of radial tyre over bias ply tyre.
- 6 What is a constant velocity universal joint?
- 7 State the need of suspension system in a vehicle.
- 8 Report how does skidding take place.
- 9 What is stopping distance? What are the parameters influencing it?
- 10 Compare rigid axles suspension with independent suspension.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Illustrate any one type of the Steering systems with neat sketch.
OR
b. Demonstrate semi-floating axle.
- 12 a. (i) With neat sketch explain the various parts in a front axle assembly. (ii) Explain the fully floating axle assembly with neat diagram.
OR
b. Illustrate with the help of neat sketch the construction and working principle Telescopic type of shock absorbers.
- 13 a. Demonstrate about hydraulic brake system with neat sketch.
OR
b. Compare power assisted brake system and servo brake system

(P.T.O)

14 a. Determine the different loads acting on chassis and explain briefly.

OR

b. With suitable diagram explain Ackerman's steering geometry.

15 a. Demonstrate universal joint and Rzeppa joint.

OR

b. Categorize the rear axle construction of Hotchkiss drive with neat sketch.

16 a. Describe about double reduction and twin speed final drives with sketches.

OR

b. Categorize the different types of wheels and with neat sketch.

17 a. Evaluate the types of rear axles with neat sketch.

OR

b. Discuss in detail about the different types of wheels and tyres with respect to construction, advantages and disadvantages.

18 a. Illustrate with neat sketch about types of drum brake systems.

OR

b. Illustrate with neat sketch about types of disc brake systems.

**Answer ALL questions
PART-C (2 x 15 = 30)**

19 a. Construct with the help of neat sketch the construction and working principle of Integral type power steering

OR

b. Compose different types of final drive, Illustrated with Schematic diagram.

20 a. Explain with sketch the construction and working of differential unit.

OR

b. Explain with neat sketch about Anti-Lock Braking System

SL.NO: 1053

SUBJECT CODE:17ATEC02

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB-2022
AUTOMOBILE ENGINEERING

ELECTIVE - NEW GENERATION AND HYBRID VEHICLES

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 What are near zero emission vehicles?
- 2 What are the factors considered for analysing the environmental impact of vehicles?
- 3 What is complex hybrid system?
- 4 What are the different methods to produce Rotating magnetic field ?
- 5 What is field oriented control?
- 6 Why capacitor is called energy storage device?
- 7 State IC engine and Electric motor operation with speed coupling of series hybrid vehicle.
- 8 What is power follower control?
- 9 List the possible combination of power sources in Hybrid vehicles.
- 10 List the possible ways of combining power flow to meet driving requirements.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain the environmental Analysis of hybrid vehicles.
OR
b. Explain the use of Solar photovoltaic in the storage of energy for Hybrid electric vehicles.
- 12 a. Explain the Techniques to Enhance Hybrid performance in detail.
OR
b. Briefly explain Rolling resistance to the motion of vehicle.
- 13 a. Explain the need for gear box in Hybrid electric vehicles.
OR
b. State and explain the dynamic equation of vehicle motion.

(p.t.o)

14 a. Explain in detail about series hybrid drive train configuration.

OR

b. Explain in detail about the possible energy flow route of hybrid drive train.

15 a. Explain in detail about step down operation.

OR

b. Discuss the advantages and disadvantages of permanent magnet motors.

16 a. Explain the concept of continuous torque production in motor.

OR

b. Briefly explain the Energy Consumption in Braking.

17 a. With a neat sketch explain Aluminium air battery in detail.

OR

b. Explain in detail about range extender Hybridness.

18 a. Briefly explain the concept of Electric motor sizing in detail.

OR

b. Briefly explain the concept of New York City Cycle (NYCC) in detail.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Explain the general configuration of Electric vehicle in detail.

OR

b. Draw a general layout of a EV and discuss the transmission characteristics.

20 a. Explain in detail about the construction and working of Induction motor.

OR

b. Explain in detail about the Electric Vehicle (EV) Drivetrain on Power Source Configuration.

SL.NO: 1052

SUBJECT CODE:17ATCC13

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB-2022
AUTOMOBILE ENGINEERING

ENGINE AND VEHICLE MANAGEMENT SYSTEM

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Define microcontroller.
- 2 What is hall effect sensor?
- 3 Mention the various liquid level sensors.
- 4 Define the stoichiometric air fuel ratio. Mention the Stoichiometric air-fuel ratio of petrol fuel.
- 5 What are the important requirements of fuel injection system?
- 6 Mention the various components of air bag safety system.
- 7 What are the advantages of ABS?
- 8 Mention the reaction involved in air bag system.
- 9 Write short note on adaptive control.
- 10 Write about the reduction catalytic reaction in 3-way catalytic converter.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain about the open loop and closed loop control strategies.
OR
b. Compare both microcontroller and microprocessor.
- 12 a. With neat sketches, explain how the crank and cam position sensors are used to control timings of spark and fuel injection.
OR
b. Explain about the knock sensor used in SI engine management.
- 13 a. Explain on wheel speed sensors in motor vehicles and its functions.
OR
b. Write short note on 1. Knock sensor, 2. Rail Pressure sensor.

(p.t.o)

14 a. With neat sketch, explain the MPFI engine control.

OR

b. Draw the block diagram for GDI engine with electronic control. Mention clearly the control signals between ECU and Sensors-Actuators.

