

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE COMPREHENSIVE EXAMINATION, MAY 2019

Course Code: AU352

Course name: COMPREHENSIVE EXAM (AU)

Max. Marks: 50

Duration: 1 Hour

- Instructions:** (1) Each question carries one mark. No negative marks for wrong answers
(2) Total number of questions: 50
(3) All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.
(4) If more than one option is chosen, it will not be considered for valuation.
(5) Calculators are not permitted

PART A- COMMON COURSES

1. The slope of the surface $z = xe^{-y} + 5y$ in the x-direction at the point (4,0) is
a) 0 b) -1 c) 1 d) 2
2. The solution of $(D^2 + 1)y = 0$ is
a) $c_1 \cos x + c_2 \sin x$ b) $c_1 e^x + c_2 e^{-x}$ c) $(c_1 + c_2 x)e^x$ d) $(c_1 + c_2 x)e^{-x}$
3. A simple spring mass vibrating system has a natural frequency of N. if the spring stiffness is halved and the mass is doubled then the natural frequency will be
a) N b) 0.5N c) 2N d) 0.25N
4. The proportion of second moment of area about centroidal axis to second moment of area about base of a rectangle will be
a) 0.3 b) 0.1 c) 0.25 d) 0.08333
5. An algorithm for scheduling a set of project activities:
a) Critical Path Method b) Crucial Practicing Method c) Centre Processing Method d) None
6. The fundamental rethinking and radical redesign of the business process to achieve dramatic improvements in critical contemporary measures of performances such as cost, quality, service and speed:
a) Recycling b) Quality engineering c) Contemporary design d) Re - engineering
7. Composting is
a) anaerobic degradation process for solid waste treatment b) anaerobic treatment for sullage c) aerobic treatment for sewage d) an aerobic degradation process for solid waste treatment
8. The rating system of India which is focussed on conservation and efficient energy use is

- a) GRIHA b) LEED India c) IGBC d) BEE
9. In orthographic projection, each projection view represents how many dimensions of an object?
a) 1 b) 2 c) 3 d) 0
10. The front view, side view and top view of a cylinder standing on horizontal plane base on horizontal plane.
a) circle, rectangle and rectangle b) rectangle, rectangle and circle c) rectangle, circle and rectangle d) circle, triangle and triangle

PART B- CORE COURSES

11. The reference fuels for knock rating of spark ignition engines would include
a) Iso-octane and alpha-methyl naphthalene b) Normal octane and aniline c) Iso-octane and normal hexane d) Normal heptane and iso-octane
12. In a four-stroke cycle petrol engine, the charge is ignited at
a) 30° before top dead centre b) 30° after top dead centre c) 30° before bottom dead centre d) 30° after bottom dead centre
13. Theoretically, a four-stroke cycle engine should develop _____ power as that of a two-stroke cycle engine.
a) Half b) Same c) Double d) Four times
14. The theoretically correct mixture of air and petrol is
a) 10:1 b) 15:1 c) 20:1 d) 25:1
15. The coolant to be employed in liquid cooling system should have
a) Low freezing temperature b) A high boiling point c) A large latent heat of vaporisation d) All of the mentioned
16. The object of providing masked inlet valve in the air passage of compression ignition engines is to
a) Enhance flow rate b) Control air flow c) Induce primary swirl d) Induce secondary turbulence
17. Commonly used anti-freeze materials are
a) Kerosene b) Sugar solution c) Calcium or magnesium chloride d) All of the mentioned
18. Ackermann steering mechanism is used for
a) Reducing steering hardness b) Keeping equal angle of turn of front wheels c) Reducing steering angle d) Getting correct steering angle
19. The included angle is the sum of the
a) Camber and castor b) Castor and SAI c) Camber and d) Camber and