15 a. Explain about the common rail GDI fuel supply system.

OR

b. With neat sketch, explain the common rail fuel injection system.

16 a. Explain about IMV in electronically controlled diesel fuel injection system.

OR

b. Explain about the split fuel injection strategy in diesel fuel supply system.

17 a. With neat sketch, explain the working of power steering system.

OR

b. Explain about the construction and working of seat belt locking system.

18 a. Explain about air bag diagnosis using OBD tool.

OR

b. Explain about the fuel control map.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. With neat sketches explain: 1. Fuel Tank pressure sensor, 2. Oxygen sensor.

OR

b. Explain about the electronically control suspension system.

20 a. Explain with neat sketch the construction and working of oxygen sensor.

OR

b. With neat sketches, explain about the various diesel fuel injection pumps.

SL.NO: 1046

SUBJECT CODE:17ATEC03

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB-2022
AUTOMOBILE ENGINEERING

ELECTIVE - MODERN AUTOMOBILE ACCESSORIES

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 What is the function of a carburetor ?
- 2 Define chassis.
- 3 What are the basic components of suspension system ?
- 4 Explain about power window in cars ?
- 5 Components of traction control?
- 6 Write about tubular space frame.
- 7 Write about pneumatic suspension system.
- 8 Write about Air ducts?
- 9 Write about active exhaust noise reduction.
- 10 What is electronic stability control?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain in detail the open loop system and closed loop system with neat sketch.
OR
b. Write short notes on the following (i)Fuel injector. (ii) Engine control unit. (iii) automobile sensors.
- 12 a. Explain in detail about the diesel particulate filter.
OR
b. Explain in detail about active suspension control system with sketch.
- 13 a. Explain in detail about pneumatic suspension control system with sketch.
OR
b. Explain with neat sketch the construction of ladder chassis frame and also give its advantage and disadvantage.

(p.t.o)

14 a. Explain in detail about air-conditioning system?

OR

b. Draw and explain the following in detail with neat sketch (i) dry air mass flow (ii) air heating .

15 a. Explain in operation principle of refrigeration cycle with neat sketch.

OR

b. Explain in detail about air-blending heating system with neat sketch.

16 a. Explain in detail about the adaptive cruise control in automobiles.

OR

b. Give the details of navigation system in automobiles.

17 a. Explain driver information system in modern automobiles.

OR

b. With neat sketch explain about the seat belt tightening system.

18 a. Explain the principle and working of anti-lock braking system with sketch.

OR

b. Explain traction control system in modern automobiles.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Explain about Intelligent transportation application?

OR

b. Explain the Principles of vehicle air conditioning and heating system with neat sketch

20 a. Give short notes on (a) traction control (b) braking control (c) steering control

OR

b. Explain the driver information system through GPS.

SL.NO:1028

SUBJECT CODE:17ATCC14

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB - 2022
AUTOMOBILE ENGINEERING

VEHICLE MAINTENANCE

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Illustrate a typical maintenance log sheet of an automobile.
- 2 How to record maintenance schedule?
- 3 Why does steering jerk while turning?
- 4 List the body repair tools.
- 5 What are the preliminary actions to be taken before taking out the engine from a vehicle?
- 6 What is a hydrometer and how can it to be used?
- 7 What are the terms adjusted in wheel alignment?
- 8 What is specific gravity test?
- 9 State the causes for overcharging trouble in a generator.
- 10 What is the use of Radiator in the cooling system?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain scheduled and breakdown maintenance of an automobile.
OR
b. Discuss briefly the scheduled maintenance and to prepare a maintenance checklist.
- 12 a. With necessary illustration elaborate in detail on Layout of Periodic maintenance check list.
OR
b. Write the step-by step procedure of overhauling a multi-cylinder petrol engine.
- 13 a. Give a detailed account of the work to be carried out for Engine tune-up and top overhauling.
OR
b. Describe a detailed note on tools and special instruments employed in Maintenance of Engine.
- 14 a. Discuss in detail on general maintenance procedure carried out on engine components.

p.t.o

OR

- b. Describe the major problems that will affect the performance of disc type clutch system of a vehicle. How they can be rectified?

- 15 a. Discuss the various troubles experienced in mechanical type gear box and explain their causes and remedies.

OR

- b. Enumerate a detailed note on overhauling of suspension system and wheel and tyres.

- 16 a. Explain in details battery troubles and their remedies.

OR

- b. Explain about the testing methods for checking electrical components

- 17 a. Elaborate in detail on testing methods to be carried out on DC generator field windings with required neat sketches.

OR

- b. Write down a brief note on trouble shooting technique to be carried out in electric horn and wiper motor mechanism.

- 18 a. Explain the various failures in the cooling system and discuss the causes and remedies for them.

OR

- b. Elaborate a detailed note on chassis lubrication.

Answer ALL questions**PART-C (2 x 15 = 30)**

- 19 a. List out the most common problems that will affect the ignition system of a petrol engine and explain the maintenance procedure for the ignition system.

OR

- b. Discuss briefly about Chassis lubrication and the workshop facilities for diesel transport vehicles maintenance.

- 20 a. Explain any four troubles experienced in hydraulic brake system and explain how these troubles can be rectified.

OR

- b. What are the possible causes and remedy for engine overheating due to cooling system? State causes and remedy for not building up of lubricating oil pressure.