- SAI
toe in

 20. Component of wheel cylinder which seals the brake fluid is
 - a) Piston
 - b) Dust cover
 - c) Spring
 - d) Cup
 21. The function of a stabilizer in an automobile is to decrease the tendency to
 - a) Pitch
 - b) Dip
 - c) Roll
 - d) Yaw
 22. The type of rear axle used on truck is
 - a) Semi-floating
 - b) Fully-floating
 - c) Three-quarter floating
 - d) None of the above
 23. Double reduction final drives help to
 - a) Increase speed
 - b) Increase power
 - c) Increase torque
 - d) Decrease torque
 24. Torque transfer at an angle is provided on propeller shaft by using
 - a) Centre support bearing
 - b) Slip joint
 - c) Universal joint
 - d) Differential
 25. Glow plugs are used in diesel engine for
 - a) Easy start-up of engine
 - b) Providing turbulence
 - c) Fuel injection
 - d) All of the above
 26. The reason for supercharging in any engine is to
 - a) Reduce weight and bulk for a given output
 - b) Increase fuel economy
 - c) Increase power
 - d) Increase thermal efficiency
 27. F/A ration required for formation of Soot is
 - a) 1
 - b) less than 0.5
 - c) greater than 2
 - d) between 1 and 2
 28. The cam shaft of a four stroke I.C. engine running at 1500 rmp will run at
 - a) 1500 rpm
 - b) 750 rpm
 - c) 3000 rpm
 - d) Any value independent of engine speed
 29. Lambda sensor measure _____content in exhaust gas
 - a) NOx
 - b) Carbon Monoxide
 - c) Oxygen
 - d) Hydrocarbon
 30. Which type of air motion has its rotational component parallel to cylinder axis
 - a) Swirl
 - b) Squish
 - c) Tumble
 - d) Turbulence
 31. The purpose of a _____ is to provide automatic control of the idling and maximum speeds to the engine.
 - a) Governor
 - b) Nozzle
 - c) Throttle
 - d) Injector
 32. In four-wheel drive there is
 - a) No live axle
 - b) One live axle
 - c) Two live axles
 - d) One dead axle
 33. Calculate speed of driving shaft in compound gear train, if the drivers have 50, 60, 80 and 100 teeth and followers have 18, 40, 60 and 80 teeth. Speed of driven shaft is 150 rpm

- a) 21.73 rpm b) 30.23 rpm c) 19.77 rpm d) None of the above
34. In which type of gear trains, shaft axes which are mounted by gear wheels have relative motion between them?
- a) Compounded gear train b) Simple gear train c) Epicyclic gear train d) Reverted gear train
35. The minimum number of teeth on pinion to avoid interference in rack and pinion is
- a) 15 b) 18 c) 21 d) 24
36. Tandem drive vehicle has (have)
- a) No drive axle b) Two drive axles at front c) One drive axle at rear d) Two drive axles at rear
37. In gears, arc of contact is
- a) Arc of approach + Arc of recess b) Arc of approach – Arc of recess c) Arc of approach / Arc of recess d) Arc of approach x Arc of recess
38. Which one of the following is a solid-state joining process?
- a) Gas tungsten arc welding b) Resistance spot welding c) Friction welding d) Submerged arc welding
39. The maximum possible draft in cold rolling of sheet increases with the
- a) Increase in coefficient of friction b) Decrease in coefficient of friction c) Decrease in roll radius d) Decrease in roll velocity
40. Two streams of liquid metal which are not hot enough to fuse properly result into a casting defect known as
- a) Cold shut b) Swell c) Sand wash d) Scab
41. Which of the following components is mainly manufactured by performing metal forging?
- a) Piston b) Engine block c) Connecting rod d) Crankcase
42. Which of the following process comes under mechanical machining?
- a) USM b) EDM c) LBM d) PAM
43. PCR is a measure of
- a) The ability of the process to manufacture the products that meet the specifications b) The ability of the operator to remove the variability c) The probability of the mean to be equal to the USL d) The probability of the mean to be equal to the LSL
44. Which one of the following RP technologies uses solid sheet stock as the starting material?
- a) droplet deposition manufacturing b) fused-deposition modelling c) laminated-object manufacturing d) selective laser sintering
45. Which one of the following is not a method to improve visibility
- a) Decrease the thickness of A Pillar b) Increase the Height of A Pillar c) Increase the Area of Wind shield d) Decrease the area of Wind Shield

46. Which one of the following layouts is not used in motor vehicles
- a) Front engine front drive b) Front engine rear drive c) Rear engine front drive d) Rear engine rear drive
47. Materials using for Vehicle Frame
- a) Steel b) Carbon Fibre c) Aluminium d) All the Above
48. If ground clearance of a car is increased then it will experience
- a) Negative lift b) Positive lift c) Drag increase d) Drag decrease.
49. The Part of the vehicle holds the passengers and the cargo to be transported is known as
- a) Hull b) Chassis c) Cabin d) Sedan
50. A traction control system (TCS) in automobiles controls the
- a) Engine power during acceleration b) Torque that is transmitted by the tyres to the road surface c) Stopping distance in case of emergency d) Vibrations on the steering wheel
